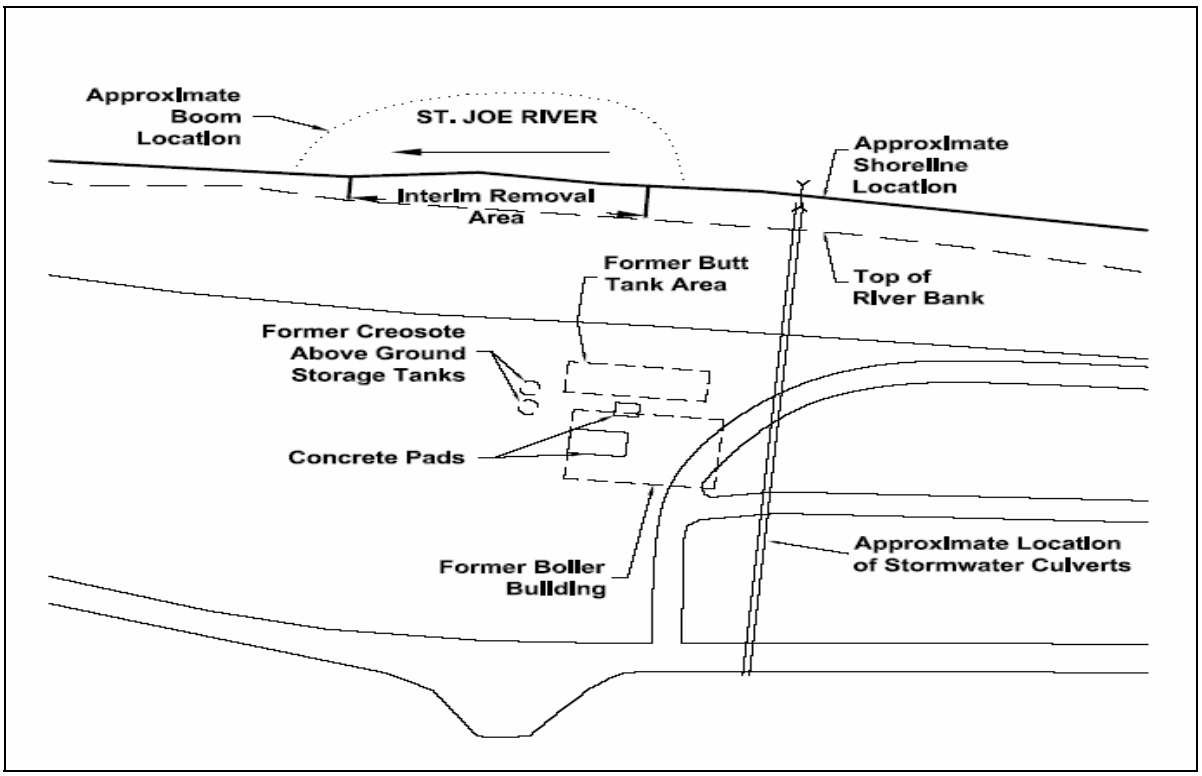
St. Maries Creosote Site
St. Maries, Idaho

Revised Proposed Plan

December 2006

US Environmental Protection Agency
Region 10



St. Maries Creosote Site Area View

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1.0 Purpose of Revised Proposed Plan

The purpose of this Revised Proposed Plan is to:

1) propose a new clean up plan (preferred alternative) for the St. Maries Creosote Site (Site) located in St. Maries, Idaho,

2) describe the rationale used to develop the new preferred alternative,

3) highlight the information in the Administrative Record which was used to develop the new preferred alternative, especially the Remedial Investigation (RI), Baseline Risk Assessment (BLRA), and the Feasibility Study (FS) which includes new supplemental information (revised FS),

4) describe and compare the new preferred alternative to the previous preferred alternative proposed in the July 2005 Proposed Plan,

5) solicit public comments on the new preferred alternative as well as other clean up alternatives considered for the Site.

In July 2005, the Environmental Protection Agency (EPA) issued a Proposed Plan (2005 PP) for the Site which described several clean up alternatives (remedies) for the Site and identified Alternative 8 as the preferred alternative. During the public comment period, EPA received comments on the 2005 PP including a proposal for a new alternative submitted by ARCADIS G&M Inc. on behalf of the City of St. Maries (City), Carney Products Co. Ltd. (Carney Products), and B.J. Carney and Company. The City and Carney Products agreed to further develop this alternative, which later became known as Alternative 9, in a Supplemental Feasibility Study. Both parties had previously conducted a Remedial Investigation and Feasibility Study for the Site pursuant to a 2001 Administrative Order on Consent (AOC). After receiving the Supplemental Feasibility Study and further technical development of Alternative 9 by EPA, ARCADIS, and the Coeur d'Alene Tribe (Tribe), EPA determined that a new preferred alternative was appropriate for the Site. EPA is issuing this Revised Proposed Plan to describe the new preferred alternative, Alternative 9A, and to solicit input from the public.

This Revised Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA), as lead agency, in consultation with the Coeur d'Alene Tribe (Tribe). It is being issued as part of EPA's public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, or the Superfund Statute) of 1980, as amended, and Section 300.430(f) (2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Changes to this new preferred alternative may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action (remedy). The final decision regarding the selected remedy will be made after the EPA has taken into consideration

all comments made during the public comment period. The final decision, as well as EPA's responses to comments, will be contained in a Record of Decision (ROD) issued by the EPA.

2.0 Community Role in Selection Process

The EPA relies on public input to ensure community concerns are considered in selecting an effective remedy for each Superfund site. The Administrative Record for this Site, which includes such documents as the Baseline Risk Assessment (BLRA), the Remedial Investigation (RI) Report, the Feasibility Study (FS) Report including supplements, this Revised Proposed Plan, and other supporting documentation is available to the public for review during the thirty-day public comment period. All information considered in the development of this response action is included in the Administrative Record. The public may review the Administrative Record at the St. Maries Public Library, 822 W. College Avenue, St. Maries, Idaho, 208-245-3732 or at the EPA Superfund Records Center, 1200 6th Avenue, Seattle, Washington, 206-553-4494.

The thirty day public comment period is scheduled from December 6, 2006 to January 5, 2007. A public meeting is scheduled from 7:00 to 9:00 PM on December 13, 2006 at the Avista Building, 502 College Street, St. Maries, Idaho, 83861. EPA will send out a fact sheet announcing the comment period and the public meeting to the St. Maries mailing list. EPA will also place an announcement in the local newspaper. Comments received at the public meeting and written comments submitted during this comment period as well as the 2005 PP comment period will be addressed in the Responsiveness Summary. This will be attached to the Record of Decision (ROD).

Please address all written comments to:

Joe Wallace, Remedial Project Manager
U.S. EPA, Region 10
1200 6th Avenue ECL-115
Seattle, WA 98101-1128
Telephone: 1-206-553-4470 or
Toll-free: 1-800-424-4372
Email: wallace.joe@epa.gov

To find out how to get involved or for general Site information, please contact:

Debra Sherbina, Community Involvement Coordinator
U.S. EPA Region 10
1200 6th Avenue ETPA-081
Seattle, WA 98101-1128
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Toll-free: 1-800-424-4372
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3.0 Site Background

St. Maries (population 2,800) lies along the southern bank of the St. Joe River (river) in Benewah County, Idaho. The Site lies approximately 2,600 feet downstream from the confluence with the St. Maries River. It is owned by the City and Carney Products and is situated within the boundaries of the Coeur d'Alene Indian Reservation (see Figure 1). The Site is located on the river side of a flood control levee and was historically used as a pole treating facility where wooden poles were treated with creosote.

Creosote, derived from coal tar, has been the most widely used wood preservative in the United States. Creosote is a mixture consisting of aromatic hydrocarbons, anthracene, naphthalene, and phenanthrene derivatives. At least 75% of the mixture consists of polynuclear aromatic hydrocarbons (PAHs). Seven of these PAH compounds are classified as carcinogenic: [benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoroanthene, dibenz(a,h)anthracene, chrysene, and indeno(1,2,3-cd)pyrene)].

From 1939 through 1964, the Site was used for peeling and treating logs to be used for poles. The bottom portions of the poles were soaked in large butt vats filled with creosote. The poles were treated to prevent them from rotting once installed into the ground. The butt vats were located in the uplands approximately 50 to 75 feet from the bank of the St. Joe River. Historically, as the treated poles were loaded onto rail cars, creosote dripped onto the soil around the butt vats and rail cars. Additionally, dumping of process wastes, including creosote, may have occurred along the riverbank. Historical photographs show that during operations, three treating tanks, two aboveground storage tanks, and a wood-fired boiler building were located in the main treatment area. Site features are shown in Figure 2.

In December 1998, the City reported an oily sheen on the riverbank and in the water of the St. Joe River to the Federal National Response Center. Following discovery of the sheen, the City and Carney Products conducted a removal action at the Site pursuant to a CERCLA Unilateral Administrative Order with EPA oversight. The action, completed in early 1999, included excavation and removal of approximately 195 tons of debris and creosote-impacted soil along the bank of the St. Joe River in the area of the observed sheen. Since the removal, small areas of sheen have been noted occasionally on the river surface near the removal area. A containment boom and adsorbent pads have been installed to contain the sheens.

Several businesses, including B.J. Carney & Company, were involved in the operation and maintenance of the creosote treating operation from approximately 1939 to 1964, when the treatment facilities were demolished and removed. Since approximately 1965, the Site and surrounding area have been used only for peeling, sorting, and storage of untreated poles. In 1982, Carney Products began operating a pole storage yard at the Site on eight company-owned acres and four acres leased from the City. Carney Products shut down operations in early 2003.

B.J. Carney & Company, Carney Products, and the City have been identified by EPA as potentially responsible parties (PRPs) and are liable for cleanup costs at the Site.

Investigations were conducted by the City, Carney Products, and EPA from 1998 to 2000. The results of these investigations indicated that sediments, soil, and groundwater had been contaminated by the creosote pole treating operations. In December 2000, the Site was proposed for listing on the National Priorities List (NPL). Although EPA has not proceeded to finalize listing of the Site, investigations and cleanup activities have been conducted in accordance with the Superfund statute and the regulations set forth in the NCP.

The City and Carney Products, with oversight from EPA and in consultation with the Tribe, entered into an Administrative Order on Consent (AOC) under CERCLA in August 2001. Under the AOC, the City and Carney Products agreed to perform a Remedial Investigation, Baseline Risk Assessment, and Feasibility Study for the Site (RI/BLRA/FS). The RI and BLRA were begun in August 2001 and focused on all the contaminated areas at the Site: uplands (the ground above and next to the river) where the pole treating took place, groundwater, riverbank soils, nearshore and offshore sediments, and surface water. The FS was begun in January 2003. The City and Carney Products added supplemental information to the FS in January and July, 2006 (revised FS) which provided the basis for Alternative 9A.

3.1 Site Characteristics

The Site is located just north of downtown St. Maries. The former creosote treating operation covered approximately 0.7 acre. Concrete pads and foundations mark the former location of treatment operations. An abandoned railroad track is located on the north side of the former treatment area. The highest creosote concentrations were found in soils beneath the former treatment area. Creosote was observed in soil borings completed between the treatment area and the river, in hand auger borings completed in soils along the riverbank, and in surface and subsurface sediments. A plume of contaminated groundwater extends north, approximately 175 feet (ft), from the treatment area to the river.

The Site lies on the south side of the St. Joe River in a flat-lying area at elevation 2,135 ft above sea level. The river channel at this point is about 300 ft wide. The deepest portion of the channel ranges from 25 to 31 ft. in depth. The mean annual flow for the St. Joe River ranges from 1,000 to 3,800 cubic feet per second (cfs). The St. Joe River flows into the southern end of Lake Coeur d'Alene, which in turn drains into the Spokane River. Flow regulation at the Post Falls Dam on the Spokane River controls water levels in Lake Coeur d'Alene and the lower portion of the St. Joe River, including the reach adjacent to the Site. Except during flood conditions, water in the St. Joe River near the Site is slack.

Immediately to the south of the Site is an earthen flood-control levee protecting the City from seasonal floodwaters of the St. Joe River. The estimated frequency of Site flooding is five to ten times per decade. In the early 1940s, the US Army Corps of Engineers (USACE) erected dikes along the southern bank of the St. Joe River to minimize damage due to flooding. Since then, this levee system has grown in height and extent so that there are now eight levee districts within

the City. The two major levees, Meadowhurst and Riverdale, are 14,000 and 11,000 feet long, respectively, and protect large tracts of the City. With the construction of levees, small-scale flooding within the City has been virtually eliminated. However, the levee system does not protect the Site from flooding since the Site lies between the river and the levees. The levee system protects St. Maries up to 2,149 ft above sea level, 7 ft above the 100-year flood level. At the 100-year flow rate of 69,000 cfs, the flood level of the St. Joe River is 2,142 ft above sea level at its confluence with the St. Maries River, which is approximately seven feet above the Site elevation.

The Site is situated in a floodplain comprised of interbedded unconsolidated sand, silt, and clay to a depth of at least 65 ft. A veneer of fill material 2 to 5 ft thick overlies the Site and armors much of the southern riverbank. Native alluvial sediments underlie the fill and include five recognizable stratographic units: upper silt unit (15 to 20 ft thick), upper interbedded unit (12 to 21 ft thick), sand unit (13 to 16 ft thick), lower interbedded unit (0 to 10 ft thick), and lower silt unit (at least 10 ft thick). The surface of the deepest unit (the lower silt unit) generally slopes to the northeast, towards the river. The lower silt unit is acting as an aquitard for the groundwater above.

The depth to groundwater varies seasonally, ranging from 2.5 to 7 ft below ground surface (bgs) except during periods of flooding. During most of the year, groundwater flow is northward toward the river. However, the groundwater flow direction varies in response to river stage and during the summer when the river stage is high, groundwater flow is southward. Temporary and local reversals in flow direction (southward from the river to the Site) also occur when the river rises during floods. Generally, groundwater in the upper silt unit flows north to the river at a rate of approximately 38 to 136 feet per year. Groundwater in the sand unit flows north to the river at a rate of approximately 313 feet per year.

Near the shore, the river bottom generally consists of unconsolidated fine-grained sediments with a high percentage of natural organic material. The central channel of the river consists primarily of fine to medium sand, overlain with woody debris and logs. Native sediment under the surface substrate consists of coarser-grained, compacted material, with trace silts and clays present.

3.2 Conceptual Site Model

Significant concentrations of creosote constituents have been found in soil and groundwater in and around the former treating area, in riverbank soils, and in shoreline, nearshore, and offshore sediments. A conceptual site model for the Site showing how contamination has moved from the uplands to the river is shown in Figure 3.

Creosote was released at the Site through spills, leaks, drips, and possibly the disposal of waste materials. The major source area is the former treating area. There may have also been disposal of wastes at the riverbank that contributed to the contaminants observed in the bank soils and shoreline and nearshore sediments. Creosote released in the upland portion of the Site has migrated from the surface soils to subsurface soils and to groundwater. Creosote has moved through soil both in the dissolved phase and as a dense non-aqueous phase liquid (DNAPL).

Dissolved phased constituents of creosote have contaminated groundwater at concentrations greater than drinking water standards. This contaminated groundwater migrates towards the river and is released to the river sediments and surface water. These constituents have also been shown to accumulate in sediments to levels that could harm aquatic and benthic organisms.

In DNAPL form, creosote constituents will move down under the force of gravity through porous soils until they reach a denser, confining layer (e.g., silt layer). They can then move horizontally along the surface of the confining layer. DNAPL will also move horizontally through more porous, thinner "lenses" of fine-grained sands. DNAPL was observed in sand lenses at depths of up to 49 ft bgs and at shallower depths of 9 to 11 ft bgs. It appears that creosote in this shallower zone has moved laterally towards the river, resulting in releases of creosote found in the sediment and surface water. The movement of creosote through these migration pathways and the possible disposal of waste materials along the riverbank resulted in high concentrations of creosote in shoreline and nearshore sediments. Over time, periodic flooding events have mobilized these sediments and re-deposited them in the river as far as 900 ft downstream of the Site.

Creosote in the upland soil, groundwater, and sediments continues to be as a source of contamination to the environment.

3.3 Results of Site Investigations

Since 1999, several phases of sampling have been conducted at the Site. Samples have been collected from soils, groundwater, sediment, and surface water to help define the extent of contamination. The constituents of creosote which have been identified as contaminants of concern (COCs) are listed in the first columns of Tables 4 through 7. High concentrations of COCs were found in many samples collected from the Site. The levels of unacceptable risks from exposure to these chemicals have been assessed and are discussed in Section 4.0.

Most of the COCs are polynuclear aromatic hydrocarbons (PAHs) which are the dominant constituents of creosote. The concentrations of PAHs vary substantially with depth and relative distance from the treatment area. Soil samples were collected using soil borings, test pits, direct push probes, and hand augers. The maximum detected concentration of all PAH compounds (total PAH) at the Site was 33,503 milligrams per kilogram (mg/kg) found in a sample collected from soils along the riverbank at a depth of 1 to 2 ft. This area of contaminated soil was excavated during a removal action in early 1999. The highest concentration of total PAH detected in soils remaining in the upland area of the Site is 15,094 mg/kg found in a sample collected from soils at a depth of 2 ft below the former treatment area. Creosote has been found in soil at depths up to 54 ft beneath the former treatment area.

Three rounds of groundwater sampling were conducted for the RI. Samples were collected from six wells in the shallow aquifer zone (upper silt unit from 5 to 20 ft bgs) and five wells in the deep aquifer zone (sand unit from 35 to 55 ft bgs). PAHs were detected in many of the samples. The maximum detected groundwater concentration of total PAH was 11,449 micrograms per liter (µg/L) collected from a shallow aquifer well located midway between the treatment area and

the river. This concentration greatly exceeds the summation of the concentrations in the EPA Region 9 preliminary remediation goals (PRGs) of 4000 μg/L as well as a summation of those concentrations determined to be protective of sediments of approximately 240 μg/L (Table 5). Based on the sampling results, a plume of contaminated groundwater extends from the treatment area to the river and is estimated to contain about 900,000 gallons of water.

Because of the Site's close proximity to the river, dissolved PAHs in groundwater could migrate and partition to river sediment causing a potentially unacceptable risk to benthic organisms. To evaluate this potential, groundwater PAH concentrations sampled from the Site were used as input parameters to EPA's BIOSCREEN model to estimate the groundwater PAH concentrations as it enters the river. The results from the model were then used to calculate an estimated sediment concentration using sediment-water partitioning coefficients. Results show that with no cleanup, after 30 years, naphthalene could accumulate in sediments to concentrations (21.8 mg/kg) that are more than 10 times the concentrations toxic to benthic organisms [2.1 mg/kg, the lowest apparent effects threshold (LAET)].

In the river, surface sediment [0 to 10 centimeters (cm) in depth] samples were collected from 18 locations and subsurface sediment samples (up to 14 ft bgs) were collected from 10 locations. The highest concentration of total PAH detected in surface sediment was 21,000 mg/kg found in a sample collected in 2002 from the area just outside of the 1999 removal area in the nearshore sediments. The highest concentration of total PAH detected in subsurface sediment in the nearshore area was 51,709 mg/kg found at 1 ft depth in a sample collected approximately 40 ft from the riverbank removal area. This nearshore area of highly contaminated surface and subsurface sediments is estimated to extend nearly 150 ft into the river from the riverbank and nearly 400 ft along the shoreline. The concentration of total PAH at one location was as great as 991 mg/kg at a depth of 10 ft within the nearshore area.

An area of less highly contaminated surface and subsurface sediments extends beyond the nearshore area to the offshore. This offshore area extends up to 150 ft into the river from the riverbank and up to 900 ft along the shoreline, downstream from the Site. PAH concentrations in surface sediment in this offshore area are anticipated to be less than sediment cleanup levels; however, higher concentrations were observed in sediment core layers just beneath the surface layer. For example, the concentration of total PAH at the sampling location furthest downstream was 24,000 mg/kg at a depth of 2 ft. Total PAH was observed in down gradient sediments at depths of up to 7 ft.

Three rounds of surface water sampling were conducted for the RI. Surface water samples were collected from five locations in the St. Joe River. Creosote constituents were not detected at concentrations above Idaho State Water Quality Standards in any of the surface water samples collected from the river.

This Revised Proposed Plan addresses soil, groundwater, and sediment contaminated by releases of creosote from pole treating operations at the Site. These releases have resulted in a localized area of soil contamination to a depth of approximately 54 ft, a plume of contaminated groundwater that flows from the former treatment area to the St. Joe River, and an extensive area of impacted sediments in the nearshore and offshore areas. There is no significant risk of human

exposure to contaminated soils unless the surface soils are disturbed. The groundwater plume is not affecting current drinking water sources or surface water quality in the St. Joe River. Sediment dwelling aquatic organisms are currently exposed to contaminated sediments at concentrations where harmful effects can be observed.

3.4 Community Involvement

To date, EPA Region 10 has initiated several community involvement activities for the Site. On June 17 and 18, 2002, EPA staff held community interviews at the St. Maries Library to hear citizens' and local officials' comments, concerns, and suggestions about the Site. The information gathered was used to write the Site's Community Involvement Plan (CIP), published in August 2002. The CIP outlines EPA's planned community involvement activities and community members' recommendations. The CIP also lists citizens' and local officials' concerns, and how people said they wanted to be involved in the Site cleanup.

In October 2002, EPA worked closely with a local group that applied for a Technical Assistance Grant (TAG) for the Site. EPA sent the group a request for a revision to their initial application in order to meet key TAG eligibility criteria. Although the group did revise their application, ultimately several obstacles remained for meeting the eligibility criteria, and the grant could not be awarded.

In August 2005, EPA held a public comment period and public meeting in St. Maries to gather comments on the July 2005 Proposed Plan. Those comments led to a new remedial alternative being added to the list of alternatives considered and generated this Revised Proposed Plan.

EPA has compiled a 160-address mailing list and sent out five fact sheets, dated from December 2000 through September 2006. EPA also established an information repository at the St. Maries Library where interested persons can review the Site Administrative Record. A St. Maries web page was created within the EPA Region 10 web site (www.epa.gov/r10earth). Site history, contacts, technical, and community involvement information is available on this web page.

4.0 Summary of Site Risks

As part of the RI/BLRA/FS, an assessment of the human health and ecological risks at the Site was conducted. Based upon current Site use (October, 2006), there is no human exposure to the contaminants found at the Site or migrating from the Site. However, if in the future, Site groundwater is used for drinking water, or if workers or trespassers excavate or otherwise come into physical contact with subsurface soil, it would pose an unacceptable risk. For ecological receptors, there is current unacceptable risk to benthic organisms living in the river sediment from exposure to COCs. The BLRA contains detailed information on current and future risks of the Site’s contaminants to human and ecological health. The basic steps in assessing risk to humans or ecological receptors are described in Table 1.

4.1 Human Health Risk Assessment

Under EPA's oversight, the City and Carney Products prepared the BLRA using the data collected during the RI. The BLRA included an evaluation of exposure to carcinogenic and non-carcinogenic contaminants at the Site. Carcinogenic and non-carcinogenic risks for several current and future exposure scenarios were calculated. These scenarios included: on site construction/ commercial/industrial worker, on site adult/child trespasser, and a hypothetical on site resident.

The Site is in a unique situation with regard to human use. It lies on a floodway between the St. Joe River and a flood control levee. On average, the river floods the Site every other year which limits use of the Site. City zoning prohibits placement of a residence on the Site and City code prohibits the use of Site groundwater.

For human exposure scenarios, there were cancer risks (greater than 10^{-6}) for trespassers, construction/industrial workers and hypothetical on site residents. Non-carcinogenic risk (hazard index (HI) greater than 1) was limited to the use of Site ground water as a drinking water source. These human health risks are summarized in Table 2.

Table 1 – Risk Assessment Process

Risk to human health is estimated using a four-step process:

Step 1: Analyze contamination
Step 2: Estimate Exposure
Step 3: Assess Potential Health Dangers
Step 4: Characterize Site Risk.

In Step 1, EPA looks at concentrations of contaminants found at a site, as well as scientific studies regarding health effects.

In Step 2, EPA considers the different ways people might be exposed to contaminants identified at the site. EPA calculates a "Reasonable Maximum Exposure" which portrays the highest level of human exposure that could reasonably be expected to occur.

In Step 3, EPA uses the information from Step 2, combined with toxicity information of each chemical to assess potential health risks. The likelihood of any kind of cancer resulting from a Superfund site is described as a probability; for example, "1 in 10,000 chance." It means that for every 10,000 people exposed, one extra cancer *may* occur. An extra cancer means that one more person could get cancer than would normally be expected to from all other causes.
EPA considers a risk unacceptable when the total excess lifetime cancer risk for a reasonable maximum exposure exceeds 10^{-4} (1 in 10,000). Total excess lifetime cancer risks below 10^{-6}, (1 in one million), are considered acceptable.

For non-cancer health effects, EPA calculates a "hazard index." The key concept is that a "threshold level" (measured as a hazard index of less than 1) exists below which non-cancer health effects are not predicted.

In Step 4, EPA determines whether site risks are great enough to cause health problems for people at or near the Superfund site. The results of the three previous steps are combined, evaluated, and summarized. The EPA adds up the potential risks from the individual contaminants and exposure pathways and calculates a total site risk.

Table 2 - Summary of Human Health Risk

Risk Scenario	Carcinogenic Risk	Non-Carcinogenic Risk (Hazard Index)
Current on site adult recreationalist/trespasser	5×10^{-6}	0.006
Current on site child recreationalist/trespasser	1×10^{-5}	0.02
Future on site commercial/industrial workers	5×10^{-6}	0.0001
Future on site construction workers	2×10^{-6}	0.1
Future hypothetical on site resident (drinking water only)	4×10^{-3} (shallow groundwater); 1×10^{-3} (deep groundwater)	20 (shallow groundwater); 7 (deep groundwater)

4.2 Ecological Risk Assessment

An Ecological Risk Assessment indicated that the potential for significant ecological impacts at the Site is high. The BLRA indicated that there is current risk to benthic invertebrates and benthic fish in the nearshore area. Potential risk to local mink populations could not be ruled out. No significant risk was found for resident or migratory fish nor the aquatic invertebrate communities exposed primarily to the water column.

Two threatened or endangered species are known to use the St. Joe River: American bald eagle and bull trout. American bald eagles (Haliaeetus leucocephalus) have been observed feeding along the St. Joe River corridor. There are no known nests near the Site. The St. Joe River is part of the Lake Coeur d' Alene Basin, which supports the spawning of the federal-listed threatened bull trout (Salvenlinus confluentus). The bull trout migrates up the St. Joe River past the Site and finally into the St. Maries River. The St. Joe River is included in the Lake Coeur d'Alene Basin Recovery Unit of the Bull Trout Recovery Plan prepared by the US Fish and Wildlife Service in 2002 to protect the species. A summary of risks for ecological receptors can be found in Table 2 below. A summary of the chemicals of concern and their effect on human and/or ecological receptors can be found in Table 3 below.

Table 3 - Summary of Risk for Ecological Receptors

Receptor	Exposure Pathway	Potential for Risk
Aquatic invertebrates (i.e., zooplankton)	Surface water	No
Benthic invertebrates (i.e., sediment dwelling insect larvae, worms, and other organisms)	Sediment	Yes
Benthic fish (i.e., brown bullhead)	Sediment	Yes
Migratory/Resident fish (i.e., bull trout)	Surface water	No
Piscivorous riparian wildlife (i.e., mink)	Fish consumption	Yes

4.3 Conclusions of Risk Assessment

The following unacceptable risks were identified for the Site:

- Potential future human exposure to subsurface soils
- Potential future human exposure to contaminated drinking water
- Current aquatic and benthic organism exposure to contaminated sediments (i.e., brown bullhead trout and sediment dwelling insect larvae, worms, and other organisms)
- Current piscivorous mammals (i.e., mink) from consumption of contaminated fish

It is EPA's current judgment that implementing the new Preferred Alternative identified in this Revised Proposed Plan will protect public health, welfare, and the environment from actual or threatened releases of hazardous substances into the environment.

5.0 Remedial Action Objectives and Cleanup Levels

Remedial action objectives and cleanup levels necessary to address the risks identified for the Site are discussed below.

5.1 Remedial Action Objectives

Remedial Action Objectives (RAOs) provide a general description of the goals that the response action is expected to accomplish. The RAOs for the Site are:

- RAO 1 – Protect aquatic and benthic organisms by preventing direct contact of benthic organisms with COCs in surface sediment in the St. Joe River at concentrations greater than protective levels.

- RAO 2 – Prevent migration of impacted groundwater or free-phase creosote to surface sediment in the St. Joe River that would result in COC concentrations greater than protective levels for aquatic and benthic organisms.

- RAO 3 – Prevent the downstream transport of COCs that result in COC concentrations in water or sediment that exceed levels protective of aquatic and benthic organisms.

- RAO 4 – Prevent residential and commercial ingestion of, and dermal contact with, COCs in groundwater and soils at concentrations greater than protective levels.

EPA has determined that the RAO initially identified in the FS as RAO 2 with the objective of preventing visible oil sheens on the St. Joe River is not appropriate for developing remedial alternatives for the Site. RAOs are generated in a process which specifically identifies both chemically and quantitatively the contaminants and/or media which have been determined to harm human health and/or the environment. RAOs also address receptor exposure pathways and

establish preliminary remediation goals. The determination of whether a sheen is visible or not does not lend itself to a quantifiable threat to human health or the environment. Although EPA believes that creosote-based sheens will be eliminated by applying the remaining four RAOs (above), the sheen RAO cannot be used to develop remedial alternatives. The RAOs have been renumbered as above following the deletion of the former sheen RAO 2.

5.2 Cleanup and Screening Levels

Cleanup and/or screening levels for the COCs in upland soil, groundwater, and surface water discharges are listed in Tables 4, 5, and 7 respectively. Screening levels for initiating additional sediment characterization are presented in Table 6. The rationale for selecting specific cleanup and/or screening levels is discussed below. The list of chemicals of concern is based on potential human contact with subsurface soils, protection of groundwater as a drinking water source, and the protection of ecological receptors associated with sediment.

5.2.1 Upland Soil Cleanup and Screening Levels

EPA used the most stringent of three separate sets of cleanup criteria to determine the screening and cleanup levels for upland soil at the Site. Two of these criteria sets are based on risk to human health and one is based on the requirements regulating the on site disposal of treated soil and sediment. Although direct contact with surface soil at the Site does not pose an unacceptable risk to human health, the following two pathways do pose risks:

- contact with deeper soils should they become exposed
- ingestion of ground water contaminated by contact with contaminated soil

The two sets of cleanup criteria which address these risk pathways are EPA Region 9 Preliminary Remediation Goals (PRGs) for Residential Soils; and, EPA Superfund Soil Screening Levels for Migration to Groundwater with as Dilution Attenuation Factor of 1 (DAF 1), respectively.

The third cleanup criteria set comes from Resource Conservation and Recovery Act (RCRA) technology-based Universal Treatment Standards which apply to soil and sediment treated in thermal treatment units. Contaminated sediments removed from the river were included in this category because they will also be thermally treated under the preferred alternative.

EPA chose the most stringent criterion for each COC from each of the three sets of criteria described above to develop Site soil screening and cleanup levels. See Table 4 for the resultant screening levels for upland soil excavation and/or stabilization, and treatment levels for thermally treated soils and sediments. The three comparison criteria sets can also be found in Table 4. Areas of the Site to which soil screening and cleanup levels apply are discussed in Section 8.0. -

5.2.2 Cleanup Levels for Groundwater

Site groundwater poses a risk from two exposure pathways:

- Human health risk from use as a drinking water source
- Ecological risk to aquatic and benthic organisms from migration to and accumulation in sediments

Because of these two different pathways, cleanup levels for groundwater for each chemical of concern were selected as the lowest of either the federal drinking water standards, called Maximum Contaminant Levels (MCLs) (or the EPA Region 9 PRGs for tap water where MCLs have not been established), or a site-specific groundwater concentration calculated to be protective of sediment. Selection of the lowest of these values ensures that both of the risk pathways will be protected. The calculation method is detailed in the RI. Groundwater cleanup levels for the Site chemicals of concern are listed in Table 5. Areas of the Site to which groundwater cleanup levels apply are discussed in Section 8.0.

5.2.3 Cleanup and Screening Levels for Sediments

Shoreline, nearshore, and offshore sediment currently pose an unacceptable risk to aquatic and benthic organisms. Neither the Coeur d'Alene Tribe, the State of Idaho, nor EPA have established freshwater sediment cleanup levels that would be applicable for the Site. However, the State of Washington has promulgated standards for marine sediments including a method to determine site specific sediment cleanup levels. Although the St. Joe River sediments are freshwater sediments, EPA has accepted the use of the State of Washington's marine sediment quality standards as a screening tool at this Site to determine whether further testing is required. These screening levels are listed in Table 6. EPA believes this approach is reasonable because PAH compounds affect aquatic animals by means of narcosis, a mode of action arresting biological activity. This mode of action is not significantly affected by ion strength, which is the predominant difference between freshwater and marine water.

The following stepwise approach for delineating the extent of contaminated sediment at the Site and establishing boundaries for cleanup has been proposed:

Step One. Screen sediment concentrations against the chemical values listed in Table 6. These values are the Washington State Sediment Quality Standards (SQS) and corresponding Lowest Apparent Effects Threshold (LAET) equivalents for sediments in marine waters in Puget Sound. The LAET values are used in cases of either very low total organic carbon (<0.2%) or high organic carbon (>4%) sediment concentrations. Exceedance of the chemical SQS (or LAET) would mark the reason to initiate biological testing in Step Two.

Step Two. For those sediments with concentrations of COCs which exceed any of the chemical SQS (or LAET) values in Table 6, biological testing would be performed to evaluate whether the contaminants in those sediments are toxic to benthic organisms. Biological testing methods would be those set forth in the Washington Department of Ecology's April 2003 Sediment

Sampling and Analysis Plan Appendix, or equivalent methods reviewed and approved by EPA. Biological test results would be used to define cleanup areas, unless site-specific chemical standards can be developed as discussed below.

It may be possible to develop a site-specific standard using the biological and chemical testing data collected during the implementation of the stepwise approach. If EPA determines that site-specific cleanup standards protective of benthic organisms can be developed, the cleanup area may be defined using those standards. If protective site-specific chemical standards cannot be developed with a reasonable level of certainty, clean up areas would be delineated using biological testing results.

The goal of this approach is to identify sediments which pose a current or future risk to benthic organisms. The point of compliance for the cleanup standards (biological and chemical) is surface sediments and any subsurface sediment which may be exposed in the future through erosion or other processes. Sediment transport studies would be performed in the remedial design phase to identify areas subject to erosion and where subsurface contaminated sediments may be exposed in the future.

5.2.4 Limits for Surface Water Discharges

Although surface water discharges have not been identified as a risk to human health or the environment at the Site, such discharges would likely occur during the cleanup process. The anticipated discharges include groundwater removed from the upland area during remediation, water removed from contaminated sediments during their dewatering process (prior to thermal treatment), turbidity generated by the removal of contaminated sediments from the river, and storm water runoff from the Site during remedy construction.

Groundwater extracted from the upland area and the water generated during sediment dewatering would be stored in a tank(s) on Site and treated using carbon filtration and then discharged to the St. Joe River in compliance with the effluent limits established in Table 7. Other treatment technologies may be utilized if they are demonstrated to be effective during the remedial design phase.

The turbidity generated during sediment removal would be controlled using engineering controls and best management practices designed for the control of turbidity such as sheetpile walls, silt curtains, containment booms, timing and sequencing of sediment removal activities, monitoring, and any other practice deemed effective in preventing an exceedence of Site sediment clean up levels or a violation of applicable surface water quality standards (WQS) or other provisions of Sections 401 and 404 of the Clean Water Act.

Storm water would be addressed using best management practices (BMPs) designed to insure that storm water discharges comply with WQS. If necessary, storm water would be treated prior to discharge into the River. The use of BMPs, monitoring, and other engineering controls addressing storm water discharges would be detailed in a pollution prevention plan as specified in the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Construction Activities issued for lands in the State of Idaho.

5.2.5 Air Emissions

Although air emissions have not been identified as a risk to human health or the environment at the Site, emissions would likely occur as a result of the cleanup process. Emissions are anticipated from the on-site thermal treatment of contaminated soil and sediment and dust is expected from excavation and capping operations.

The thermal treatment system would be pilot tested to evaluate risks to human health and the environment which may accompany the thermal treatment operation. Once safe operating parameters have been established, operation of the thermal treatment unit would be monitored to ensure that the system complies with all ARARs including the hazardous waste incinerator standards 40 CFR 264.340 and the National Emission Standards for Hazardous Air Pollutants for Combustions 40 CFR 63. 1200. The monitoring program includes measurement of stack emissions as well as treated soil and sediment contaminant concentrations.

Dust control measures will be implemented as necessary to address construction related dust generation. These measures would be implanted in a manner to ensure compliance with ARARs.

Table 4 – Screening Levels for Upland Soil Excavation and/or Stabilization, and Treatment Levels for Thermally Treated Soils and Sediments

Chemical of Concern	Proposed Soil Screening and Treatment Levels and Sediment Treatment levels (mg/kg)	Region IX PRGs for Residential Soil (mg/kg)	EPA Superfund Soil Screening Levels – Migration to Groundwater DAF 1 (mg/kg)	RCRA Universal Treatment Standards (mg/kg)
Napthalene	**4**	56	4	5.6
Acenaphthylene	**3.4**	NA	NA	3.4
Acenaphthene	**3.4**	3700	29	3.4
Fluorene	**3.4**	2700	28	3.4
Phenanthrene	**5.6**	NA	NA	5.6
Anthracene	**3.4**	22000	590	3.4
Fluoranthene	**3.4**	2300	210	3.4
Pyrene	**8.2**	2300	210	8.2
Benz(a)anthracene	**0.062**	.062	0.08	3.4
Chrysene	**3.4**	62	8	3.4
Benzo(b)fluoranthene	**0.2**	0.62	0.2	6.8
Benzo(k)fluoranthene	**2**	6.2	2	6.8
Benzo(a)pyrene	**0.062**	0.062	0.4	3.4
Indeno(l ,2,3,-c,d)pyrene	**0.62**	0.62	0.7	3.4
Dibenzo(a,h) -anthracene	**0.062**	0.062	0.08	8.2
Benzo(g,h,i)perylene	**1.8**	NA	NA	1.8
Benzene	**0.002**	0.64	0.002	10
Toluene	**0.6**	520	0.6	10
Ethylbenzene	**0.7**	400	0.7	10
Xylenes	**10**	270	10	30
Carbazole	**0.03**	24	0.03	NA
Dibenzofuran	**150**	150	NA	NA
4-Methylphenol	**310**	310	NA	NA
2,4-Dimethylphenol	**0.4**	1200	0.4	14

NA = not applicable or no value is available from this source

Table 5 – Cleanup Levels for Groundwater

Chemical of Concern	MCL (µg/L)	EPA Region 9 Tap Water PRG (µg/L)	Site-Specific Groundwater Concentration Protective of Sediment (µg/L)	Groundwater Cleanup Level (µg/L)
Naphthalene	NA	6.2	85	**6.2**
Acenaphthylene	NA	NA	45	**45**
Acenaphthene	NA	370	6.5	**6.5**
Fluorene	NA	240	5.8	**5.8**
Phenanthrene	NA	NA	15	**15**
Anthracene	NA	1,800	42	**42**
Fluoranthene	NA	1,500	12	**12**
Pyrene	NA	NA	20	**20**
Benz(a)anthracene	NA	0.092	0.72	**0.092**
Chrysene	NA	9.2	1.1	**1.1**
Benzo(b)fluoranthene	NA	0.092	0.16	**0.092**
Benzo(k)fluoranthene	NA	0.92	0.15	**0.15**
Benzo(a)pyrene	0.2	--	0.21	**0.2**
Indeno(1,2,3,-c,d)pyrene	NA	0.092	0.02	**0.02**
Dibenzo(a,h)anthracene	NA	0.0092	0.01	**0.0092**
Benzo(g,h,i)perylene	NA	NA	0.03	**0.03**
2-Methylnaphthalene	NA	NA	NA	**NA**
Benzene	5	--	NA	**5**
Toluene	700	--	NA	**700**
Ethylbenzene	1000	--	NA	**1000**
Xylenes	10,000	--	NA	**10,000**
Carbazole	NA	3.4	NA	**3.4**
Dibenzofuran	NA	12	NA	**12**
4-Methylphenol	NA	180	NA	**180**
2,4-Dimethylphenol	NA	730	NA	**730**

NA – Not applicable or no value is available from this source

Table 6 – Screening Levels to Determine if River Sediments Need Further Analysis

Chemical Parameter	SQS (mg/kg-OC)*	LAET [µg/kg (dry weight)]**
Naphthalene	99	2100
Acenaphthylene	66	560
Acenaphthene	16	500
Fluorene	23	540
Phenanthrene	100	1500
Anthracene	220	960
2-Methylnaphthalene	38	670
LPAH, Total	**370**	**5200**
Fluoranthene	160	2500
Pyrene	1000	3300
Benzo(a)anthracene	110	1600
Chrysene	110	2800
Total Benzofluoranthenes	230	3600
Benzo(a)pyrene	99	1600
Indeno (1,2,3,-c,c)pyrene	34	690
Dibenzo (a,h)anthracene	12	230
Benzo(g,h,i)perylene	31	720
HPAH, Total	**960**	**17,000**

* SQS – Washington State Marine Sediment Quality Standards normalized for organic carbon

** LAET – Washington State lowest apparent effect thresholds for the Puget Sound Estuary Program

Table 7 – Surface Water Discharge Limits

Chemical of Concern	Effluent Limits for Discharge to Surface Water (µg/l) (1)
Naphthalene	100
Acenaphthylene	*
Acenaphthene	*
Fluorene	*
Phenanthrene	*
Anthracene	*
Fluoranthene	*
Pyrene	*
Benz(a)anthracene	0.0028
Chrysene	0.0028
Benzo(b)fluoranthene	0.0028
Benzo(k)fluoranthene	0.0028
Benzo(a)pyrene	0.0028
Indeno(1,2,3,-c,d)pyrene	0.0028
Dibenzo(a,h)anthracene	0.0028
Benzo(g,h,i)perylene	*
2-Methylnaphthalene	Not Available
Benzene	1.2
Toluene	Not Available
Ethylbenzene	Not Available
Xylenes	Not Available
Carbazole	Not Available
Dibenzofuran	Not Available
4-Methylphenol	Not Available
2,4-Dimethylphenol	Not Available

(1) Taken from EPA's proposed NPDES Idaho Groundwater Remediation Discharge General Permit

* Indicates a Group II PAH. Total concentrations of Group II PAHs must not exceed 200 µg/l

Not Available – Clean up or discharge concentrations have not been developed. However, if other listed discharge limits are achieved, it is assumed that these parameters will not be present in concentrations which could cause harm to human health or the environment.

Note: Coeur d' Alene Tribal Water Quality Standards have been developed by the Tribe. Tribal Water Quality Standards will be evaluated as potential ARARs prior to publication of the St. Maries Creosote ROD.

6.0 Summary of Remedial Alternatives

There have been fourteen remedial alternatives developed for this Site. The 2005 PP described and compared twelve of these: Alternatives 1, 2, 3a, 3b, 3c, 4a, 4b, 4c, 5, 6, 7, and 8. The revised FS includes additional information on each of these twelve alternatives plus Alternative 9 which was proposed during the 2005 PP public comment period and developed further in the revised FS. EPA used Alternative 9 to develop Alternative 9A.
The Remedial alternatives developed in the revised FS and this Revised Proposed Plan are summarized in Table 8 and address the following five subareas of the Site (see Figure 4):

1. Upland Soils and Groundwater (approximately 0.44 acres). Includes the area around the former treatment facilities that contains soil and groundwater with COCs above soil cleanup levels.
2. River Bank Soils (approximately 0.05 acres). Area of the 1999 removal action.
3. Shoreline Sediments (approximately 0.05 acres). In-water area of highly contaminated sediments adjacent to the 1999 removal action area.
4. Nearshore Sediments (approximately 0.71 acres). In-water area of highly contaminated sediments that extends approximately 150 ft into the river and 400 ft along the shoreline.
5. Offshore Sediments (approximately 2.3 acres). In-water area of lesser contaminated sediments that extends approximately 150 ft into the river and at least 900 ft downstream from the Site along the shoreline.

This Revised Proposed Plan describes and compares the 2005 PP preferred alternative, Alternative 8, and the new preferred alternative, Alternative 9A. Both Alternative 8 and Alternative 9A combine the elements of containment, removal, treatment, capping, and monitoring which were introduced in the FS. All other alternatives were described and compared in the 2005 PP.

6.1 Description of Alternatives

A summary of Alternatives 8 and 9A is presented below. Detailed descriptions of the alternatives numbered 1 through 9 can be found in the revised FS. Costs for each alternative are presented as total present value (2006) dollars. Costs shown for the operation and maintenance (O&M) category in Alternative 8 and 9A are based on 30 years. Costs assume a discount rate of 7 percent over the O&M period. Estimated costs are based on preliminary quantity and level of effort estimates and are intended to have a plus 50 to minus 30 percent accuracy. Estimated costs may change as new information is obtained.

Table 8 - Summary of Remedial Alternatives

Remedial Action Component	Alternative												
	1	2	3a	3b	3c	4a	4b	4c	5	6	7	8	9A
Upland Soils and Groundwater													
• No action	x												
• Natural attenuation		x	x			x							
• Enhanced biodegradation by air sparging				x			x						
• Containment – 3-sided slurry wall to depth of 60 ft (to lower silt unit)					x			x					
• Containment – 3 sided sheetpile wall to depth of 60 ft (to lower silt unit)									x				
• Containment – 4 sided sheetpile and slurry wall to lower silt unit with surface soil cap												x	
• Soil solidification										x			
• Removal, on site treatment, and on site disposal of surface soils (<20 feet), deeper soil in-situ stabilization													x
• Removal, off site treatment and off site disposal											x		
Bank Soils													
• No action	x												
• Removal and fill with thin layer cap		x											
• Solidification to upper silt unit with 2 ft cap			x	x	x	x	x	x					
• Removal into upper silt unit, backfill to original bathymetry									x	x	x	x	x
Shoreline Sediment													
• No action	x												
• Removal of top 2 ft with a clean thin layer cap		x											
• Removal of top 2 ft and cap with clean backfill			x	x	x								
• Removal of top 3 ft and cap with clean backfill						x	x	x					
• Removal of top 6 ft and cap with clean backfill										x	x		
• Removal of top 8 ft and cap with clean backfill									x			x	
• Removal of all contaminated sediment, cap with clean backfill													x
Nearshore Sediment													
• No action	x												
• Thin layer cap		x											
• 2 to 3 ft clean cap over existing sediments			x	x	x								
• Removal of top 3 ft and cap with clean backfill						x	x	x					
• Removal of top 6 ft (average) and cap with clean backfill										x	x		
• Removal of top 8 ft (average) and cap with clean backfill									x			x	
• Removal of all contaminated sediment and cap with clean backfill													x
Offshore Sediment													
• No action	x												
• Monitoring with clean cap over 20 to 100% of existing sediments		x	x	x	x	x	x	x				x	
• 2 ft cap over existing sediments									x				
• Assessment with removal and cap with clean backfill													x
• Removal of top 6 ft and cap with clean backfill										x	x		

Alternative 8 – Containment and Capping of Upland Soils, Removal of Bank Soils, Shoreline Sediments, and Nearshore Sediments and On Site Thermal Treatment with Off Site Disposal, Capping and Monitoring of Offshore Sediments
Estimated Total Cost: $10,956,000 (Capital Cost: $10,143,000; O&M Cost: $813,000)
Estimated Removal Volume: 15,000 CY
Estimated Construction Timeframe: One to two years
Estimated Time to Achieve RAOs: Achieved upon completion of construction

Alternative 8 is a combination of containment, excavation, thermal treatment, capping, monitoring, and institutional controls that was developed by EPA as the July 2005 Proposed Plan was assembled.

Upland soils and groundwater would be contained on site with a four-sided sheetpile and slurry wall in a waste management area. The wall would be extended into the lower silt unit (approximate depth of 60 ft) to prevent migration of COCs or contaminated groundwater to the river. The area would be capped to prevent precipitation and flood water infiltration and be resistant to scouring during flood events. Groundwater inside and outside this waste management area would be monitored to evaluate the effectiveness of the containment cell.

Bank soils, shoreline sediments, and nearshore sediment would be removed, treated on site with a portable thermal desorption unit, and disposed off site. Removal of these most highly contaminated areas (to a depth of 8 ft) and backfilling or capping with clean scour-resistant materials to the original bathymetry would restore the aquatic and benthic environment and prevent further migration of contaminated sediments downstream. Engineering methods and monitoring would be used during removal activities to control potential short-term on and off site impacts such as air emissions from the thermal desorption unit.

Additional chemical and biological testing to determine the extent and depth of contaminated sediments would be conducted to determine the boundaries of the offshore area that would be capped (estimated costs assume 100% of the area would be capped). Physical conditions of the river would also be assessed to determine design parameters for a scour-resistant cap. The material and thickness of the cap would be determined during remedial design.

Monitoring would occur both during and after the construction of the remedy to ensure that the remedy achieves compliance with all RAOs and other Applicable or Relevant and Appropriate Requirements (ARARs). This includes monitoring groundwater, surface water discharges, air emissions, riverine sediments, and thermally treated soils and sediments.

Institutional controls would be used to restrict groundwater and land use, and to protect sediment and soil caps.

Alternative 9A– Removal, On Site Thermal Treatment, and On Site Disposal of Surface Upland Soils, Contaminated Bank Soils, Nearshore Sediments, and Selected Offshore Sediments; In Situ Stabilization of Deeper Upland Soils, Backfilling of Nearshore and Offshore Sediment Removal Sites; Monitoring of Upland Soil ,Groundwater, Bank Soil, Nearshore, and Offshore Sediments.
Estimated Total Cost: $11,222,000 (Capital Cost: $10,791,000; O&M Cost: $431,000)
Estimated Removal Volume: 70,000 CY
Estimated Construction Timeframe: Two to three years
Estimated Time to Achieve RAOs: Achieved upon completion of construction

Alternative 9A is a combination of excavation and on site thermal treatment of soils and sediments, on site disposal of treated soils/sediments, in-situ stabilization, capping/backfilling of excavated areas, monitoring, and institutional controls.

The top 20 feet of the contaminated upland and contiguous river bank soils would be excavated and along with removed and dewatered contaminated river sediments would be thermally treated on site with a portable thermal desorption unit (thermal treatment). The treated soils and sediments would later be deposited within the footprint of the upland excavation. The surface of all thermally treated soils and sediments deposited in the upland area would be amended with organics and/or topsoil and seeded to provide a vegetative cover resistant to scouring during flood events. If necessary, excess thermally treated soils/sediments may be hauled to an off site disposal facility. The specifications for soil amendments and seeding as well as specifications for backfilling and capping materials would be determined during the remedial design process.

The portable thermal treatment unit would be operated and monitored in accordance with applicable RCRA and Clean Air Act guidance and regulations for desorption units and/or incinerators. The riverbank excavation would be backfilled with clean scour resistant materials. Contaminated upland and riverbank soils below the 20 foot excavation, up to 40 more feet in depth or the confining lower silt unit, would be solidified in place with cementaceous materials such as Portland cement to significantly reduce groundwater permeability and contaminant leaching. Pilot studies would be completed during the remedial design phase to develop a mixture and application rate which best achieves RAOs. Monitoring wells would be installed near the solidified subsurface matrix to ensure that contaminants are not leaching into the groundwater.

A temporary watertight sheetpile wall would be installed around the most contaminated nearshore sediments to facilitate their removal by dredging, followed by dewatering, thermal treatment and on site upland disposal. All contaminated nearshore sediments containing concentrations of COCs above the sediment clean up level would be removed to the extent practicable. The dredged area would be returned to its original topography by backfilling or capping with clean scour-resistant gravels and sediments and the sheetpile wall would be removed. If necessary, in-situ stabilization would be utilized to address deeper contaminated sediments not suitable for removal as determined in the Remedial Design phase.

Offshore sediments would be sampled and a stepwise process involving chemical analysis, toxicity testing, and sediment scour and transport investigations would be instituted to determine

the extent of contaminated river bottom sediments which pose a current or reasonably anticipated future risk to benthic organisms. These so identified sediments would be removed, dewatered, thermally treated if necessary (as determined during remedial design), and disposed of in the upland area. Areas of removal would be backfilled or capped with clean scour-resistant gravels and sediment. Contaminated sediments which do not lend themselves to efficient removal may be capped with scour resistant materials to prevent future exposure. The details specifying which sediments require removal, thermal treatment, backfilling and/or capping would be as determined during the remedial design process.

Water collected during the upland excavation and the dewatering of contaminated nearshore and offshore sediments would be stored in containment tank(s) on site, treated in activated carbon units, and discharged to the St. Joe River. This discharge would be monitored to ensure compliance with applicable surface water quality standards.

Monitoring would occur both during and after the construction of the remedy to ensure that the remedy achieves compliance with all RAOs and ARARs. This includes monitoring groundwater, surface water discharges, air emissions, riverine sediments, and thermally treated soils and sediments.

Institutional controls would be used to protect sediment caps and to restrict groundwater and land use as necessary.

7.0 Evaluation of Alternatives

Nine criteria are used to evaluate each alternative individually and against each other in order to select a remedy. The nine evaluation criteria are: (1) overall protection of human health and the environment; (2) compliance with Applicable or Relevant and Appropriate Requirements (ARARs); (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume of contaminants through treatment; (5) short-term effectiveness; (6) implementability; (7) cost; (8) Tribe/State support agency acceptance; and (9) community acceptance. This section of the Revised Proposed Plan profiles the relative performance of each alternative against the nine criteria. The nine evaluation criteria are discussed in the following sections below.

7.1 Overall Protection of Human Health and the Environment

Determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Upland Soils and Groundwater. Alternative 8 includes the construction of a four-sided, sheetpile and slurry containment cell and capping while Alternative 9A includes excavation, thermal treatment, and in situ stabilization. Both alternatives are designed to prevent leaching of contaminants in soil to groundwater and subsequent migration of contaminated groundwater to the river. Alternative 8 prevents direct contact with soil or ingestion of contaminated

groundwater using containment and capping, while Alternative 9A achieves the same objectives using treatment of the most heavily contaminated soils as a principle element followed by in situ stabilization of the deeper soils and associated groundwater. Both alternatives utilize institutional controls to prevent future remedy damage. Both are anticipated to adequately protect human health and the environment from the contaminants in soil and groundwater.

Bank Soils. Both alternatives include removal and thermal treatment of contaminated bank soils and are considered to be protective of human health and the environment. However, Alternative 9A may include removal and in situ stabilization of contaminated material at greater depth and would provide a greater degree of protectiveness.

Shoreline Sediment. Both of the alternatives include removal of contaminated shoreline sediments and are considered to be protective of the environment; however, Alternative 9A may include removal and in situ stabilization of contaminated material from greater depth and would provide a higher degree of protectiveness.

Nearshore Sediment. Alternatives 8, and 9A include removal of all of the contaminated nearshore sediments to a depth of eight feet, which offers a high degree of protectiveness for the environment. Alternative 9A may include removal and in situ stabilization of contaminated material from greater depth and is the preferred alternative for this criterion.

Offshore Sediment. Alternative 8 and 9A both include additional assessment and monitoring, of the offshore sediments. Alternative 8 focuses on capping all contaminated sediments. Alternative 9A focuses on removal of contaminated sediments to the degree practicable, followed by backfilling with clean gravels to the original bathymetry providing a greater degree of protectiveness. Alternative 9A may also include scour-resistant capping if necessary to address contaminated sediments which are not suitable for removal as determined during the remedial design process.

7.2 Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Evaluates whether the alternative meets federal, state, and tribal environmental statutes, regulations, and other requirements that pertain to the Site or whether a waiver is justified.

The Feasibility Study identifies ARARS for this Site and details how each alternative addresses each ARAR.

Upland Soils and Groundwater. Both Alternative 8's slurry and sheetpile containment cell and Alternative 9A's excavation, thermal treatment, and deeper soil in situ stabilization confine soil and groundwater within a Waste Management Area (WMA). Both remedial action alternatives are designed to comply with ARARs (eg. drinking water standards) just outside that WMA. Alternative 8's WMA cap is designed to meet ARARs. Alternative 9A's excavated soils will be thermally treated and monitored to meet and assure compliance with ARARs.

Bank Soils. Both alternatives remove and treat contaminated bank soils and both would comply with ARARs. Alternative 9A treats removed soils to a more stringent standard to allow on site disposal.

Shoreline Sediment. Both alternatives are designed to comply with ARARs by removing and treating contaminated shoreline sediment followed by backfilling or capping to the original pre-removal topography. Alternative 9A treats removed sediments to a more stringent standard to allow on site disposal. Both alternatives include the temporary erection of a sheetpile wall around the nearshore and shoreline sediments greatly reducing the potential for the transport of contamination to other areas of the river during removal sediment removal activities.

Nearshore Sediment. Both alternatives remove and treat contaminated nearshore sediment and would comply with ARARs. Alternative 9A treats removed sediments to a more stringent standard to allow on site disposal. In addition, Alternative 9A includes the temporary erection of a sheetpile wall around the nearshore and shoreline sediments greatly reducing the potential for the transport of contamination to other areas of the river during removal sediment removal activities.

Offshore Sediment. Both remedial actions would comply with ARARs.

7.3 Long-Term Effectiveness and Permanence

Considers the ability of an alternative to maintain protection of human health and the environment over time.

Upland Soils and Groundwater. Alternative 8 includes a four-sided sheetpile and slurry wall to provide protection to groundwater and sediment quality by preventing the contact of groundwater with contaminated soil. Alternative 8's slurry and sheetpile walls fully enclose the contaminated area and include a surface cap to exclude the infiltration of precipitation or surface water. Alternative 9A would have a higher long-term effectiveness because it includes removal and thermal treatment of the most contaminated upland soil. Alternative 9A's stabilization matrix is less likely to leach contaminants into the groundwater and less likely to leak contaminated groundwater than with Alternative 8's containment design because the contaminants and groundwater would be chemically bonded into a solid matrix within the WMA, thereby significantly reducing the potential for leaching contaminants into the groundwater or the river sediments.

Bank Soils. Both alternatives include bank soil removal and would be effective in the long term unless there is recontamination via migrating groundwater. Alternatives 8 and 9A include either soil (and groundwater) containment, solidification, or removal of upland soils to prevent recontamination of bank soils. Alternative 9A would have the highest long-term effectiveness by including removal and thermal treatment of the most contaminated bank soil and the in situ solidification of deeper soil thereby significantly reducing the potential for leaching of contaminated groundwater to the river sediments.

Shoreline Sediment. Alternative 8 includes the removal of up to 8 feet of contaminated sediment and replacement with scour-resistant sand and gravel backfill. Alternative 9A includes the removal of contaminated sediments to a greater depth and possible chemical stabilization of deeper sediment if necessary followed by backfilling or capping with clean scour-resistant gravels and sediments. Alternative 9A is considered to be the most effective and permanent action in this category.

Nearshore Sediment. Alternatives 8 and 9A include removal of all sediment with the potential to cause risk to receptors. Both alternatives are considered to be effective and permanent.

Offshore Sediment. Alternative 8 includes a cap for the offshore sediments, which is considered effective in the long-term if scour-resistant capping materials are used and if institutional controls are maintained to prevent damage to the cap. Alternative 9A includes a combination of removal with thermal treatment and backfilling and, if necessary, capping with scour-resistant materials. Both alternatives are considered effective and permanent.

7.4 Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment

Evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

Upland Soils and Groundwater. Alternative 9A reduces toxicity, mobility, and volume to a greater extent than Alternative 8 because it includes removal and onsite treatment of contaminated soil. Alternative 8 does not provide treatment for uplands soils but rather relies only on containment and therefore is ranked lower for this criterion.

Bank Soils. Both alternatives include removal and thermal treatment. Alternative 9A may remove additional contaminated soil and may include stabilization if determined necessary in the remedial design phase. Removal of contaminated bank soils combined with thermal treatment would do the most to reduce toxicity, mobility and volume of contaminants (Alternatives 8 and 9A). Alternatives 9A may include a greater reduction in toxicity, mobility and volume, because a greater quantity of material may be removed and and/or stabilized.

Shoreline Sediment. Alternative 8 includes the excavation and thermal treatment of impacted sediments to up to 8 ft in depth whereas Alternative 9A may include the removal of sediments to greater depth and the addition of in situ stabilization if deemed necessary by EPA. Both of the removal actions would be effective in reducing toxicity, mobility and volume of contaminants. Alternatives 9A may include a greater reduction in toxicity, mobility and volume, because a greater quantity of material may be removed and and/or stabilized.

Nearshore Sediment. Both Alternatives 8 and 9A include removal and thermal treatment of contaminated sediments, which would reduce their mobility, toxicity and volume. Alternative 9A may include a greater reduction in toxicity, mobility and volume, because a greater quantity of material would be removed and and/or stabilized.

Offshore Sediment. Both alternatives include assessment, monitoring, capping and/or removal. Alternative 8's assessment, monitoring and capping actions do not include treatment and is therefore ranked lower under this criterion. Alternative 9A includes removal and treatment and may include capping depending on the outcome of the remedial design phase. Alternative 9A would better reduce mobility, toxicity and volume.

7.5 Short-Term Effectiveness

Considers the length of time needed to implement an alternative, the length of time until cleanup standards are met, and the risks the alternative poses to workers, residents, and the environment during implementation.

Upland Soils and Groundwater. Alternative 9A's removal of the top 20 feet of contaminated soil, thermal treatment, and in situ stabilization requires more excavation, more exposure of contaminated soils, more extensive use of equipment and therefore would require more construction time, worker exposure, and impacts from noise and air emissions than Alternative 8's installation of sheetpile and slurry walls. For this reason, Alternative 9A imposes more temporary impacts to workers, community, and the environment and takes more time to implement than the Alternative 8 remedy. Both alternatives would achieve clean up standards upon implementation of the remedy.

Bank Soils. Both alternatives exhibit a potential for short-term impacts to the aquatic environment during removal actions; however, Alternative 9A utilizes the construction of a sheetpile wall around the area of nearshore contamination, thereby minimizing impact to the river during removal activities. There is a potential during removal and treatment activities for short-term impacts from noise and air emissions from the excavating and thermal treatment equipment. Both alternatives remove contaminated bank soils and thermally treat them on site although Alternative 9A may involve a greater volume of removal as well as the potential for chemical stabilization for deeper soils. Alternative 8 hauls the treated soils to an off site location increasing local traffic congestion whereas Alternative 9A's treated soils are deposited on Site. Both alternatives would achieve clean up standards upon implementation of the remedy. Alternative 9A is considered most effective in attaining clean up standards and reducing short term environmental risk.

Shoreline Sediment. Alternative 9A poses less of a short-term risk to the environment due to the construction of a sheetpile wall around the area of contaminated sediments, thereby minimizing impact to the river during removal activities. There is a potential during on site treatment activities for short-term impacts from noise and air emissions from the excavating and thermal treatment equipment. Alternative 9A may involve the removal of a greater volume of sediment and may also include chemical stabilization. Alternative 8 involves hauling treated materials to an off site location creating more traffic congestion and inconvenience to residents than Alternative 9A's on site disposal scenario. Alternative 9A is considered most effective in attaining clean up standards and reducing short term environmental risk in this category.

Nearshore Sediment. Alternative 9A specifies the installation and removal of a temporary water tight sheetpile wall around the nearshore sediments which decreases the potential for incidental releases to the aquatic environment during removal activities when compared to the sediment dredging scenario included in Alternative 8. Although requiring additional time to install and remove, the presence of the sheetpile wall may allow for faster and more efficient removal of nearshore sediments. Alternative 9A may remove a greater volume of sediments as well as provide in situ stabilization of deeper sediments if necessary. There is also a potential of short term impacts from noise and air emissions during removal and on site treatment activities for both alternatives. Both alternatives pose similar risks to workers at the Site and both would meet clean up standards upon completion. Alternative 9A is considered most effective in attaining clean up standards and reducing short term environmental risk for this criterion.

Offshore Sediment. Alternative 8 includes capping which should have minimal short-term risk to the environment. Cleanup standards would be met upon the installation of the cap. Alternative 9A has a higher short-term risk to the environment because of the potential for incidental releases during dredging. In addition, dredged materials would be dewatered and treated on site increasing processing time. Dredged areas would be returned to their original bathymetry by backfilling or capping with scour resistant materials. Alternative 9A poses a higher risk to workers due to its increased complexity. Alternative 8 takes less time to implement creates less of an impact to workers, residents, and the environment.

7.6 Implementability

Considers the technical and administrative feasibility of implementing the alternative such as relative availability of goods and services.

While both alternatives can be implemented at the Site, technical implementability decreases with increasing complexity of construction and use of specialized equipment.

Upland Soils and Groundwater. Alternative 8 includes upland sheetpile and slurry walls, which should be relatively easy to implement because this is well known technology. Alternative 9A utilizes removal, on site treatment, and in situ stabilization of contaminated soil which is more difficult to implement because of the higher complexity of activities. Alternative 8 would be the easier to implement for this criterion.

Bank Soils. Both of the alternatives include excavation and thermal treatment so this does not affect the relative implementability between alternatives for bank soils. Alternative 8 includes off site disposal of treated soils whereas Alternative 9A deposits treated soils on site. Even though Alternative 9A may also include chemical stabilization, it is considered the more implementable remedy.

Shoreline Sediment. Both of the alternatives include removal of contaminated shoreline sediments. However, Alternative 9A does so within the confines of a sheetpile wall constructed around the contaminated nearshore sediments. The construction of the sheetpile wall increases the complexity of the remedy but also reduces the difficulties involved with insuring that

contaminants and sediments do not migrate to other parts of the river. Alternative 8 includes off site disposal of treated soils where as Alternative 9A deposits treated soils on site. Alternative 9A may also include chemical stabilization. These differences in remedial approaches tend to offset each other in this analysis and therefore neither of the alternatives appears to be more preferable for this criterion.

Nearshore Sediment. Alternative 8 includes removal and capping followed by on site thermal treatment and the added complexity of off site disposal. Alternative 9A includes the additional complexity of the temporary installation of a sheetpile wall, improved efficiency for sediment removal followed by backfilling or capping and on site thermal treatment with on site disposal, and possible deeper in situ stabilization. These differences in remedial approaches tend to offset each other in this analysis and therefore neither of the alternatives appears to be more preferable for this criterion.

Offshore Sediment. Alternative 8 includes assessment, capping, and monitoring which would not be difficult to implement because capping is a commonly used remedy. Alternative 9A includes assessment, removal, capping and/or backfilling, thermal treatment, disposal on site, and monitoring, and would therefore be more difficult to implement due to the added complexity of the remedy.

7.7 Cost

Includes estimated capital and operation and maintenance costs as well as present worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

Alternative 8 removes approximately 15,000 cubic yards of contaminated materials and has an estimated cost of $10,956,000. Alternative 9A is estimated to remove nearly five times that amount of contaminated material, or about 70,000 cubic yards, at a cost of $11,222,000. Although Alternative 9A removes contaminated materials at a much less cost per unit volume than Alternative 8, Alternative 8 is the least expensive alternative. All cost estimates are approximate and made without detailed engineering design. The actual cost of the project depends on the final scope of the remedial action and on other unknowns.

7.8 Tribe/State/Support Agency Acceptance

Considers whether the Tribe/State agrees with the EPA's analyses and recommendations of the RI/FS and the Revised Proposed Plan.

The EPA has consulted with the Coeur d'Alene Tribe throughout the RI, BLRA, and FS process as well as this Revised Proposed Plan and will seek the Tribe's concurrence on the final remedy as published in the ROD.

The state of Idaho is conducting a review of this Revised Proposed Plan and the preferred alternative concurrent with the public comment period. The state will be asked to provide comments to EPA by the end of the public comment period.

7.9 Community Acceptance

Considers whether the local community agrees with the EPA's analyses and preferred alternative. Comments received on the Revised Proposed Plan are important indicators of community acceptance.

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD for the Site.

8.0 Preferred Alternative

In July 2005, EPA issued a Proposed Plan selecting Alternative 8 as the Preferred Alternative to address contamination at the St. Maries Site. However, as a result of the associated public comment period, EPA developed Alternative 9A, which has several benefits relative to Alternative 8 including the toxicity-based removal and treatment of a much greater volume of contaminated soil and sediments. Although nearly equivalent in total cost to Alternative 8, Alternative 9A disposes of thermally treated soils and sediments on site. On site thermal treatment and on site disposal would ensure that concentrations of creosote materials would be reduced to less than RCRA Land Disposal Restriction (LDR) requirements at a cost significantly less than with off site disposal. In addition, on site treatment and on site disposal reduces traffic congestion and limits interference to local residents. Contaminated groundwater below the upland excavation of the most contaminated soils would be assimilated into a physically and chemically stable matrix rather than contained in a subterranean box constructed with slurry and sheetpile walls, increasing the permanence of the remedy. Actions for each subarea in Alternative 9A are shown in Figure 5. This combination of actions is considered to achieve the best balance in meeting the nine criteria. Consequently, EPA has selected Alternative 9A as the preferred alternative. Note that the preferred alternative is based on current information and details of the remedy could change in response to public comment or other new information.

8.1 Upland Soils and Groundwater

For the Upland Soil area, Alternative 9A specifies that approximately the top 20 feet of the contaminated soil exceeding soil screening levels would be excavated, perhaps blended with contaminated sediments removed from river areas, and treated on site with thermal desorption equipment. On site thermal treatment methods would be managed to minimize potential impacts to the community from air and noise pollution, dust, and runoff.

The thermal treatment would be performed to achieve cleanup standards for the soil and sediments prior to replacement on site. EPA has made a contained in determination for these thermally treated materials to facilitate their disposal on site. Deeper contaminated soils,

screened and delineated during the remedial design process, would be mixed in-situ with Portland cement and potentially other materials to create a stabilized solid block matrix. The depth of this mixing is expected to average 40 to 60 feet below the current soil surface. The goal of soil excavation, thermal treatment, and in-situ stabilization for the uplands soil area is to treat as much of the source mass as is reasonably accessible. While the exact dimensions of the zones for each treatment type cannot be ascertained until remedial design activities are completed, soils that are above the soil cleanup level would either be excavated and thermally treated, or stabilized in place.

Shallow groundwater entering the upland soil excavation and water pumped from perimeter dewatering wells would be collected, treated, and discharged to the St. Joe River in compliance with the effluent limits in Table 7. Impacted groundwater located below the upland excavation would be bound up with the soils during in-situ stabilization. After the in-situ stabilization is completed, thermally treated soils and sediments would be backfilled into the excavation and possibly layered over other locations on the upland portions of the Site. A clean soil amendment would be placed over any footprint of the treated soils/sediments and seeded, providing a vegetative cover resistant to scour from flooding. Additional treated soils and sediments may be hauled to an off site disposal area if necessary.

Groundwater would be monitored in wells outside but near the treated soil area to ensure that the sources of groundwater contamination have been eliminated. There may be additional monitoring requirements. Institutional controls would be used to restrict groundwater use until drinking water standards are met and to restrict the use of the land in such a manner that may disturb the deeper, stabilized soils. These actions would achieve RAOs 2 and 4.

8.2 Removal and Treatment of Bank Soils and Nearshore Sediments

The removal of shoreline and adjacent nearshore soil/sediment would be accomplished by excavating material in the area where sheens are currently generated (see Figure 4). River bank soils would be removed to a vertical and horizontal extent such that all soil exceeding the cleanup level is removed or stabilized. During remedial construction, water generated from dewatering soils and sediments or water removed during excavation would be treated in the same system used to treat groundwater removed during upland excavation. The excavation is anticipated to extend somewhat beyond the area of the 1999 removal and into the bank approximately 30-40 feet, but the final dimensions would be determined based on additional delineation information obtained prior to excavation. It is possible that the deeper soils would be stabilized concurrently with the upland in-situ soil stabilization. This would be determined when the configuration of the upland stabilization area is further developed. The riverbank would be backfilled or capped to its original configuration with clean gravels and sediment.

Removal of the river bank soils and on site thermal treatment of these materials would ensure that creosote materials are no longer present above soil cleanup levels. This would eliminate the pathway for groundwater contamination to occur. Groundwater monitoring wells around the area of removal would be monitored to ensure that the removal has adequately reduced concentrations of COCs in the groundwater to the extent necessary to comply with drinking

water standards and insuring that the groundwater does not contaminate river sediments. This remedial action satisfies RAO 2, RAO 3, and RAO 4.

Contaminated nearshore sediments would be removed in a manner that protects the St. Joe River from increased suspended solids and mobilization of creosote-related COCs. A temporary water-tight sheet pile wall would be installed along the outer perimeter of this area prior to the removal activities to create a zone that can be partially dewatered (see Figure 5). All contaminated nearshore sediments would be excavated to a depth that would eliminate unacceptable risk to benthic organisms. This depth is anticipated to be approximately 8 feet below the river bottom but will be better defined during the remedial design process. The removed sediments would be dewatered, thermally treated, and deposited on site in the upland area. All contaminated nearshore sediments below the 8 foot depth would either be removed, stabilized in situ, or capped with scour resistant materials if necessary as determined during the remedial design phase. The water generated from the dewatering process would be treated as described for the upland area. The nearshore removal area would be backfilled or capped with clean sediments and gravels to the elevation of the original bathymetry followed by removal of the sheetpile wall. These actions would eliminate the direct contact of benthic organisms with toxic concentrations of COCs. The nearshore sediment area would be monitored to ensure that the removal has adequately reduced concentrations of COCs resulting in the protection of benthic organisms. This remedial action satisfies RAOs 1 and 3.

8.3 Assessment, Monitoring, and Capping of Offshore Sediments

Offshore sediment would be sampled and analyzed during the remedial design phase and the resultant concentrations would be screened against the values in Table 6 to see if additional testing is necessary. For those sediments exceeding the screening concentrations, additional analysis would be completed to determine if those sediments contain concentrations of COCs or exhibit toxicities which may constitute an unacceptable risk to benthic organisms. The physical conditions of the river would also be investigated to determine if scour and associated transport and deposition of sediments can reasonably be expected to influence future sediment toxicity and/or COC concentrations. Any areas which currently or may in the future exhibit toxicity or exceed COC sediment cleanup levels would be excavated and backfilled or capped with clean, scour-resistant sediments to the elevation of the original bathymetry. The excavated sediments would be dewatered, thermally treated if necessary (as determined during the remedial design process), and deposited in the upland area. The water collected from the dewatering process would be treated and discharged as with the collected upland groundwater described above. Any areas where treated sediments would be disposed on the uplands would be graded, amended with clean soil, and seeded to prevent scour during flooding or other high flow events. The specification of offshore backfill/capping material and thickness of this material would be determined during remedial design. Industrial controls would be implemented to protect river sediment capping. The backfill/cap would be monitored to verify performance and long-term stability. These actions would achieve RAOs 1 and 3.

8.4 Summary of Preferred Alternative

- Removal, onsite thermal treatment, and on site disposal of contaminated upland and riverbank soils within 20 feet of the surface.
- In place stabilization of contaminated upland and riverbank soils at depths greater than 20 feet, monitoring of groundwater.
- Removal, on site thermal treatment, on site upland disposal, backfilling/capping of contaminated nearshore and shoreline sediment.
- Assessment; removal, thermal treatment, and upland disposal; backfilling/capping, and monitoring of offshore sediment
- Implementation of institutional controls to prevent disturbance of subsurface stabilized soils and sediment capping.

Estimated Total Cost (Present Worth): $11,222,000
(Capital Cost: $10,791,000; O&M Cost: $431,000 over 30 years)
Estimated Removal Volume: 65,000 CY
Estimated Construction Timeframe: Two to three years
Estimated Time to Achieve RAOs: Achieved upon completion of construction

The combination of actions constituting Alternative 9A is considered to achieve the best balance in meeting the nine criteria over the other alternative considered. It would achieve substantial risk reduction by, removing, and treating or stabilizing a much greater volume of source materials. This reduces risks more effectively, costs less per unit volume to implement, and is more permanent and protective. Please note that this new preferred alternative is based on current information and details of the remedy could change in response to public comment or new information.

CERCLA requires that remedial actions that result in any hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure be subject to statutory five-year reviews to ensure protection of human health and the environment. The Site would be subject to statutory five year reviews because EPA believes there would be contaminants left in place at concentrations greater than levels protective of unrestricted use and unlimited exposure.

Based on the information currently available, EPA believes the new preferred alternative meets the threshold criteria and provides the best balance of tradeoffs with the other alternatives with respect to the balancing and modifying criteria. The EPA expects the new preferred alternative to satisfy the following statutory requirements of CERCLA Section 121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective; 4) utilize permanent solutions and alternative treatment technologies to the maximum extent practicable; and 5) meets the preference for selecting remedies with treatment as a principal element.

EPA encourages comment on the new Preferred Alternative during the public comment period. Changes to this new preferred alternative may be made if public comments or additional data

indicate that such a change will result in a more appropriate remedy. Please see Section 2 for EPA contact information.

9.0 Glossary of Terms

This glossary defines many of the technical terms used in this Revised Proposed Plan.

Applicable or Relevant and Appropriate Requirements (ARARs): Promulgated environmental laws and regulations which apply to cleanup activities at a particular site either because they apply directly or because they are relevant and appropriate. The definitions of "Applicable requirements" and "Relevant and Appropriate requirements" can be found in the Code of Federal Regulations at 40 CFR 300.5.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Chemicals of Concern (COCs): Contaminants, identified during the site investigation and risk assessment, that pose a potential risk because of their toxicity and potential routes of exposure to public health and the environment.

Groundwater: Water, filling spaces between soil, sand, rock and gravel particles beneath the earth's surface, which often serves as a source of drinking water.

Institutional Controls: Controls placed on property to ensure safe access and future development, or to alert buyers about the history of a site.

Maximum Contaminant Levels (MCLs): The maximum permissible level of a contaminant in water that is or may be consumed as drinking water. These levels are determined by EPA and are applicable to all public water supplies.

Monitoring Wells: Special wells installed at specific locations on or off a hazardous waste site where groundwater can be sampled at selected depths and studied to determine such things as the direction in which the groundwater flows and the types and concentrations of contaminants present.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The Federal regulation that guides the Superfund program.

Operation and Maintenance (O&M): Activities conducted at a site after response actions occur, to ensure that the cleanup or containment system continues to be effective.

Plume: A body of contaminated groundwater flowing from a specific source. The movement of the groundwater is influenced by such factors as local groundwater flow patterns, the character of the aquifer in which groundwater is contained, and the density of contaminants.

Potentially Responsible Party (PRP): A designation under the Comprehensive Environmental Response, Compensation, and Liability Act that identifies certain categories of persons as having legal responsibility for contamination at a site.

Resource Conservation and Recovery Act (RCRA): A Federal law passed in 1976 protecting human health and the environment from potential hazards associated with hazardous wastes.

Toxicity: A measure of the degree to which a substance is harmful to human and animal life.

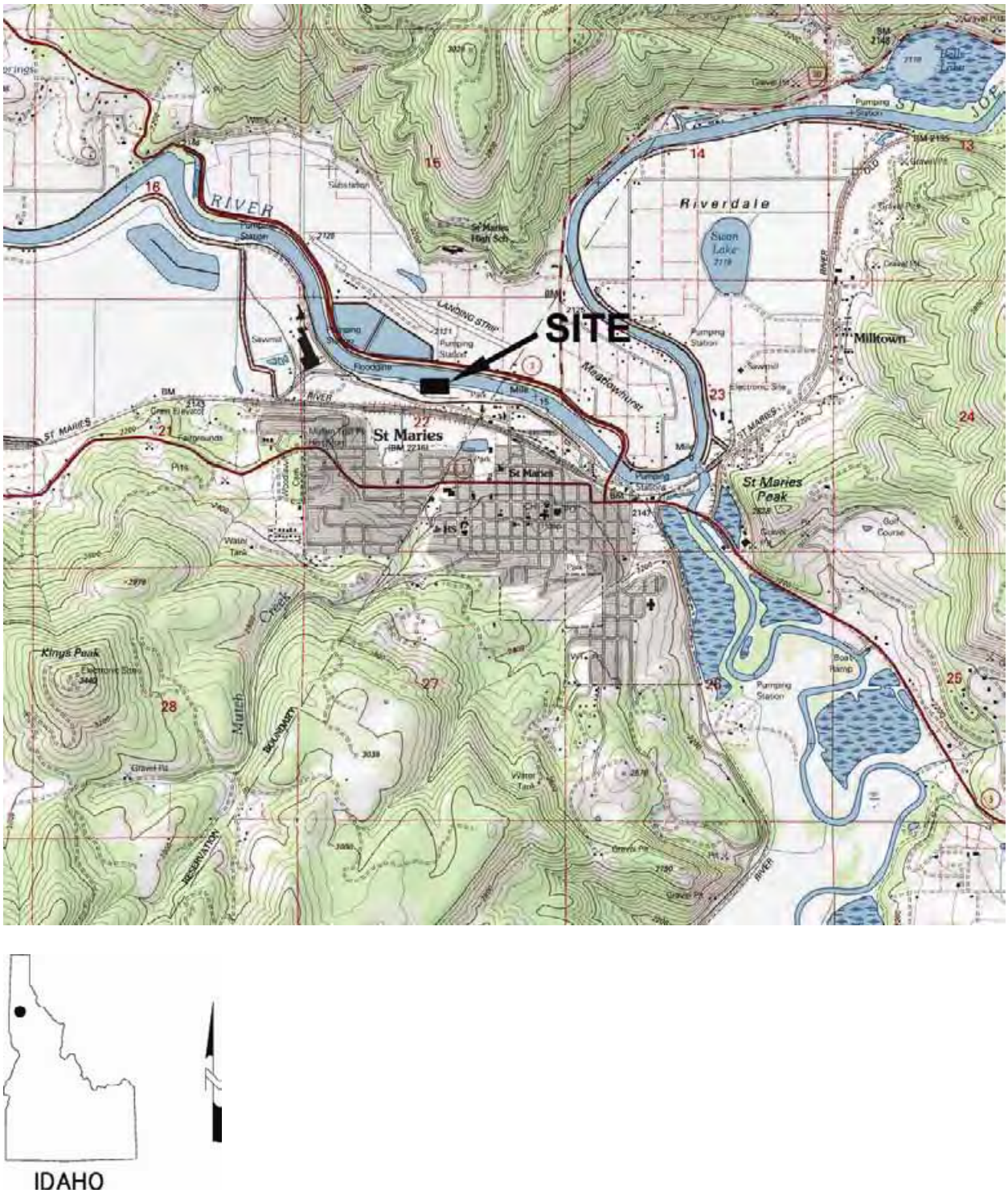

Figure 1: Site Vicinity Map

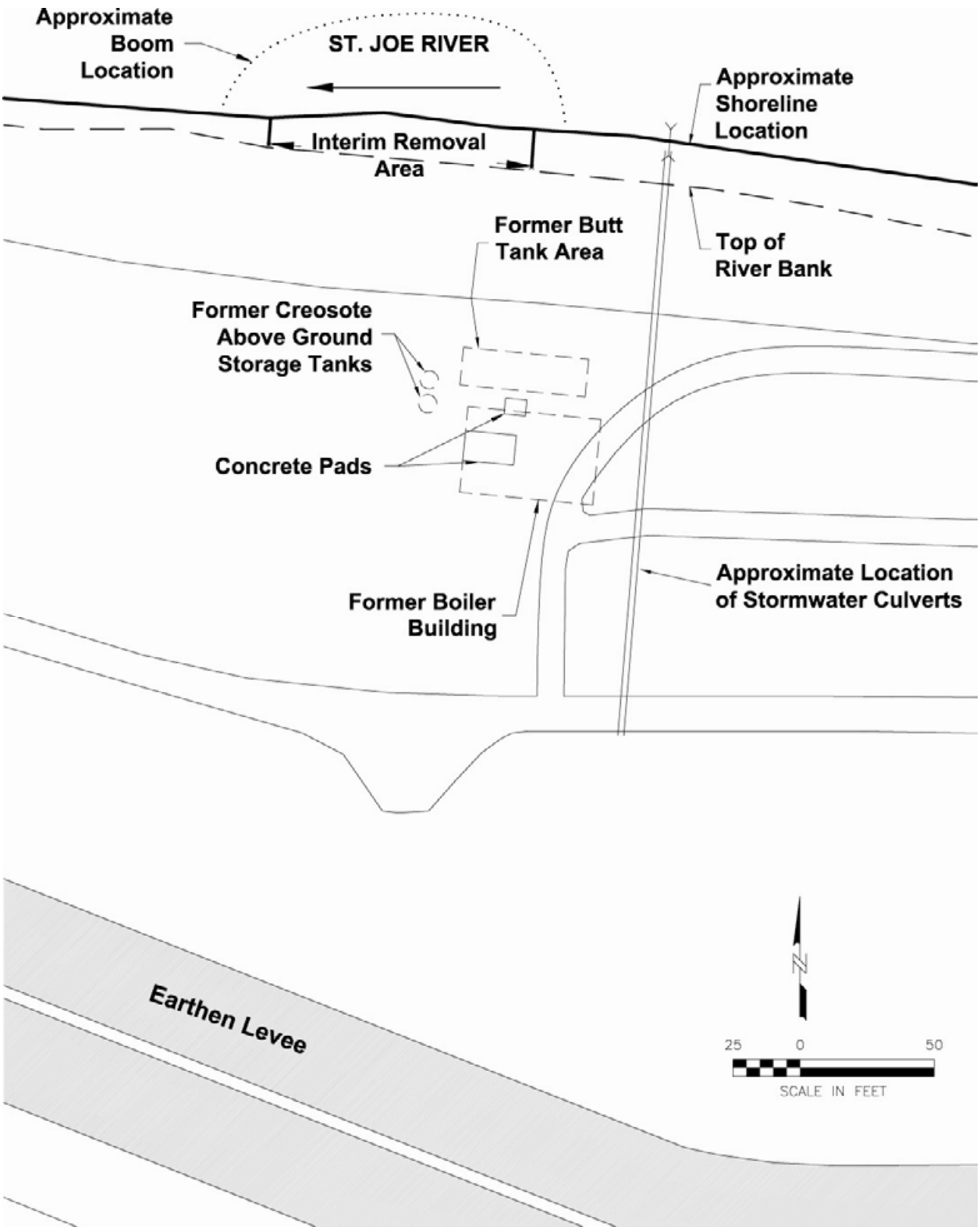

Figure 2: Former Treating Plant Layout

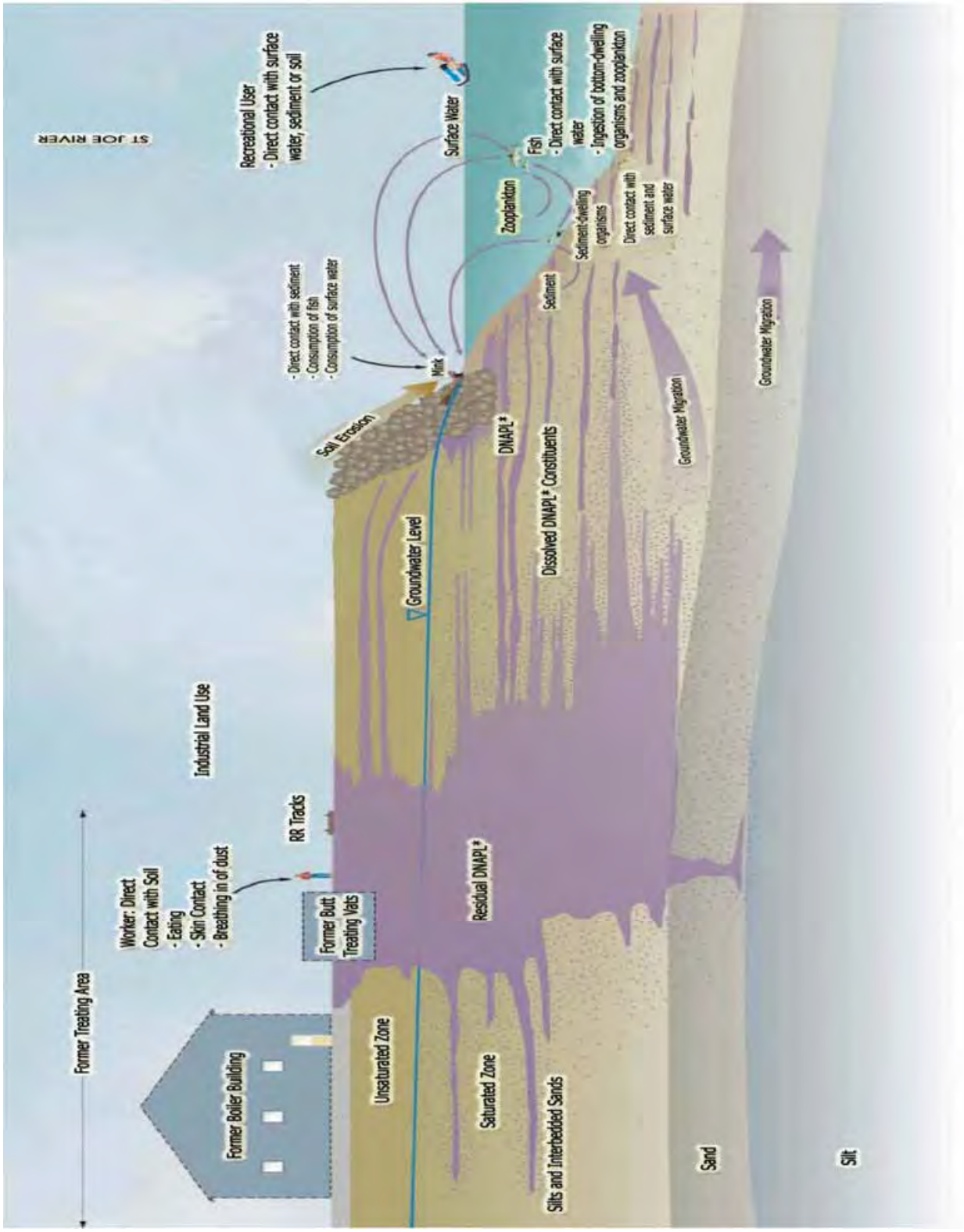

Figure 3: Conceptual Site Model

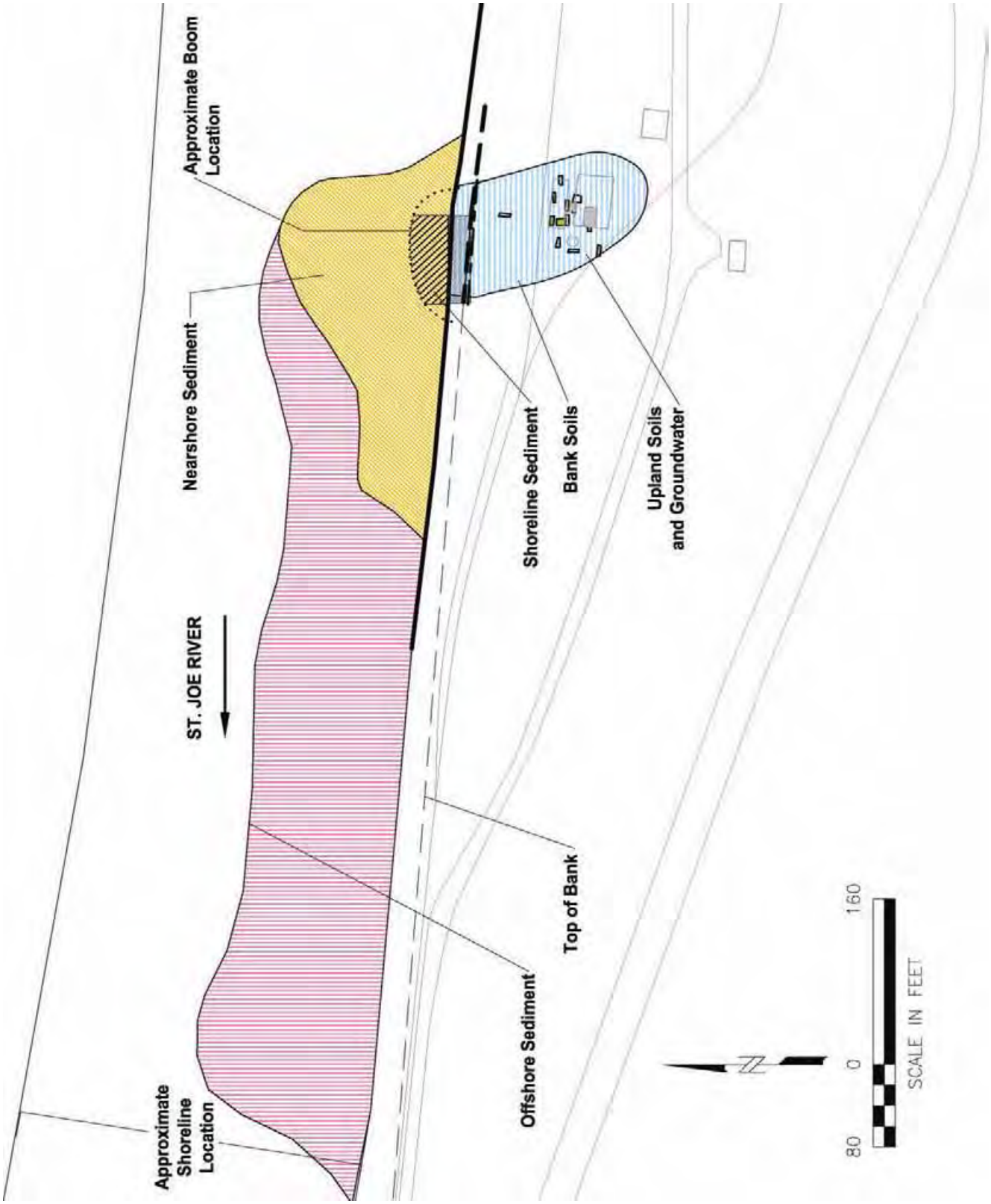

Figure 4: Site Subareas

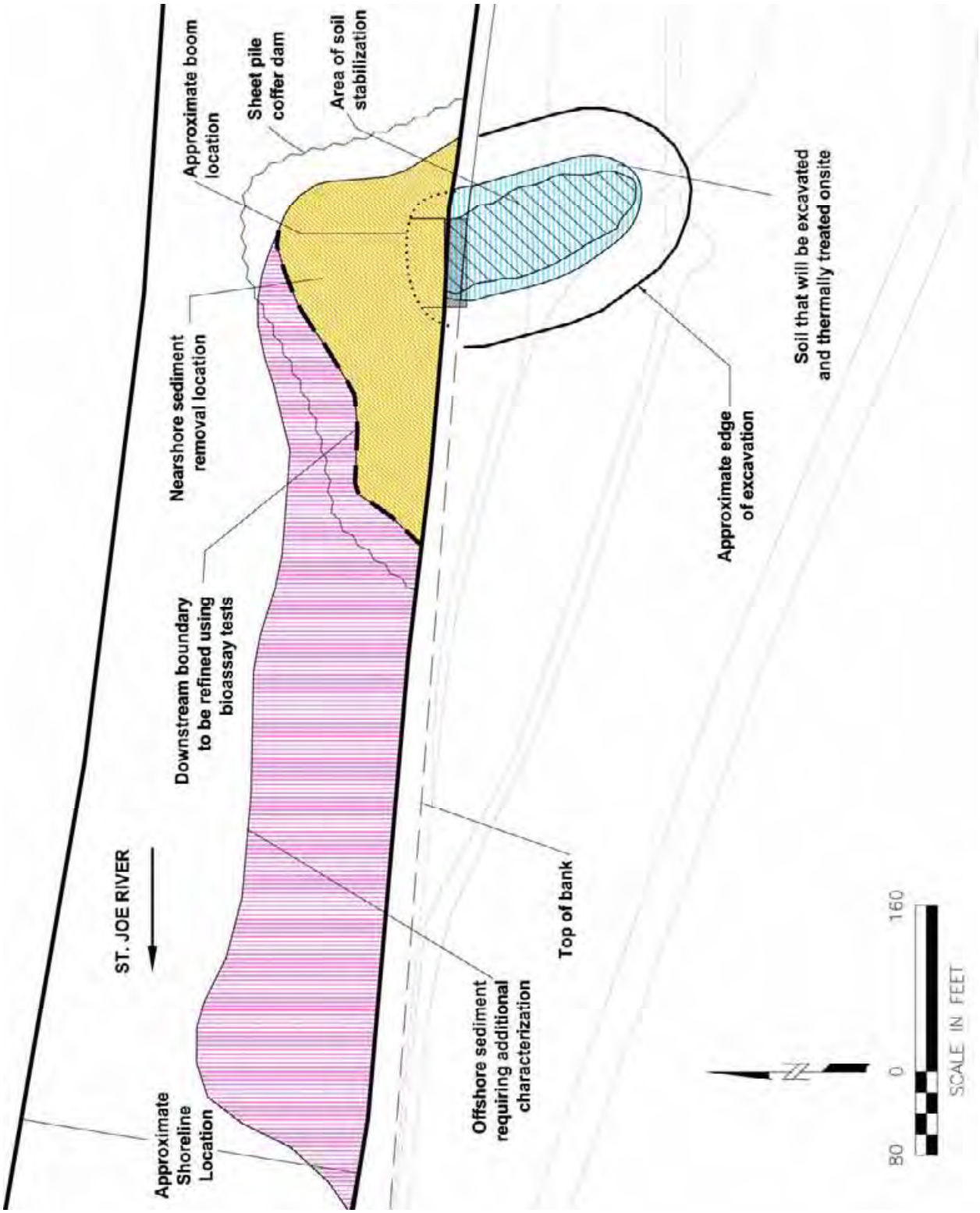

Figure 5: Components of EPA's New Preferred Alternative