

San Jacinto River Waste Pits Superfund Site Technical Document Review: Remedial Alternatives Memorandum (RAM)

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What is the purpose of the Remedial Alternatives Memorandum (RAM)?

The Remedial Alternatives Memorandum (RAM) is a document that lists the available options for cleaning up the San Jacinto River Waste Pit (SJRWP) Site based on the overall goals for remediating the Site. These goals, referred to as Remedial Action Objectives (RAO), will be discussed in further detail below.

What are the objectives of the RAM?

The objectives of the RAM are:

- To identify the relevant remediation options and current technologies specific to the Site.
- To develop the initial goals (RAOs) for the remediation.
- To identify and review options that call for contaminated sediment removal.
- To identify and review remedial possible technologies and eliminate those which are not practical or applicable.
- Narrow the remediation options based on the reviews of the alternatives and technologies. The remaining options will be further explored as part of the Feasibility Study (FS).

What is the current status of the SJRWP Site?

The Site consists of a set of impoundments located on the western bank of the San Jacinto River just north of the Interstate 10 (I-10) bridge. The SJRWP Site was added to the National Priority List (Superfund) on March 19, 2008. A time critical removal action (TCRA) was conducted at the northern impoundments in 2011. The TCRA involved placing nearly 60,000 tons of rock over the Site. The TCRA also included lining the areas with the highest levels of contaminants with geotextiles and geomembranes.

Dioxins and furans are the chemicals of primary concern (COPC) associated with the paper mill waste contamination site, because the highest risk to human health and ecosystems is associated with these chemicals. The highest concentration of contaminants occur within the original 1966 impoundment perimeter, but elevated concentrations have been reported in sediment samples collected outside of the original perimeter boundary. The remedial investigation (RI) for the site has been completed, and the FS is being prepared. As of September 2013, the FS is scheduled for completion in May of 2014.

What are the RAOs?

RAOs, are established in the RI/FS to specify “contaminants and media of concern, potential exposure pathways, and remediation goals” (40 Code of Federal Regulations [CFR] §300.430(e)(2)(i)). According to EPA Guidance Documents RAOs “describe what the proposed site cleanup is expected to accomplish.” Because the RAM is a document prepared early in the process,

this document includes *preliminary* RAOs, that may change based on the information gathered during the RI/FS process, and will only be finalized in the Record of Decision (ROD).

- RAO 1: Eliminate dioxins and furans from the paper mill waste from entering the sediment and surface water of the San Jacinto River.
- RAO 2: Reduce human exposure to dioxins and furans due to consumption of fish and shellfish by remediating sediments affected by the paper mill waste to EPA-approved levels.
- RAO 3: Reduce direct contact human exposure to dioxins and furans from the paper mill waste in contaminated sediment by remediating sediments affected by paper mill waste to EPA-approved levels.
- RAO 4: Reduce human exposures to Site-derived dioxins and furans from direct contact with upland soils to appropriate cleanup levels.
- RAO 5: Reduce the exposure of mammals, birds, fish, reptiles, and shellfish to COPCs by remediating sediment affected by paper mill wastes to appropriate cleanup levels.

What are the Sediment Management Areas (SMAs)?

Sediment management areas (SMAs) are used to divide the Site into smaller areas with common characteristics that might affect the performance of certain remedial technologies. For example, a remedial approach like capping might not be appropriate for deep water applications. Five SMAs were identified in this document:

- NAV – Navigation; areas that can or do currently support navigation by barges and other large vessels, typically areas that are deeper than 12 feet.
- NS – Near Shore; shallow (typically less than 2 feet) areas with limited access.
- ST – Fixed Structure; areas beneath the footprint of fixed structures
- TCRA – Time Critical Removal Action; area beneath the TCRA footprint
- OW = Open Water; all other areas not included above

A copy of the map prepared by the respondents, showing each of the areas, is provided below.

What are General Response Actions (GRAs)?

General Response Actions (GRAs) are major categories of cleanup activities that could be applied to manage the dioxins and furans in sediments and soils. Following Superfund guidance, clean up options that should be considered include:

- No Further Action
- Institutional Controls (administrative and legal controls like use restrictions and signs that limit access to contamination)
- Monitored Natural Recovery (MNR) and Enhanced Natural Recovery
- In Situ Containment (capping)
- In Situ Treatment (treating the contamination in place using technologies like solidification)
- Removal Technologies (digging up or dredging up the contamination)
- Ex Situ Treatment (treating the removed contamination using thermal [like incineration] or chemical treatment technologies)
- Disposal Technologies (both on and off site, for example landfilling or beneficial reuse of treated material)

**Identification of General Response Actions, Technology Types, and Process Options
Potentially Appropriate for the San Jacinto River Waste Pits RI/FS**

GRA	Technology Type	Process Option		Section
		Sediment	Soil	
Institutional Controls	Administrative and Legal Controls	Waterway Use Restrictions and Maintenance Agreements	Access and Property Use Restrictions	4.4.I Institutional Controls
		Access and Property Use Restrictions	Informational Devices (e.g., signage)	
		Informational Devices (e.g., signage and fish consumption advisories)		

GRA	Technology Type	Process Option		Section
		Sediment	Soil	
Natural Recovery	Monitored Natural Recovery	Sedimentation	Not Applicable	4.4.2 Monitored Natural Recovery and Enhanced Natural Recovery
		Placement of Thin Layer of Clean Cover		
In situ Containment	Cap	Conventional Cap	Soil Cap	4.4.3 In Situ Containment (Capping)
		Low-Permeability Cap		
In situ Treatment	Physical-Immobilization	Adsorptive Amendments	Adsorptive Amendments	4.4.4 In Situ Treatment
		Solidification/ Stabilization (S/S)	Solidification/ Stabilization (S/S)	
Removal	Dry Excavation	Excavator	Excavator	4.4.5 Removal
	Dredging	Mechanical Dredging		
		Hydraulic Dredging		
Ex situ Treatment	Thermal	Incineration	Incineration	4.4.6 Ex Situ Treatment Technologies
		In Pile Thermal Desorption	In Pile Thermal Desorption	
	Chemical	Solvated Electron Technology™ (SET)	Solvated Electron Technology™ (SET)	
		Base-Catalyzed Decomposition	Base-Catalyzed Decomposition	
Disposal/ Reuse	Aquatic Disposal	Confined Aquatic Disposal (CAD)	Not Applicable	4.5.1 Aquatic Disposal
		Nearshore Confined Disposal Facility		
		Open-Water Disposal		
	Off-Site Upland Disposal	Confined Disposal Facility/Landfill	Landfill	4.5.2 Upland Disposal
		Beneficial Use	Beneficial Use	4.5.3 Beneficial Use

What are the remediation alternatives?

The above technologies can be combined to two general methods of addressing the contamination related to paper mill wastes that were disposed at the San Jacinto Waste Pits site:

- Removal-Focused – Using one or more of the removal and disposal remedial technologies as the primary method to address the contamination related to the San Jacinto Waste Pits.
- Integrated-Focused – The primary method of addressing the contamination related to the San Jacinto Waste Pits site will be focused on limited disturbance of the materials, and will instead focus on maintaining the cap along with monitoring and possibly treating material on site.

In addition, as required by Superfund, a “No Further Action” alternative was included as a baseline for comparison. A summary of the alternatives follows:

How are the remediation options evaluated?

The RAOs are evaluated by looking at three criteria: implementability, effectiveness, and cost.

- *Implementability* - This evaluation criterion is based on whether a technology is technologically and administratively feasible. Specifically, technological feasibility refers to both the short-term (i.e., construction, operation, and completion of the remedial action) and long-term (i.e., O&M, replacement, and monitoring post-remedial action completion) aspects of an alternative. Administrative feasibility refers administrative features like agency coordination and project coordination (e.g., equipment or off-site storage availability).
- *Effectiveness* - This evaluation focuses on its ability to reduce the toxicity, mobility, or volume of contamination and its ability to minimize or eliminate the risk associated with a particular contaminant. Both short-term and long-term effectiveness is considered
- *Cost* - An assessment of the construction or implementation costs associated with a particular alternative are also included.

Remedial Technology and Disposal Screening Summary

GRA	Technology Type	Process Option	Implementability	Effectiveness	Cost	Screening Decision
Institutional Controls	NA	NA	Moderate	Moderate	Low	Retained ^{4,5}
Natural Recovery	Monitored Natural Recovery	Sedimentation	High	High ¹	Low	Retained ⁴
		Placement of thin layer of clean cover	Moderate to High	High ¹	Low to Moderate	Retained ⁴
In Situ Containment	Capping	Conventional	Moderate	High	Moderate	Retained ^{4,5}
		Low-Permeability	Low	High	Moderate to High	Retained ^{4,5}
In Situ Treatment	Physical-Immobilization	Solidification/Stabilization	Moderate to High ¹	High ²	Moderate	Retained ^{4,4,5}
		Adsorptive Amendments	Moderate to High	High	Moderate	Retained ^{4,5}
Removal	Dry Excavation	Soil Excavators	Low	Moderate to High ³	High	Retained ^{4,5}
	Dredging	Mechanical Dredging	Moderate	Moderate to High	High	Retained ⁴
		Hydraulic Dredging	Moderate	Moderate to High	High	Retained ⁴
Ex Situ Treatment	Thermal	Incineration	Moderate	High	High	Retained ^{4,5}
		Thermal Desorption	Low	High	High	Not Retained
	Chemical De-halogenation	SET	Low	Moderate	High	Not Retained
		BCD	Low	High	High	Not Retained
Disposal/Reuse	Aquatic Disposal	Confined Aquatic Disposal (CAD)	Moderate	Moderate to High	Low to Moderate	Retained ⁴
		Nearshore Confined Disposal Facility (CDF)	Moderate	Moderate to High	Low to Moderate	Retained ⁴
		Open-Water Disposal	N/A	N/A	N/A	Not Retained
	Off-Site Upland Disposal	Confined Disposal Facility/Landfill	Moderate	High	Moderate to High	Retained ^{4,5}
		Beneficial Use	N/A	N/A	N/A	Not Retained

What are the Next Steps?

Once the RAM and RI are complete, the respondents will use the information in both of those documents to prepare a FS to further evaluate the remedial alternatives. Once the FS has been completed, the U.S. Environmental Protection Agency (EPA) will use the information in the FS to select a remedy for the contamination at the site. International Paper Company and McGinnes Industrial Maintenance Corporation will then be responsible (under EPA oversight) to design and implement the selected remedy.