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Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R06-85/008
August 1985

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Superfund Record of Decision:

Bayou Bonfouca, LA

TECHNICAL REPORT DATA
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EPA/ROD/R06-85/008		

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	14. SPONSORING AGENCY CODE 800/00

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Bayou Bonfouca site, a 55-acre abandoned creosote works facility, is located off of West Hall Avenue and Bayou Lane in Slidell, Louisiana. The site is a flat, mostly overgrown parcel and is located primarily within a designated 100-year floodplain. The earliest records of the Bayou Bonfouca site date back to 1904. The creosote plant treated pilings for use in the construction of a railway across Lake Ponchartrain. Over the years, the plant operated under the ownership of various creosote companies, with the last property owner being the Braselman Corporation. On-site creosote waste deposits have contaminated the floor of the bayou, two drainage pathways through the site, the creek bottom, on- and off-site soil and upper groundwater zones.

The selected remedial action for this site includes: excavation, transportation and disposal of creosote waste and the upper six inches of contaminated soil beneath the creosote piles and debris at a RCRA landfill facility; and transportation and disposal of contaminated water by deep-well injection at an approved RCRA facility. Additional investigations will be undertaken to examine the contaminated drainage pathways, groundwater zones, and bayou sediment. These areas will be addressed in a second remedial action. Total capital cost for the selected remedial alternative is estimated to be $903,000.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Bayou Bonfouca, LA Contaminated Media: gw, soil, sediments Key contaminants: creosote		

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Record of Decision
Remedial Alternative Selection

SITE: Bayou Bonfouca, Slidell, Louisiana

DOCUMENTS REVIEWED

I am basing my decision on the following documents describing the analysis of cost effectiveness of remedial alternatives for the Bayou Bonfouca site:

- Bayou Bonfouca Task Memoranda Investigation Report
- Bayou Bonfouca Focused Feasibility Study
- Summary of Remedial Alternative Selection
- Responsiveness Summary

DESCRIPTION OF SELECTED REMEDY

- Creosote Waste - Offsite Landfill
- Contaminated Water - Injection Well

DECLARATIONS

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the National Contingency Plan (40 CFR Part 300), I have determined that the selected remedy at the Bayou Bonfouca site is a cost effective remedy and provides adequate protection of public health, welfare, and the environment. The State of Louisiana has been consulted and agrees with the approved remedy.

I have also determined that the action being taken is appropriate when balanced against the availability of Trust Fund monies for use at other sites. In addition, the off-site transport, and secure disposition is more cost effective than other remedial actions, and is necessary to protect public health, welfare, and the environment.

The EPA is undertaking an additional Remedial Investigation/Feasibility Study to evaluate potential groundwater contamination and bayou contamination remedies.

August 15, 1985
Date

Dick Whittington, P.E.
Regional Administrator
Region VI

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
BAYOU BONFOUCA
SLIDELL, LOUISIANA
AUGUST 1985

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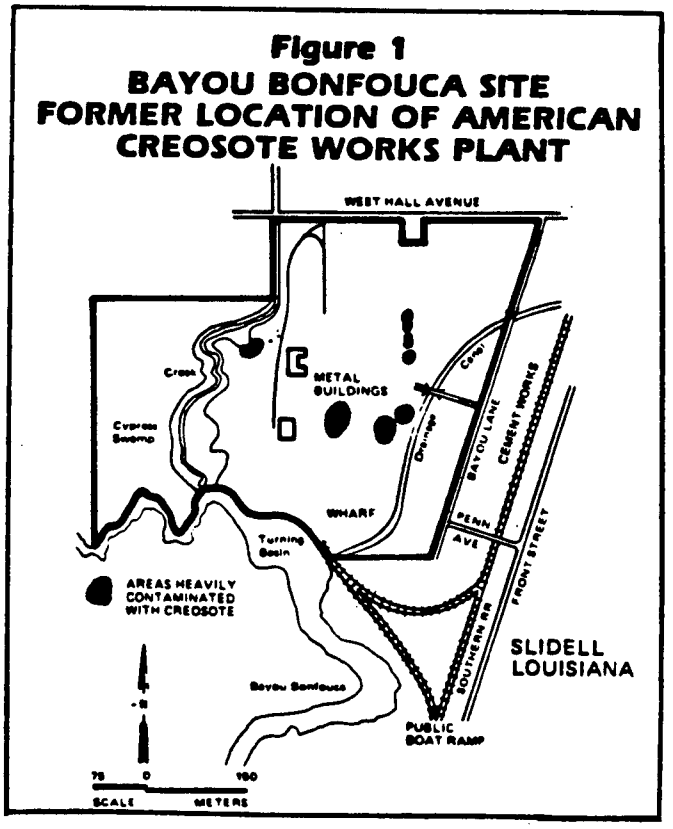
SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

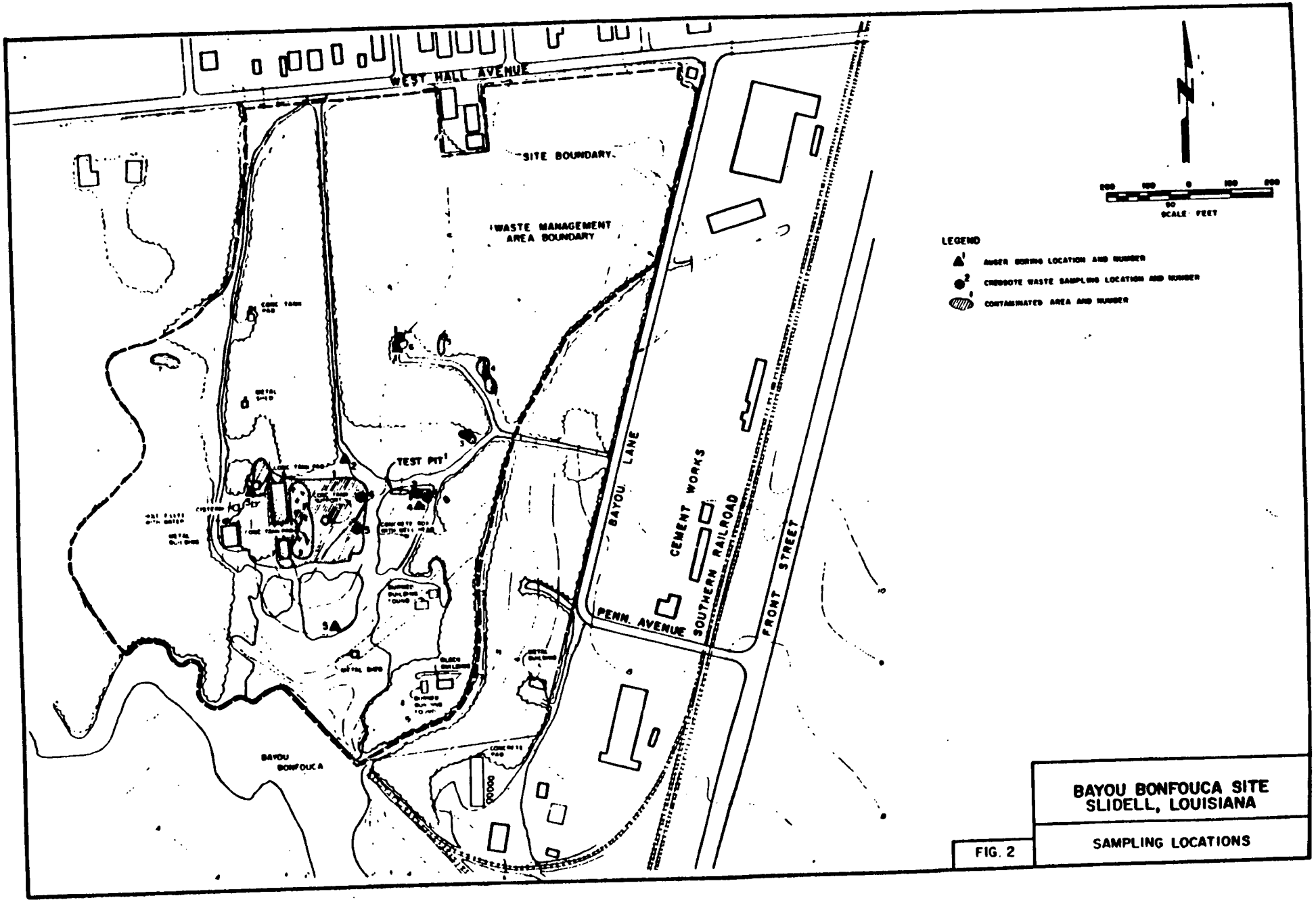
Bayou Bonfouca
Slidell, Louisiana

SITE LOCATION AND DESCRIPTION

The Bayou Bonfouca site, a 55 acre abandoned creosote works facility, is located off of West Hall Avenue and Bayou Lane in Slidell, Louisiana (Figure 1). The site, a flat, mostly overgrown parcel, is located primarily within a designated 100 year floodplain. Adjacent land uses include a cement works plant east of the site, residential/commercial areas to the north, and a subdivision west across the Bayou Bonfouca. The Bayou Bonfouca, a navigable waterway, flows south from the site seven miles to Lake Ponchartrain. Between 1970 and 1972, the plant was dismantled, leaving a few building shells and foundation slabs. Groundwater resources include two low-yield water-bearing sands within the top 50 feet of the surface that are not used at this time. A regionally significant aquifer named the Shallow aquifer begins at 60 feet and is some 100 - 150 feet thick. The principal aquifer of use is the Pontchatoula, at 1500 feet, which supplies water to the 26,000 residents of Slidell, of whom 10,000 live within one mile of the site.

Creosote contamination exists on the site surface, in the groundwater and on the bayou bottom. The purpose of this document is to outline the selection of the remedial alternative for the surface cleanup. This action will involve 5000 cubic yards of creosote waste 800 cubic yards of contaminated soil, 500 cubic yards of debris, and approximately 200,000 gallons of contaminated water. The creosote contamination in the groundwater and on the bayou bottom is the subject of a second operable unit and separate feasibility study.




WEST HALL AVENUE
SITE BOUNDARY
WASTE MANAGEMENT AREA BOUNDARY
TEST PIT
BAYOU LANE
CEMENT WORKS
SOUTHERN RAILROAD
PENN. AVENUE
FRONT STREET
BAYOU BONFOUCA
SCALE: FEET
LEGEND
AUGER BORING LOCATION AND NUMBER
CREOSOTE WASTE SAMPLING LOCATION AND NUMBER
CONTAMINATED AREA AND NUMBER
BAYOU BONFOUCA SITE
SLIDELL, LOUISIANA
FIG. 2
SAMPLING LOCATIONS

SITE HISTORY

The earliest records of the Bayou Bonfouca site date back to 1904. The creosote plant treated pilings for use in the construction of a railway across Lake Ponchartrain. Over the years, the plant operated under the ownership of various creosote companies including Southern Creosoting Company, Hattiesburg Creosoting Co., Gulf States Creosoting and American Creosote Works, with property ownership resting finally with the Braselman Corporation. Numerous releases of creosote occurred during the years of operation.

In 1976, the U.S. Coast Guard undertook an investigation of the Bayou Bonfouca waterway. This was supplemented by another study conducted by the EPA, the Coast Guard, and the National Oceanic and Atmospheric Administration in 1978. In 1979, a Regional Response Team agreed that dredging the Bayou Bonfouca and landfarming that waste along with the onsite creosote piles was a good cleanup solution. However, methods for dredging the Bayou Bonfouca were felt to be environmentally dangerous and merited more study. A cleanup proposal for the on-site contamination proposed by Braselman Corporation in 1981 was rejected as inadequate by the State of Louisiana. The site was included on the National Priority List in December 1982. The Remedial Investigation/Feasibility Study was initiated in late 1983 with the first phase of the field work completed in the summer of 1984. In late 1984, the EPA determined the need for an operable unit approach to the site. The surface contamination was the subject of the Focused Feasibility Study completed in May 1985.

CURRENT SITE STATUS

Since 1976, numerous studies have been undertaken to examine the extent of the problems originating from the Bayou Bonfouca site. These studies indicate four areas of major creosote contamination. The greatest amount of creosote is at the bottom of the Bayou Bonfouca. This deposit contains an estimated 24,000 yards of creosote extending 1400 feet downstream from the site with a thickness of one-to-three feet. A second area of concern is the two drainage paths through the site. The creek bottom and creek floodplain along the western side of the site contain 800 cubic yards of creosote, while the drainage ditch on the eastern portion of the site contains only minor creosote contamination. The third area of identified creosote contamination includes the seven locations of known on-site creosote waste deposits (Figure 2). Approximately 5000 cubic yards of creosote are contained in these deposits. The fourth area of creosote contamination is in the upper groundwater zones beneath the site.

Prior to the EPA remedial investigation of 1984, no groundwater contamination attributed to the site had been reported, and limited characterization of the hydrogeology of the site had been performed. It was known that the native clay soils had permeabilities in the 10^{-6} cm/sec range and shallow core borings were reported as uncontaminated. The EPA decided to install three monitoring well nests to verify the previous studies and enhance knowledge on the hydrogeology of the site. The investigation revealed two water-bearing zones above the regionally significant Shallow aquifer. The first zone is just below the surface. The second zone is a narrow confined silt layer approximately 30 feet below the site. The Shallow aquifer was determined to begin at 60 feet below the site. Well nests installed in the vicinity of the large creosote deposits were found to be contaminated in the first and second zone, but clean in the Shallow aquifer. The well nests installed in the northern portion of the site were found to be clean in both upper zones and in the Shallow aquifer.

The creosote material in the bayou, groundwater and on the site has been verified to be typical of most creosote, composed primarily of aromatic hydrocarbons, but containing many compounds. Results of sampling during the EPA remedial investigation (Table 1) revealed that the creosote in the on-site waste deposits contain percent range concentrations of base neutral organic compounds. Depending on the length of contact time and sensitivity of the individual, various health effects from mild rashes to severe burns could occur from direct contact with creosote. Additionally, some of the individual compounds, such as phenanthrene have been specifically identified as potential carcinogens (Table 2). Because of the real and potential harm that this creosote material could have on the public health, the EPA must determine what actions should be taken to alleviate any danger.

The results of the investigations performed to date at the Bayou Bonfouca site has prompted the EPA to phase the cleanup of the site into two operable units; a groundwater/bayou unit and a source control unit. The source control operable unit, the subject of this document, will include the on-site creosote waste deposits. A focused feasibility study (FFS) to identify cleanup alternatives to handle this material was completed in May 1985. The drainage path/groundwater/bayou unit is still under study.

The results of the analysis of the waste deposits reveal a distinct demarcation between the creosote deposits and the underlying native clays. Comparing Table 1 with Table 3, it is apparent that a sharp decrease in creosote constituents occurs in the soil at a depth of about six inches beneath the creosote deposits. Field observations further verify that the creosote deposits are easily distinguishable from the underlying clay. It is the intent of this operable unit to treat and dispose of, as appropriate, the creosote material. The quantity of this material is approximately 5000 cubic yards (Table 4). For added protection to the public health and the environment, the upper six inches of soil beneath the creosote piles will also be treated and disposed of, as appropriate. This quantity of material is approximately 800 cubic yards (Table 5) [Note: This material was not considered in the Focused Feasibility Study.] The treatment/disposal of this soil material along with the creosote waste will thus involve all major creosote constituent contamination. Additionally, the creosote waste piles contain water which will require treatment or disposal, as will the water needed to clean the concrete pads under parts of area 1. Finally, this operable unit will include the storage or disposal of 500 cubic yards of debris found in the creosote piles.

TABLE 1

CREOSOTE WASTE ANALYSIS

	Location[1]. 1	2	3	4	5
VOLATILE COMPOUNDS, ug/kg					
2 - Butanone[2].	38,000	38,000	38,000	41,000	38,000
Styrene	7,000	U	U	U	U
Benzene	U	U	U	5,800	U
Toluene	U	U	U	16,000	U
Ethylbenzene	U	U	U	16,000	U
Total Xylenes	U	1,800	U	27,000	2,400
SEMIVOLATILE COMPOUNDS, ug/g					
Naphthalene	2,500	1,700	480	11,000	4,200
2 - Methylnaphthalene	2,000	800	480	5,400	2,300
Acenaphthene	5,400	1,500	2,500	8,000	7,040
Dibenzofuran	3,800	1,700	2,300	10,000	6,400
Fluorene	5,800	2,400	4,400	11,000	10,000
Phenanthrene	28,000	16,000	26,000	52,000	48,000
Anthracene	7,500	3,300	8,200	120,000	16,000
Fluoranthene	16,000	14,000	19,000	18,000	28,000
Pyrene	8,800	7,800	8,800	9,800	15,000
Benzo(a)Anthracene	1,700	2,000	2,200	2,500	3,700
Chrysene	2,000	2,400	2,300	2,900	4,000
Benzo(b)Fluoranthene	1,000	1,800	1,400	U	1,100
Benzo(a)Pyrene	U	860	600	U	1,100

U = Undetected at analysis detection limits

1. Refer to Figure 2.
2. 2 - Butanone appears to be a potential laboratory contaminant

TABLE 2

HEALTH HAZARDS OF WASTE CONSTITUENTS

	Hazard Code[1]				
	1	2	3	4	5
VOLATILE COMPOUNDS					
2 - Butanone		o	o	o	
Styrene		o	o	o	
Benzene	o	o	o	o	o
Toluene		o	o	o	o
Ethylbenzene		o	o	o	o
Total Xylenes		o		o	o
SEMIVOLATILE COMPOUNDS					
Naphthalene		o	o	o	
2 - Methylnaphthalene*					
Acenaphthene		o			
Dibenzofuran*					
Fluorene	o		o		
Phenanthrene	o	o			
Anthracene		o	o		
Fluoranthene	o		o	o	
Pyrene	o		o		
Benzo(a)Anthracene	o		o		
Chrysene	o		o		
Benzo(b)Fluoranthene	o		o		
Benzo(a)Pyrene	o				

*Toxic Effects Unkknown

[1]Hazard Code

1. Possible Carcinogen
2. Irritant
3. Toxic by Ingestion
4. Toxic by Inhalation
5. Toxic by Skin Absorption

Sources:

1. Merck Index
2. Dangerous Properties of Industrial Materials
3. Priority Toxic Pollutants

TABLE 3

CREOSOTE CONSTITUENTS[1] IN SHALLOW SOILS (ug/g)

Sampling Depth (ft)	Boring Location[2] B-1	B-2	B-3	B-4	B-5	Test Pit
0-0.5	2,684	15,680	5,310	253	638	56
0.5-2.5	1	404	21	213	1	-
2.5-5.0	1	161	1	47	1	118
5.0-7.5	18	89	31	39	7	3
7.5-10.0	7	1	8	8	1	-

1. Creosote constituents represented by total semi-volatile compounds.
2. Refer to Figure 2.

TABLE 4

SURFACE CREOSOTE WASTE VOLUMES

Area Number (See Note 1)	Surface Area (ft^2)	Depth (ft)	Volume (ft^3) Creosote Waste	Volume (ft^3) Contaminated Water
1.A. Concrete	16,400	0.25	4,100	
B. Waste	34,800	3.0	104,400	
C. Standing Water	6,000	0.50		3,000
D. Cleaning Water	16,400	0.02(See Note 2)		328
Area 1	Subtotal		108,500	3,328
2.A.	1,290	1.5	1,935	
B.	129	0.5	65	
Area 2	Subtotal		2,000	
3.	1,800	0.5	900	
4.A.	840	2.5	2,100	
B.	1,260	1.5	1,890	
Area 4	Subtotal		3,990	
5.	750	1.0	750	
6.	707	1.0	707	
7.	1,500	3.0	4,500	
Area 1-7	Subtotal		121,347	3,328
	Contingency (10%)		12,135	333
	Total ft^3 (Rounded)		135,000	3,675
	Total yd^3		5,000	-
	Total gallons		-	27,500

Note
1. Refer to Figure 2.
2. Assumed to be 0.02 feet of contaminated water remaining over the concrete area following steam cleaning.

TABLE 5

SURFACE CREOSOTE WASTE VOLUMES - SOILS CONTAMINATION

Area	Surface Area (ft^2)	Volume[1] (ft^3)
1	34,800	17,400
2	1,419	710
3	1,800	900
4	2,100	1,050
5	750	375
6	707	353
7	1,500	750
	Total	21,538
	Cubic yards	798
	use	800

Previous Total = 5000 cubic yards

New Total = 5800 cubic yards

[1]Based upon six inches of soil removal

ENFORCEMENT

To date, two Potentially Responsible Parties (PRPs) have been identified at the Bayou Bonfouca site. These two PRPs are Braselman Corporation, the present property owner, and American Cresote Works, Incorporated (ACW), the last wood treating company to own/operate the facility.

ACW, a Texas corporation, owned/operated the facility from 1958 until 1972 when economic problems forced the closure of the operation. In 1975 ACW was sold to new owners. The former stockholders of ACW formed Braselman Corporation which retained the Bayou Bonfouca property.

ACW underwent several internal changes after 1975 and emerged as ACW, a Delaware corporation. Currently ACW is in Chapter 11 bankruptcy and is negotiating with EPA, Region 4, for liability on at least two other CERCLA sites. Some settlements have been made with ACW in Region 4; however, continued enforcement may force a Chapter 7 liquidation.

Braselman Corp., beginning in 1980, negotiated with the State of Louisiana to develop a mutually agreeable cleanup plan. These negotiations were unsuccessful. EPA and Braselman have also discussed the cleanup and the company has verbally indicated that it is interested in cleaning up the land portion of the property, but that it may not have the resources to undertake a CERCLA-approved cleanup.

EPA, Region 6, mailed "Notice Letters" to ACW and Braselman for the source control Remedial Design/Remedial Action. In a letter received by EPA on June 14, 1985, ACW declined involvement with the site cleanup. In a letter received on July 22, 1985, Braselman Corporation declared an inability to pay for the site cleanup.

ALTERNATIVES EVALUATION

A Source Control Focused Feasibility Study (FFS) was performed to determine what remedial action, if any, would be appropriate at the Bayou Bonfouca site. The purpose of the study was to propose source control remedial action to cost effectively mitigate and minimize damage to, and provide adequate protection of, public health, welfare, and the environment, resulting from the presence and release of hazardous substances from the surface of the Bayou Bonfouca site.

A source control remedial action is necessary at the Bayou Bonfouca site in accordance with the National Contingency Plan (NCP), 40 CFR Part 300.68 (e)(2), which states: "Source control remedial actions may be appropriate if a substantial concentration of hazardous substances remain at or near the area where they were originally located and inadequate barriers exist to retard migration of substances into the environment".

The primary threats that the Bayou Bonfouca site poses to the public health and safety are:

(1) Direct contamination of groundwater supplies in the area;

(2) transportation of the onsite waste material into a navigable waterway during flooding; and

(3) potential for direct contact with the concentrated hazardous material located on an unsecured site.

Remedial Objectives

The specific objective of the Bayou Bonfouca FFS is to develop and evaluate remedial action alternatives for the cleanup of creosote wastes and contaminated debris on the land surface in order to:

1. Minimize public exposure to creosote contamination existing on the surface of the site;

2. reduce the potential for continued contaminant releases to the Bayou from waste existing on the surface of the site;

3. mitigate the potential for contaminant migration due to site flooding;

4. minimize continuing contamination in the surficial and upper artesian aquifers at the site; and

5. Close the site in a manner that will minimize contaminant migration resulting from surface runoff, minimize surface water ponding, and minimize continued contamination from residual creosote constituents.

Cleanup criteria associated with each objective were not established since the goal of this action is source control; that is, to contain or remove the material from the uncontrolled condition in which it now exists. This would mean containing or removing the creosote wastes in bulk. In accordance with 40 CFR 300.68(e)(3), the contamination caused by the present waste is the subject of an ongoing remedial investigation study. That project will gather the necessary information to better ascertain what is needed to determine the level of cleanup for the bayou and groundwater contamination at Bayou Bonfouca. Meanwhile, the hazardous materials causing the shallow groundwater pollution and posing a threat to the public health, welfare, and the environment through potential surface water releases must be mitigated. To this end, nine source-control alternatives were considered, including a "no action" alternative.

Initial Screening of Alternatives

According to Section 300.68 (h) of the NCP, three broad criteria should be used in the initial screening of alternatives:

(1) Cost. For each alternative, the cost of installing or implementing the remedial action must be considered, including operation and maintenance costs. An alternative that far exceeds the cost of other alternatives (i.e., order of magnitude) evaluated, and that does not provide substantially greater public health or environmental benefit should usually be excluded from further consideration.

(2) Effects of the Alternative. The effects of each alternative should be evaluated in two ways: (a) Whether the alternative itself or its implementation has any adverse environmental effects; and (b) for source-control remedial actions, whether the alternative is likely to achieve adequate control of source material, or for off-site remedial actions, whether the alternative is likely to effectively mitigate and minimize the threat of harm to public health, welfare or the environment. If an alternative has significant adverse effects, it should be excluded from further consideration. Only those alternatives that effectively contribute to protection of public health, welfare, or the environment should be considered further.

(3) Acceptable Engineering Practices. Alternatives must be feasible for the location and conditions of the release, applicable to the problem, and represent a reliable means of addressing the problem.

Nine alternatives were screened in terms of the criteria of the NCP, as summarized in Table 6. The rationale for rejecting or selecting each alternative for further detailed evaluation follows.

Alternative 1 - No Action: 40 CFR 300.68(h)(2)(ii) sets forth one criteria for the rejection of a remedial alternative and one criteria for the acceptance of a remedial alternative. The criteria for the rejection of an alternative is that adverse effects would be caused by implementation of the alternative. As documented previously, past releases of hazardous contaminants into the surface water and groundwater have occurred and are still occurring. The no action alternative would allow this to continue.

The continued release of hazardous contaminants demonstrates inadquate isolation and control of the wastes at the Bayou Bonfouca site. Therefore, the no action alternative would not meet the criteria for alternatives under the NCP. Resulting risks to the public health and the environment caused by the no action alternative would be unacceptable and the no action alternative is rejected.

The rationale for retaining or rejecting the remaining alternatives is briefly summarized:

Alternative 2 - Fencing with Run-on and Run-off Control (Construction of fences and berms around the creosote piles) - Rejected

Rationale:

No groundwater protection
Excessive maintenance requirements

Alternative 3 - RCRA - Compliant On-site Landfill (Construction of a RCRA-compliant landfill at the Bayou Bonfouca site) - Retained

Rationale:

Waste isolated from the environment and public

Alternative 4 - Capping with Consolidation (Placement of the creosote piles into one area and construction of a clay cap over that area.) - Rejected

Rationale:

Insufficient groundwater protection due to free liquids in waste
Waste not destroyed or isolated

Alternative 5 - On-site Biological Degradation (Construction of a biological treatment process on the Bayou Bonfouca site) - Rejected

Rationale:

Not historically proven for degradation of creosote waste

TABLE 6

INITIAL SCREENING FACTORS

	Alternative	Present Worth Cost	Public Health & Environmental Effects	Engineering Practice
1.	No Action	0	Waste migration, direct contact Continued ground water contamination	Not Accepted Practice
2.	Fencing w/Run-on Control	200,000	Waste migration direct contact Continued ground water contamination	Not Accepted Practice Excessive Maintenance Requirements
*3.	On-site RCRA Landfill	1,000,000	No significant effects if liner, etc. intact	Accepted and Proven Practice
4.	Cap & Consolidate	500,000	Continued ground water contamination	Accepted and Prov Practice
5.	Onsite Biological Degredation	NA	NA	Not Historically Proven or Accepted Practice
*6.	Onsite Incineration	4,000,000	No significant effects	Accepted and Proven Practice
7.	Offsite Incineration	5,500,000	No significant effects	Accepted and Proven Practice
*8.	Offsite Landfill	750,000	No significant effects if containment intact	Accepted and Proven Practice
9.	Offsite Biological Degredation	NA	NA	Not Historically Proven or Accepted Practice

* - Retained for Detailed Evaluation
NA - Insufficient Information Available to Perform Adequate Screening Evaluation

Alternative 6 - On-site Incineration (Use of a mobile incinerator on the site to burn the creosote.) - Retained

Rationale:

Waste destroyed

Alternative 7 - Off-site Incineration (Transport of the creosote to existing RCRA incineration facilities for burning.) - Rejected

Rationale:

Costs significantly greater than all other alternatives
Does not provide advantage over on-site incineration

Alternative 8 - Off-site landfill (Transport of the creosote to existing RCRA-compliant landfill facility.) - Retained

Rationale:

Low cost alternative
Waste isolated from the environment and public

Alternative 9 - Off-site Biological Degradation (Transport of the creosote to existing biological treatment facilities) - Rejected

Rationale:

Few existing facilities
Not historically proven for degradation of creosote waste.

Description of Retained Alternative

The three retained alternatives were analyzed (Table 7, 8) in detail, in accordance with the NCP, 40 CFR Part 300.68 (i). Common to all three alternatives is the disposal of washwater and rainwater. An estimated 28,000 gallons of water will be used to clean the concrete pads and a quantity of rainwater will be contained during construction. The washwater and rainwater, the quantity dependent on the length of implementation of each alternative, will be disposed of by deep-well injection at an approved facility. There are also approximately 500 cubic yards of debris, barrels, pipes, etc., which will be disposed of at a landfill onsite or offsite, as appropriate. The cost for disposal of the debris and the water is included in each alternative. Following excavation of the waste areas and cleaning of the concrete slabs, samples of the soil beneath the concrete and in the excavated areas will be collected and analyzed to determine the level of contaminants in the soils for consideration of subsurface contaminant migration and the need for additional remedial action. Excavated areas will be backfilled and compacted with a minimum of two feet of clay, one foot of sand, and two feet of topsoil. The surface of each area will be vegetated and graded to promote positive drainage and minimize erosion. Table 9 summarizes the cost of the retained alternatives. A summary of the full discussion of the three retained alternatives contained in the FFS follows.

TABLE 7

COMPARISON OF PUBLIC HEALTH AND ENVIRONMENTAL EFFECTS

	PUBLIC HEALTH							ENVIRONMENTAL						
	Beneficial		Adverse					Beneficial			Adverse			
Alternative	1	2	1	2	3	4		1	2	3	1	2	3	4
No Action			•								•	•	•	
Onsite Landfill	•				•			•	•			•		•
Onsite Incineration	•	•		•	•			•	•	•				•
Offsite Landfill	•				•	•		•	•					•

PUBLIC HEALTH EFFECTS

Beneficial

1. Removal of direct contact hazard
2. Destruction of wastes

Adverse

1. Continued direct contact potential
2. Potential exposure to combustion air emissions
3. Site worker exposure during implementation
4. Potential for spills during transport offsite.

ENVIRONMENTAL EFFECTS

Beneficial

1. Isolation of wastes
2. Eliminates migration pathwa
3. Destruction of wastes

Adverse

1. Continued potential for surface water pollution
2. Pre-empts alternate land use
3. Potential for waste migration
4. Potential for air pollution during implementation.

TABLE 8

COMPARISON OF INSTITUTIONAL ISSUES

Alternative	INSTITUTIONAL ISSUES 1	2	3	4	5	6
No Action	●			●	●	
Onsite Landfill	●	●		●	●	●
Onsite Incineration			●			
Offsite Landfill						●

Issues

1. Precludes beneficial land use.
2. Requires continued maintenance and monitoring.
3. Requires compliance with air quality regulations.
4. Wastes located near residential areas.
5. Requires deed restrictions on property.
6. Requires monitoring of RCRA permit compliance.

TABLE 9

SUMMARY OF COSTS FOR REMEDIAL ACTION ALTERNATIVES

Alternative	PRESENT WORTH Capital Cost	O & M Cost	Total Present Worth
NO ACTION	NA	NA	NA
ONSITE LANDFILL	$ 735,000	$207,840	$ 942,840
ONSITE INCINERTION	4,914,180	0	4,914,180
OFFSITE LANDFILL	903,000	0	903,000

RCRA - Compliant On-site Landfill

This alternative entails the construction of an on-site double-lined landfill that complies with provisions of RCRA. The major components of the lining system include a 2 foot liner of compacted clay, two synthetic liners, and a drainage layer of sand containing the leachate collection and removal piping between each liner. A final cover system consisting of compacted clay, drainage layer, synthetic membrane, compacted soil, and topsoil layers will be placed over the landfill. Groundwater monitoring will be designed to be in compliance with RCRA requirements for the life of the landfill (i.e., 30 years).

The estimated capital costs of the on-site landfill is $735,000. The post-closure cost elements for the on-site landfill include groundwater monitoring, maintenance, leachate removal and disposal, and site inspection and security; all at a present worth cost of $207,840. The total present worth cost is estimated to be $942,840.

Construction of the landfill will be straight forward. No unusual construction techniques will be required to implement the alternative, but provisions for siting the landfill in a 100 year floodplain will be necessary. The possiblility for liner failure does exist due to unforeseen reasons, such as burrowing animals and other potential problems. However, techniques are available to deal with such occurrences.

This alternative will result in some negative public health and environmental effects resulting mainly from the construction of the fill. During construction, there will be minor short-term effects on air quality resulting from vehicle exhaust, particulate emissions and creosote vapors. On-site workers will be required to maintain continuous environmental monitoring and use proper personnel protection. After construction is completed, the wastes will be isolated from the environment, although not destroyed or rendered harmless.

Adverse environmental impacts due to the implementation of this alternative are not anticipated.

On-site Incineration

This alternative will involve the utilization of a mobile incinerator to effectively destroy the hazardous organic constituents in the creosote wastes. The incinerator system used, rotary kiln or otherwise, will be expected to fully comply with the technical requirements for incinerators set by RCRA. Remaining ash will be analyzed to determine the presence of any hazardous waste. Assuming no hazardous waste is present, delisting procedures will allow the ash to be disposed of in a sanitary landfill. The estimated capital costs of the on-site incinerator is $4,914,000. Since the wastes are destroyed, no long-term operation and maintenance costs exist.

The mobile incineration of hazardous waste contaminated with creosote is an advanced treatment technology that is becoming proven. The constructability of the system is more complex than other alternatives, lending itself to long implementation time. Additionally, comparatively more engineering expertise during design and implementation is needed to carry out the alternative.

This alternative has positive long-term public health and environmental effects by destroying the wastes, removing the direct contact hazard, and eliminating further surface water and groundwater contamination, Short-term effects during the handling and incineration of the creosote waste will be minimal given proper safety precautions and proper operation of equipment.

Adverse environmental impacts due to the implementation of this alternative are not expected.

RCRA Compliant Off-site Landfill

This alternative will involve the excavation of 6300 cubic yards of creosote wastes and creosote contaminated debris which will be transported off-site by truck to a RCRA-compliant hazardous waste landfill. The estimated capital cost, based on vendor quotes from existing RCRA facilities, for this alternative is $903,000. No operation and maintenance costs exist in this alternative.

Minimal engineering is needed for the implementation of this alternative. The excavation would be accomplished using backhoes and front-end loaders. The free liquids within the waste would need to be removed or chemically fixed prior to transportation and disposal. Since the free liquids consist mostly of water, a drainage system to separate the water from the waste could be utilized to reduce the amount of fixation.

By isolating the wastes from the environment, this alternative results in positive long-term public health and environmental effects. This alternative would entail transportation risks not found in the other alternatives.

COMMUNITY RELATIONS

The public comment period was from May 31 to June 21, 1985. The public meeting took place on June 12, 1985, in Slidell, Louisiana. Thirty people were in attendance, with six people commenting or asking questions at the meeting. No written comments were received concerning the proposed remedies.

In addition to the public meeting, a briefing for local officials was held on June 12, 1985, at the offices of the City of Slidell. The city engineer was briefed on the proposed alternatives and the EPA preferred alternative. No major concerns were voiced by the city engineer about any of the alternatives.

In the presentation on June 12, 1985, the EPA indicated a preference for the off-site landfill alternative at a cost of $810,000 (now amended to $903,000) as the remedial action. This alternative will consist of the excavation and removal of the creosote contamination to a RCRA-approved landfill facility. This alternative was considered acceptable to all parties.

CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

As specified in the EPA draft policy on compliance with environmental statutes other than CERCLA, the alternatives were developed to correspond to one or more of the following categories:

1. Alternatives specifying off-site storage, destruction, treatment, or secure disposal of hazardous substances at a facility approved under the Resource Conservation and Recovery Act (RCRA). Such a facility must also be in compliance with all other applicable EPA standards (i.e., Clean Water Act, Clean Air Act, Toxic Substances Control Act).

2. Alternatives that attain all applicable or relevant Federal public health or environmental standards, guidance, or advisories.

3. Alternatives that exceed all applicable or relevant Federal public health and environmental standards, guidance, and advisories.

4. Alternatives that meet the CERCLA goals of preventing or minimizing present or future migration of hazardous substances and protect human health and the environment, but do not attain the applicable or relevant standards. (This category may include an alternative that closely approaches the levels of protection provided by the applicable or relevant standards).

5. No action.

As a result of the initial screening, the following alternatives corresponding to the above categories, except category 4, were retained for detailed evaluation. The alternatives corresponding to category 4, consolidation with capping and fencing with run-on control, failed to meet the screening criteria.

Alternative	Category
No Action	5
On-site Landfill	2
On-site Incineration	3
Off-site Landfill	1

In accordance with the May 6, 1985, memorandum "Procedures for Planning and Implementing Off-site Response Actions," any waste removed from the Bayou Bonfouca site will be disposed of or treated at RCRA facilities that are in compliance with all applicable requirements for the facility type. Additionally, landfill disposal facilities will meet the minimum technical requirements of the 1984 RCRA amendments. All three of the alternatives developed for the source-control action at the Bayou Bonfouca site can be implemented in compliance with this policy.

RECOMMENDED ALTERNATIVE

In accordance with 40 CFR 300.68(j), the lowest cost alternative that is technologically feasible, reliable, and which effectively mitigates and minimizes damage to, and provides adequate protection of, public health, welfare, or the environment, has been determined to be excavation and transportation of the creosote waste material to a fully compliant RCRA-approved landfill. The cost of this alternative is approximately $903,000. The off-site landfill alternative will effectively isolate the waste from the public, eliminating a direct contact hazard, and will protect the environment by eliminating migration pathways for the waste material in the creosote piles on the Bayou Bonfouca site.

The on-site landfill alternative and the on-site incineration alternative do not prove to be cost effective when compared to the off-site landfill alternative. (See Table 10 for a summary of the comparison of the alternatives). Onsite landfill will cost four percent more and onsite incineration 540 percent more than the off-site landfill alternative. For these alternatives to be recommended over off-site landfill, an appropriate increase in protection to the public health and the environment would have to be achieved.

The on-site landfill and the off-site landfill options provide equal long-term protection to the public health and the environment since both alternatives provide isolation of the waste. Implementation of the on-site landfill achieves a marginal increase in short-term protection to the public health and the environment because of the elimination of the transportation risks inherent in the off-site alternative. However, the marginal gain is offset some by the risks associated with the construction activities needed to build and fill the landfill and to place the waste. The added long-term operation and maintenance costs of an on-site landfill do not provide a further increase of protection, but instead lend to a decrease in the cost effectiveness of an on-site landfill since the off-site landfill capitol costs include long-term monitoring performed by the facility operator/owner. The site is not a good location for a landfill due to the floodplain and high groundwater table. The four percent increase in cost for the on-site landfill over the off-site landfill does not provide for an equivalent increase in protection to the public health and the environment. Thus the on-site landfill would not be allowed as the cost effective alternative in accordance with the National Contingency Plan.

The on-site incineration option provides greater long-term protection to the public health and the environment by destroying the waste as opposed to isolating the waste in a landfill. In comparing short-term protection factors, the elimination of most of the transportation risks inherent in the off-site landfill alternative are offset by the risks

of incineration of hazardous material in a populated area. Both types of risk are relatively minimal and can be strictly controlled. Failures in either transportation or burn efficiency are equally unacceptable. Weighing these factors, and given the small amount of waste subject to this particular action, it is more cost effective to isolate the creosote material in the RCRA-compliant landfill than to destroy the material by on-site incineration.

In summary, the most cost effective alternative for the source-control action at the Bayou Bonfouca Superfund site consists of the excavation, transportation, and disposal of approximately 5000 cubic yards of creosote waste, 800 cubic yards of contaminated soil, and 500 cubic yards of contaminated debris at a RCRA-compliant landfill facility, and the transportation and disposal of approximately 242,000 gallons of contaminated water by deep-well injection at an approved RCRA facility. The estimated cost of the alternative is $903,000 with a construction time of two months.

TABLE 10

COMPARISON OF REMEDIAL ALTERNATIVES

Alternative	Present Worth Cost (thousands) Capital	Total	Public Health Considerations	Environmental Considerations	Technical Considerations	Public Comment	Other
1. No Action (not retained)	NA	NA	Direct contact by residents of carcinogenic, volatile contaminants from air emissions or run-off. Continued groundwater contamination.	Exposures to biota of hazardous material.	Periodic emergency responses.	No comments	Requires deed restrictions.
2. On-site Landfill	735	943	Eliminate immediate public health risks. Minimizes direct contact. Minimal excavation risks. No transportation risks. Minimal hazardous vapor risks.	Wastes isolated.	Poor location for landfill. Maximum on-site construction.	Mildly opposed	Continued monitoring and maintenance.
3. On-site Incineration	4,914	4,914	Same as 2 but added long term benefits.	Wastes destroyed.	Less reliable technology. Longest implementation time.	Mildly opposed	Air quality monitoring.
4. Off-site Landfill	903	903	Same as 2 but involves transportation risks.	Same as 2	Minimum implementation time	Favored	RCRA permit monitoring.

SCHEDULE

° Source Control Record of Decision (ROD) Signed	August 1985
° Interagency Agreement for Design Awarded	August 1985
° Interagency Agreement for Remedial Action Awarded	September 1985
° Design Completed	November 1986
° Bid Award	January 1986
° Construction Begins	February 1986

FUTURE ACTIONS

As described previously, the Agency is conducting a remedial investigation in order to evaluate the need for remedial measures for the groundwater and bayou contamination. The report on this investigation should be available in August 1985.

COMMUNITY RELATIONS RESPONSIVENESS SUMMARY

Bayou Bonfouca, Louisiana

INTRODUCTION

The responsiveness summary documents for the public record:

- Concerns and issues raised during remedial planning.
- Comment raised during the comment period on the Feasibility Study.
- How EPA considered and responded to these concerns.

CONCERNS RAISED PRIOR TO THE FEASIBILITY STUDY COMMENT PERIOD

In response to an April 1976 media request, the U.S. Coast Guard began investigating creosote pollution of Bayou Bonfouca. Five area residents filed reports with the U.S. Coast Guard citing damage to boats from contact with oily substances in the bayou. Later in 1976, the local newspaper reported continuous discharges of creosote-derived oils into the bayou.

A 1978 fish kill in the bayou near Slidell, Louisiana was attributed to anoxia. About this time, there were other complaints concerning creosote odors, oil slicks on properties adjacent to the bayou, and foul-tasting seafood from the bayou.

More recent press releases covering the site related to a house fire in the immediate vicinity and to a 1980 proposal to construct a ship-building facility on the property. The Bayou Bonfouca Environmental Society was formed in 1980 and actively opposed the sale of the site to the shipyards company. Champion Shipyards issued a letter to the public identifying positive impacts of its proposal. The local Chamber of Commerce sponsored a public meeting to discuss the issues involved. Local opposition concerned land use incompatibility as well as the potential for the stirring up of creosote settled into the bayou bed.

City officials first became concerned about the site when they were considering purchase of the property for a city park in the early 1980s.

There was local, New Orleans, and Baton Rouge press coverage in 1982 concerning the Superfund National Priorities List. This coverage included discussions of the Bayou Bonfouca site.

An extensive article in the New Orleans Times-Picayune appeared in August 1984, based upon the reporter's review of the EPA Bayou Bonfouca files. The paper later published a letter from the Regional Administrator addressing some of the issues raised by the article.

CONCERNS RAISED DURING THE COMMENT PERIOD AND EPA RESPONSE

The public comment period was from May 31 to June 21, 1985. The public meeting took place on June 12, 1985, in Slidell, Louisiana. Thirty people were in attendance with six people commenting or asking questions at the meeting. No written comments were received concerning the proposed remedies.

In addition to the public meeting, a briefing for local officials was held on June 12, 1985, at the offices of the City of Slidell. The city engineer was briefed on the proposed alternatives and the EPA preferred alternative. No major concerns were voiced by the city engineer about any of the alternatives.

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COMMUNITY CONCERNS

The following issues were raised at the public meeting. The EPA response follows the comment.

Comment #1

Richard Van Sandt, Slidell City Councilman, asked for the status of the bayou in EPA's program and expressed concern that the site's ranking on the NPL (517) would jeopardize funding of any work. Mr. Van Sandt indicated support for the preferred alternative.

EPA Response

The study of the bayou will be completed this Summer with a Feasibility Study completed this Fall. The EPA will hold another public meeting upon completion of the Feasibility Study. The site's ranking will have no effect on the availability of funding. At this time, funds are available for the proposed cleanup.

Comment #2

Armand Pichon, former St. Tammany Parish councilman, wondered if it would be possible to consider on-site incineration, with the incinerator remaining in St. Tammany Parish to handle sludge wastes from wastewater treatment plants and domestic trash. The incinerator, upon completion of burning the creosote, could be sold to a private company for operation in the Parish.

EPA Response

Two problem areas exist with this proposal. First, technical considerations preclude the use of mobile incinerators built to handle hazardous waste from being used to burn domestic waste. The mobile incinerators that burn hazardous waste are built for low flow rates at temperatures higher than is practical for domestic use. Second, legally the cost of an alternative for use at a Superfund site must be justifiable for that site alone. The cost of this proposal to the Agency would be at least $35 million exceeding the cost effectiveness requirement of CERCLA.

Comment #3

Ben Benson, Peterson, Inc., inquired as to the length of cleanup, destination of the waste, and determination of "how clean is clean." He also asked if samples would be taken after excavation of the creosote, and if any air emissions are expected.

EPA Response

The recommended alternative is expected to take two months once the cleanup action begins. The waste will be taken to a fully compliant RCRA facility that has had no significant (Class 1) violations in its last inspection, which must have occurred less than six months prior to disposal of the waste. The cleanup action is presently set to remove the creosote sludge plus six inches of native soils. Additional samples of the soil will be taken prior to finishing the cleanup to determine the effectiveness of the removal. Significant air emissions are not expected due to the excavation, based upon EPA tests performed in the Summer of 1984.

Comment #4

George Stewart, Slidell resident, asked if the creosote material slated for removal could be recycled.

EPA Response

The quality and quantity of the waste material is such that a recycling scheme is not practical.

Comment #5

John Case, Slidell resident, requested an opinion from George Buynoski of the Centers for Disease Control (CDC) about the effect of the site on the public health of the local residents.

EPA (CDC) Response

It is the opinion of the CDC that there is no acute public health problem due to the site. Receptor pathways are not contaminated, that is, the drinking water is not contaminated nor are air emissions occurring. The concern from a health perspective is direct contact with the waste. While the creosote would not constitute an immediate threat to anyone, it is advisable from a public health viewpoint to perform remedial actions at the site to eliminate long-term risks.