United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R06-87/022
October 1986

EPA

Superfund Record of Decision:

GURLEY PIT, AR

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
EPA/ROD/R06-87/022		

4. TITLE AND SUBTITLE	5. REPORT DATE
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	14. SPONSORING AGENCY CODE 800/00

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Gurley Pit site, located within the flood plain of 15 Mile Bayou, a tributary of the St. Francis river, is 1.2 miles north of Edmondson in Crittenden County, Arkansas. The site, contained on three sides by soybean fields, slopes gently toward the Bayou. Originally the site was a single large pit created when a clay deposit was excavated for use as construction material. Currently the single pit is divided into three cells by earthen dikes. From 1970 to 1975 the Gurley Refining Company operated the pit under a Arkansas Department of Pollution Control and Ecology (ADPCE) permit for the disposal of sludge and filter material from the re-refining of used motor oil. In December 1975, Gurley Refining returned its permit saying the waste disposal had stopped and the site was secure. In May 1978, the U.S. Fish & Wildlife Service reported that overflows from the pit had damaged fish and waterbirds in the Bayou. In April 1979, 15 Mile Bayou flooded and innundated the pit, causing as much as 500,000 gallons of oil to escape from the pit into the surrounding fields and Bayou. Approximately 432,470 cubic feet of sludge, soil, sediments and oil contained in the pit are contaminated with lead, barium, zinc and PCBs.

The recommended remedial alternative includes: construction of an onsite pond water treatment unit; treatment of pond water with discharge to 15 Mile Bayou; removal of solid contaminants from pond water to be disposed of with the pit sludge; removal of oil (See attached sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Gurley Pit, AK - EDD First Remedial Action Contaminated Media: pit water, soil, sediments Key contaminants: PCBs, heavy metals, VOCs		

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Gurley Pit, AK - EDD

16. ABSTRACT (continued)

from the pond water by an oil/water separator and drummed and incinerated in a PCB approved incinerator; excavation and stabilization of pit sludge, sediments and soil. (Stabilized materials will be held onsite in the pit's north cell); and onsite capping of stabilized waste. The estimated capital cost for this remedial alternative is $5,780,000 with annual O&M of $21,000.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

ENFORCEMENT DECISION DOCUMENT
REMEDIAL ALTERNATIVE SELECTION

Gurley Pit Site
Edmondson, Arkansas

Documents Reviewed

I am basing my decision on the following documents describing the analysis of the cost and effectiveness of remedial alternatives for the Gurley Pit site:

- Remedial Investigation: Gurley Oil Pit, Final Report, April 18, 1986 by CH_2M Hill
- Endangerment Assessment, Gurley Oil Pit, Final Report, April 18, 1986 by CH_2M Hill
- Final Feasibility Study, Gurley Oil Pit, April 18, 1986 by CH_2M Hill
- Responsiveness Summary on Public Comments During the RI/FS Process
- Summary of Remedial Alternative Selection

In addition I have discussed the issues involved in this case with my staff and considered their recommendations.

Description of the Selected Remedy

The basic selected remedy is in two parts: treatment and discharge of contaminated water in the pit and stabilization of waste sludges and sediments with disposal of them and contaminated soils in an on-site landfill. Major points of the remedy are:

1. An on-site water treatment unit would be built. The unit would include both physical and chemical treatment. The resulting water must meet NPDES discharge criteria.
2. Water from the pit would be treated and discharged to 15 Mile Bayou, a nearby stream.
3. Solid contaminants removed from the water would be disposed of with the pit sludge.

4. Oil removed from the water by the oil/water separator would be drummed and incinerated in a PCB approved incinerator.

5. Pit sludge, sediments and contaminated soil would be excavated and stabilized. Stabilized material would be held on-site in the pit's north cell.

6. A RCRA compliant on-site landfill cell would be constructed with an appropriate groundwater monitoring system.

7. Stabilized waste would be placed in the RCRA cell.

8. Adequate provisions for permanent operation, maintenance and monitoring would be made. This would include limiting site access and maintenance of protection against flooding.

Declaration

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 described in the preceeding section is a cost-effective remedy that provides adequate protection of public health, welfare and the environment. The State of Arkansas has been consulted on the remedy, but did not submit formal comments. Informal, oral comments by staff of the Arkansas Department of Pollution Control and Ecology indicated that the State feels that the selected remedy is too extensive and has too great a financial cost.

I have also determined that the alternative selected is a cost-effective alternative when compared to the other remedial options reviewed. Performance of the selected alternative is necessary to protect public health, welfare and the environment.

10.6.1986
Date

Frances E. Phillips
Acting Regional Administrator

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

Gurley Pit, Edmondson, Arkansas
Source Control

Site Location and Description

The Gurley Pit site is located 1.2 miles north of Edmondson in Crittenden County, Arkansas. It is on the northwest corner of the intersection of County Roads 14 and 175. The location is shown in the figure below.

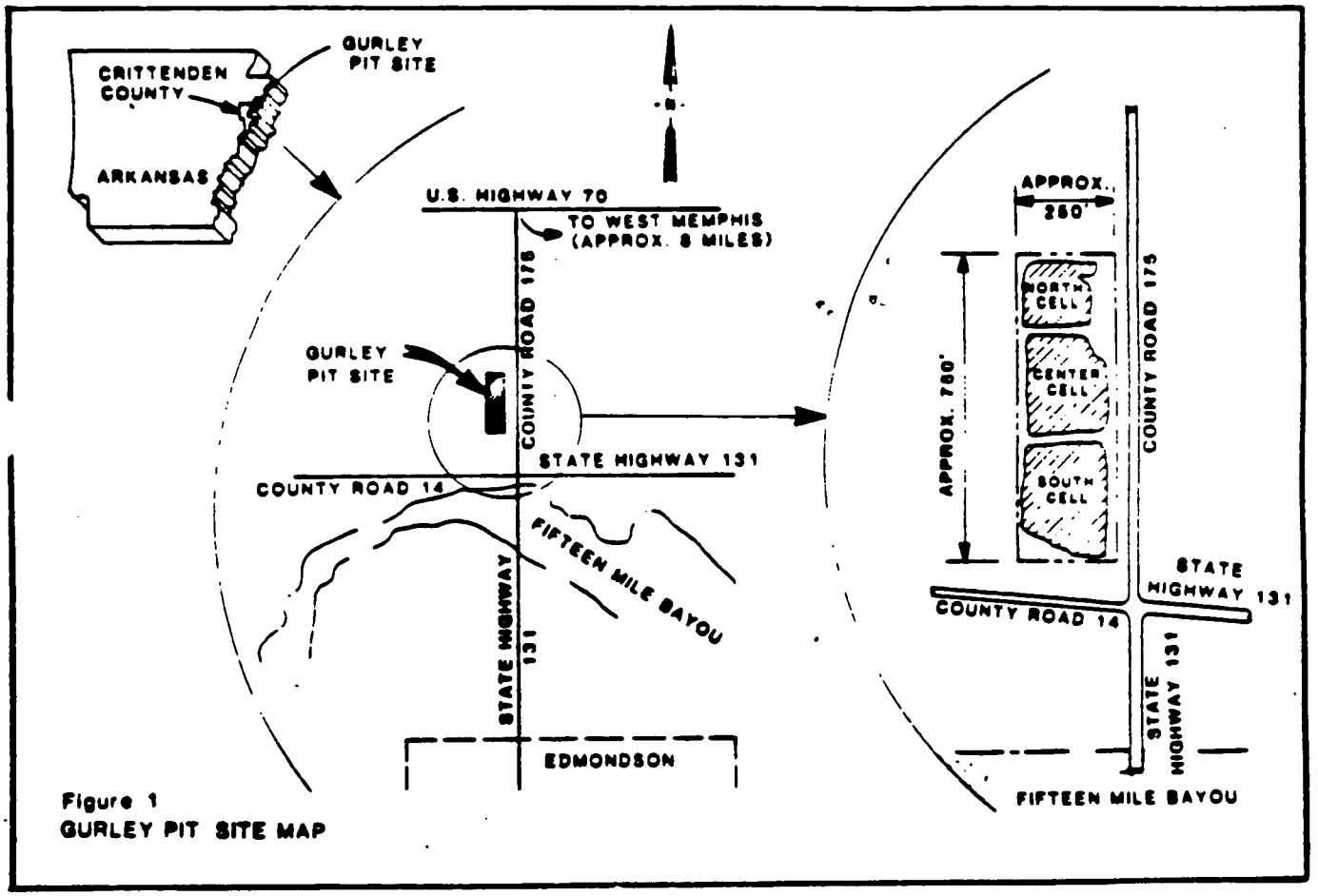

Figure 1
GURLEY PIT SITE MAP

The site is located within the floodplain of 15 Mile Bayou, a tributary of the St. Francis River. The site is surrounded on three sides by soybean fields. On the fourth, across County Road 175, are two residences. There are a total of five residences within a half-mile radius of the site. The town of Edmondson to the south of the site, has around 500 residents. The site consists of a single pit divided into three cells by earthen dikes. The area is generally flat, sloping gently toward 15 Mile Bayou. There are three major groundwater aquifers at the following depths: 90 to 200 feet; 300 to 1125 feet; and 1400 to 1700 feet. The shallow aquifer is used for irrigation. Area drinking water is supplied by a private water company from a well in the deep aquifer. The well is located about two miles south of the site.

Site History

Originally the site was a single large pit made when a clay deposit was excavated for use as construction material. In July, 1970, the Gurley Refining Company of West Memphis, Arkansas, got a ten year lease from the property owner to use the pit for waste disposal. Gurley Refining got a permit to use the pit for waste disposal from the Arkansas Department of Pollution Control and Ecology (ADPC&E) in September 1970. From then until late 1975 Gurley Refining used the pit to dispose of sludge and filter material from the re-refining of used motor oil. In December 1975 Gurley Refining returned its permit to ADPC&E saying that the waste disposal had stopped and that the site was secure.

In May 1978 the U.S. Fish and Wildlife Service reported that overflows from the pit had damaged fish and waterbirds in the bayou. EPA directed work to treat and discharge the pit waters. In April 1979 15 Mile Bayou flooded and innundated the pit. Perhaps as much as 500,000 gallons of oil escaped the pit into the surrounding fields and down into 15 Mile Bayou. EPA cleaned up the spill under Section 311 of the Clean Water Act. In December 1982 the site was placed on the National Priorities List (NPL). Negotiations to get PRP investigation and clean-up failed and in February 1984 an EPA remedial investigation was started. This culminated in the Remedial Investigation Report, Endangerment Assesment, and Feasibility Study that were released April 18, 1986.

Current Site Status

The remedial Investigation showed the pit to be 250 feet wide and 750 feet long. The pit is nine feet deep at the edge deepening to 15 feet in the center. The pit is divided into three cells, north, center and south. (See Figure 1) The north cell is full of sludge. The center and south cells are full of water with a one to two foot layer of sludge/sediment on the bottom.

Total Waste

Sludge, soil and sediments	432,000 cubic feet
Water	4.1 million gallons
Oil	470 cubic feet

Sampling and analysis of the pit contents show the following major contaminants:

Average Level of Major Contaminants

Contaminant	Sludge (ppm)	Water (ppm)	Oil (ppm)
lead	14,000	0.05	80
barium	936	0.04	47
zinc	1,530	0.41	764
PCBs	20	ND	28

ND = below detection limits

The sludges show a variety of low levels of other metals and broad contamination with heavy hydrocarbons typical of oil wastes. Sediment samples taken in the drainage ditch that runs from next to the pit down to 15 Mile Bayou showed no contamination. Soil borings taken a few feet beyond the pit edge also showed no contamination. The borings were converted into monitoring wells and sampled. The wells were of two different depths, 20 and 50 feet. Analysis of samples showed low levels of metals and some organics, but no PCBs, in three of the shallow wells. Judging from the results of the remedial investigation there has been little vertical movement of the contaminants and only slow horizontal movement. This is due to the low permeability of the soil in which the pit lies. Further investigation will be needed to find the horizontal extent of the contaminant movement.

The risk for overflows from the pit still exists. The surrounding clay holds water in the pit and a period of heavy rains could lead to a pit overflow. The drainage ditch next to the site leads directly to 15 Mile Bayou so any overflow would have ready access to surface waters. The pit is still fenced, but remains open. The risk for direct contact with waste either in the pit or in surrounding areas following an overflow remains. As for receptors, there are five homes within a 0.5 mile radius of the pit. However, they do not use the area groundwater as a drinking water supply. The groundwater is used for irrigation and, should contamination spread to sufficient depth, plant uptake could become a factor in irrigated areas. Area residents could be exposed in either occupational (agriculture) or recreational (hunting and fishing) settings. In case of release to 15 Mile Bayou, the Bayou's aquatic plants and animals would be a receptor.

Enforcement Analysis

There are two PRPs, Gurley Refining and the property owner, Mr. Caldwell. Gurley Refining has sent in a letter stating that it has liquidated its assets and is unable to do the work. The letter did not include any support for this statement. Mr. Caldwell has also submitted a letter stating that he does not have the resources to pay for the work. Mr. Caldwell has already won a suit in U.S. District Court holding Gurley Refining responsible for costs due to pit releases.

Alternatives Evaluation

The alternatives seek to eliminate the three most probable routes for contaminant exposure: releases due to pit overflow or flooding; movement of contaminants into the groundwater; and air releases. The alternatives all have two main parts, disposal of contaminated water and disposal of contaminated solids. Offsite disposal of the water was considered, but rejected. There are no commercial treatment plants or POTWs nearby that are capable of handling the volume of water involved. As sites further away were considered problems with transportation and the sheer cost of moving so large a volume of water rapidly eliminated these options. What remains is onsite treatment with discharge of the clean water. This option is readily obtainable. The water contamination consists of heavy metals. These can be removed with available precipitation, chemical treatment and sedimentation technologies.

The following table shows the options for handling the sludge, soil and sedime

TABLE 1
SUMMARY OF REMEDIAL ALTERNATIVES

REMEDIAL ACTIONS	ALTERNATIVES					
	1	2A	2B	3	4A	4B
No Action	•					
Excavate sludge, soil, and sediment		•	•	•	•	•
Offsite disposal in landfill		•	•			
Onsite disposal in landfill				•		
Offsite incineration					•	•
Backfill excavated area with clean soil		•	•	•	•	•
Remove surface water and take to offsite disposal facility		•			•	
Treat surface water onsite and discharge into Fifteen Mile Bayou			•	•		•
Fence site and monitor groundwater				•		
Estimated cost (in millions)	-0-	$12.6	$7.5	$5.8	$28.2	$23.2

Alternative 1 is the no action alternative. Alternative 2 is offsite disposal in a landfill. Alternative 3, onsite disposal in a RCRA landfill cell, meets all relevant and applicable standards. Alternative 4, offsite incineration, exceeds those standards. Table 2 presents in full the manner in which the alternatives were evaluated. Essentially, Alternative 3 meets all the necessary standards. The no action alternative was eliminated since the potential for pit overflows or flooding was not ended. Any alternatives between Alternative 3 and no action, such as capping or stabilizing the waste in place, were eliminated as we already have evidence of migration out of the pits. Existing clays are slowing but not stopping migration of the waste. Inquiries about stabilizing revealed two problems. One was that the high organic content of the waste would make it vulnerable to degradation by moisture after stabilization if in fact the stabilization process would be effective on the waste in the first place. None of the processes evaluated by EPA to date appear able to prevent this. This eliminated the stabilization and capping alternatives. If additional migration measures such as sheet pilings or slurry walls were taken to prevent groundwater intrusion into the stabilized waste the cost was so close to that of the RCRA cell and the surity of the remedy so much lower that we are left with Alternatives 3 and 4. Incineration, Alternative 4, has the advantage of elimination of the waste. Yet the threat from the waste if placed onsite in a RCRA cell is very low. The combination of a properly constructed and monitored RCRA cell combined with the already low permiability clay onsite should easily be able to contain the stabilized waste. The large increase in cost for incineration for a small gain in containment weighed against incineration. In addition, the waste would have to be transported, unstabilized to an incinerator. This would increase the danger of exposure of the public through accidental spills. The combination of high cost and increased risk to the public eliminated Alternative 4.

TABLE 2

TECHNICAL EVALUATION MATRIX
(Page 1 of 2)

ALTERNATIVE	TECHNICAL			
	PERFORMANCE	RELIABILITY	IMPLEMENTABILITY	SAFETY
	--	o	↔	↔
Assembled Alternative 1				
No Action	Poor Contaminant migration to offsite watercourses and groundwater expected over a long-term period.	Not Applicable	Easiest alternative to implement.	No construction required.
Assembled Alternative 2A	+	+	o	--
Stabilize sludge, contaminated soil and sediment, transport stabilized waste to offsite RCRA disposal facility, remove surface water, transport to a RCRA treatment facility.	Alternative removes waste and transports it to a more controlled situation. Removal of waste would eliminate source of surface and groundwater contamination. Public health and environment would be protected.	Stabilization techniques for this waste have high reliability and have demonstrated and proven performance.	Construction can be accomplished with moderate effort. Nearby residences and the site's location in the 100 year flood plain will cause constraints. This can be overcome by detailed project planning. Implementation should be completed within one year.	Nearby residences will be affected by construction activities. Even with careful planning, stringent safety procedures will be necessary for worker and nearby resident protection.
Assembled Alternative 2B	+	+	o	—
Stabilize sludge, contaminated soil and sediment, transport stabilized waste to offsite RCRA disposal facility, treat surface water onsite.	Same as 2A except surface water would be treated onsite and discharged.	Same as 2A except personnel would be required to operate the onsite treatment facility. Onsite treatment facility has proven reliability and performance.	Same as 2A. Construction can be easily accomplished although the facility would require protection from the 100 year flood.	Same as 2A except slightly less disruption of neighborhood due to less truck traffic because surface water would not be transported offsite.
Assembled Alternative 3	+	o	--	--
Stabilize sludge, contaminated soil and sediment, dispose in an onsite constructed RCRA landfill, onsite surface water treatment.	Stabilized waste would be excavated and disposed in an onsite RCRA landfill. Should adequately control the release of hazardous mate-	Requires periodic operation and maintenance. RCRA landfills have been proven reliable in the field. Surface water treatment has proven to	Alternative requires one year or longer to implement. The RCRA landfill would require a moderate effort to construct.	Same as 2A except time required to implement would be longer with increased potential of exposure.

TABLE 2
TECHNICAL EVALUATION MATRIX
(Page 2 of 2)

ALTERNATIVE	TECHNICAL: PERFORMANCE	TECHNICAL: RELIABILITY	TECHNICAL: IMPLEMENTABILITY	TECHNICAL: SAFETY
Assembled Alternative 4A	+	--	--	--
Excavate sludge, contaminated soil and sediment, transport offsite to a RCRA permitted incinerator, surface water removal, transport and treatment at a RCRA facilty.	Incineration is a proven method to destroy some hazardous waste constituents, residues from incineration may require disposal at a RCRA facility. Performance is a proven and commercially available technology. Surface water removal and treatment at a RCRA facility is a proven technology.	Incineration facilities require constant attention by highly-trained personnel. Reliability is proven and well established. Surface water removal and treatment has high reliability.	Offsite facilities are available but cost may be high. Offsite facilities that can treat waste material may be limited. Ash residue would require disposal at a RCRA facility. Incineration of the waste material would take several years.	Excavation will require stringent safety procedures.
Assembled Alternative 4B	+	--	--	--
Excavate sludge, contaminated soil and sediment, transport offsite to a RCRA permitted incinerator, onsite surface water treatment.	Same as 4A. Surface water treatment onsite is a commercially available and demonstrated technology.	Same as 4A	Same as 4A	Same as 4A
	--	--	-	-
In situ stabilization of sludge; surface water treatment or removal; installation of a RCRA cap (not evaluated in detail).	Stabilization would be blind. All waste material may not be stabilized. Waste material could leach to groundwater.	Requires periodic maintenance. Questionable reliability due to lack of liner and leachate collection/ detection system.	Alternative could be implemented in 1 to 2 years.	Same as 2A

:fer to Appendix B for discussion on The Evaluation Matrix Criteria

Community Relations

Community concern beyond residents in the immediate pit area is very low. Statements by [illegible] pit residents and by the mayors of Edmondson and surrounding communities expressed a desire for any action so long as it solved the pit problem. There was no specific support or opposition to any alternative except from the PRPs or their representatives.

Consistency with Other Environmental Laws

Major environmental laws impacted would be: RCRA standards for construction, maintenance, closure and monitoring of hazardous waste sites; Clean Air Act and National Ambient Air Quality Standards for emission of pollutants to the air; Toxic Substances Control Act regulations for PCB disposal; NPDES, Federal Water Quality Criteria and Executive Orders for Flood Plains and Wetlands as they apply to discharges to surface streams; and finally, Department of Transportation and RCRA requirements for the transport of hazardous substances. The no action alternative violates all of these requirements. The remaining four alternatives could meet all of them. The offsite disposal and incineration alternatives both exceed the requirements for RCRA disposal and closure. The recommended alternative, treatment and discharge of the pit water and onsite disposal of the sludge, sediments and soil in a RCRA cell, meets all of the relevant and applicable standards.

Recommended Alternative

Table 3, the Final Evaluation Matrix, compares each of the alternatives, including number 3 the recommended alternative, for reliability, cost and public health concerns. The no action alternative fails to protect the public health or the environment. The offsite incineration alternative costs four times as much as the recommended alternative with only minor improvements in protection. Disposal in an offsite landfill would provide the same level of reliability and protection of public health and the environment as the recommended alternative, but would expose the public to greater risk during transport of the material to the offsite landfill and would be 1.7 million dollars more expensive. A mention will be made here of the alternative of stabilizing the waste in place and using a RCRA cap. This alternative was screened out before the final evaluation stage and is mentioned here only to satisfy the requirement for an alternative that fails to meet relevant and applicable standards. The stabilization processes evaluated to date will not pass RCRA tests for stabilization since the organic content of the waste is so high. Degredation of the stabilized waste with subsequent migration offsite could occur due to contact with area groundwater. This alternative fails to protect the public and fails to meet relevant and applicable standards. The only way it would not fail would be the introduction of a new stabilization process that could demonstrate compliance with relevant and applicable standards.

A breakdown of the costs associated with the recommended alternative has been provided in Table 4. The major components of the capital costs are 1 million dollars for construction of the RCRA landfill cell, $370,000 for stabilization of the waste, 1 million for backfilling of the excavated area and construction of flood protection, and $600,000 for onsite treatment of contaminated water. Annual operation and maintenance is expected to cost $21,000. This includes annual groundwater monitoring, maintenance of the monitoring wells, cell cap, and the flood protection.

Operation and Maintenance

Permanent operation and maintenance would be required with the recommended alternative. As the alternative includes a RCRA landfill cell, the RCRA requirements for annual groundwater monitoring would have to be met. This will require the annual sampling of one upgradient and three downgradient monitoring wells with analysis for specified contaminants. In addition to the sampling and analysis, routine maintenance of the physical aspects of the remedy would be necessary. The cap, flood control structures , site fence, and monitoring wells will have to be maintained. Any plan for implementation of the selected remedy must include provisions for permanent operation and maintenance of the site. The responsible parties will be responsible for both payment and performance of the operation and maintenance.

Future Actions

A second operable unit covering groundwater migration will be needed. This will involve an investigation to determine the extent of horizontal migration of the contamination.

As mentioned in the operation and maintenance section, long term monitoring, operation and maintenance of the site will be required by the recommended alternative.

TABLE 3

FINAL EVALUATION MATRIX

ALTERNATIVE	TECHNICAL				ENVIRONMENTAL				COST ($1,000)		
	PERFORMANCE	RELIABILITY	IMPLEMENTABILITY	SAFETY	SHORT-TERM (CONSTRUCTION)	LONG-TERM (OPERATION)	INSTITUTIONAL	PUBLIC HEALTH	PRESENT WORTH COSTS	CAPITAL COST	ANNUAL O&M COST
Assembled Alternative 1 No Action	-- Poor Contaminant migration to offsite watercourses and groundwater expected over a long-term period.	• Not Applicable	•• Easiest alternative to implement.	•• No construction required.	• Not Applicable	-- Site poses an environmental threat to adjacent residents.	-- Uncontrolled waste site. Site does not comply with RCRA or other State and Federal Environmental laws.	-- Migration of contaminants from site would continue unabated. Pathways of direct contact with contaminants is unmitigated. Risk to residents from soil and groundwater ingestion.	0	0	0
Assembled Alternative 2A Stabilize sludge, contaminated soil and sediment, transport stabilized waste to offsite RCRA disposal facility, remove surface water, and transport to a RCRA treatment facility.	• Alternative removes waste and transports it to a more controlled situation. Removal of waste would eliminate source of surface and groundwater contamination. Public health and environment would be protected.	• Stabilization technique for this waste has high reliability and have demonstrated and proven performance.	• Construction can be accomplished with moderate effort. Nearby residences and the site's location in the 100 year flood plain will cause constraints. This can be overcome by detailed project planning. Implementation should be completed within one year.	-- Nearby residences will be affected by construction activities. Even with careful planning, stringent safety procedures will be necessary for worker and nearby resident protection.	• Construction activities will probably create odor, noise, and surface water pollution but these will be limited and controllable. Some alteration to wildlife habitat may occur during construction but disruption will be minimal and of short duration. Increased truck traffic will cause short-term neighborhood disruption.	• Long-term adverse impacts will be minimal because waste material will be removed from the site. Long-term effects will be confined to the site boundary.	• This alternative would meet RCRA because waste material would be removed and treated or disposed at a permitted facility.	• Potential offsite exposure to nearby residents during construction. Long-term effect would be to reduce risk from ingestion of contaminated soil or groundwater.	$12,040	$12,040	0
Assembled Alternative 2B Stabilize sludge, contaminated soil and sediment, transport stabilized waste to offsite RCRA disposal facility, treat surface water onsite.	• Same as 2A except surface water would be treated onsite and discharged.	• Same as 2A except personnel would be required to operate the onsite treatment facility. Onsite treatment facility has proven reliability and performance.	• Same as 2A. Construction can be easily accomplished although the facility would require protection from the 100 year flood.	-- Same as 2A except slightly less disruption of neighborhood due to less truck traffic because surface water would not be transported offsite.	• Same as 2A	• Same As 2A	• This alternative would meet all applicable Federal and State environmental regulations. Obtaining a NPDES discharge permit for treated surface water effluent would require additional effort.	• Same As 2A	$7,530	$7,530	0

FINAL UATION MATRIX

ALTERNATIVE	TECHNICAL				ENVIRONMENTAL				COST ($1,000)		
	PERFORMANCE	RELIABILITY	IMPLEMENTABILITY	SAFETY	SHORT-TERM (CONSTRUCTION)	LONG-TERM (OPERATION)	INSTITUTIONAL	PUBLIC HEALTH	PRESENT WORTH COSTS	CAPITAL COST	ANNUAL O&M COST
Assembled Alternative 3 Stabilize sludge, contaminated soil and sediment, dispose in an onsite construct-ed RCRA landfill, onsite surface water treatment.	•	•	-	--	--	•	•	•	$4,120	$3,700	$21
	Stabilized waste would be excavated and disposed in an onsite RCRA landfill. Should adequately control the release of hazardous mate-rials.	Requires periodic oper-ation and maintenance. RCRA landfills have been proven reliable in the field. Surface water treatment has proven to be reliable although careful O&M is necessary.	Alternative requires one year or longer to implement. The RCRA landfill would require a moderate effort to construct.	Same as 2A except time required to implement would be longer with increased potential of exposure.	Extensive site ex-cavation would gener-ate noise, dust, odors, and surface water runoff. Large amount of excavated waste/debris would be generated for placement into the RCRA onsite land-fill. Neighbor-hood distruption would occur during construction.	System would contain waste materials in accordance with RCRA regulations. Long term maintenan-ance and ground-water monitoring required. Landfill may require periodic replacement.	Alternative will meet RCRA with stipulations due to location in a wetland.	Release of waste materials minimized or eliminated. Temporary short-term expo-sure to onsite personnel. Risks from ingestion of groundwater or contaminated soil exists.			
Assembled Alternative 4A Excavate sludge, contaminated soil and sediment, transport offsite to a RCRA per-mitted incinerator, surface water removal, transport, and treat-ment at a RCRA facility.	•	--	--	--	•	•	•	•	$20,200	$20,200	0
	Incineration is a proven method to destroy some hazar-dous waste constitu-ents, residues from incineration would require disposal at a RCRA facility. Performance is a proven and commer-cially available technology. Surface water removal and treatment at a RCRA facility is a proven technology.	Incineration facili-ties require constant attention by highly-trained personnel. Reliability is proven and well established. Surface water removal and treatment has high reliability.	Offsite facilities are available but cost may be high. Offsite facilities that can treat waste material may be lim-ited. Ash residue would require dis-posal at a RCRA facil-ity. Incineration of the waste material would take several years.	Excavation will re-quire stringent safety procedures.	Odor, noise, and surface water pollu-tion may occur during the stabilization and excavation phase. These impacts can be reduced with careful planning. Some disruptions of the neighborhood can be expected due to truck traffic.	After the waste material and sur-face water are removed, the site should not pose impacts to ground and surface water or to surrounding land uses.	Due to cost, this alternative may not be approved by all parties. This alternative would meet appli-cable federal and State environmental regulations.	This alternative would result in removal of waste material. Risks from ingestion of contaminated groundwater or soil is reduced.			
Assembled Alternative 4B Excavate sludge, contaminated soil and sedi-ment, transport offsite to a RCRA permitted incinerator, onsite surface water treatment.	•	--	--	--	•	•	•	•	$23,300	$23,300	0
	Same as 4A. Surface water treatment on-site is a commer-cially available and demonstrated technology.	Same as 4A	Same as 4A	Same as 4A	Truck traffic would be reduced near the site vicinity as surface water would not be re-moved. 4B would have slightly less short-term impacts.	Same as 4A	Same as 4A. NPDES permit requirements would have to be met for surface water treatment and discharge.	Same as 4A			
In situ stabilization of sludge, surface water treatment or removal, installation of a RCRA cap (not evaluated in detail).	--	--	-	-	-	-	--	-			
	Stabilization would be blind. All waste material may not be stabilized. Waste material could leach to groundwater.	Requires periodic maintenance. Question-able reliability due to lack of liner and leachate collection/ detection system.	Alternative could be implemented in 1 to 2 years.	Same as 2A	Same as 3	Groundwater mon-itoring would be necessary. Main-tenance of RCRA cap and control of site access would be required.	Would not meet RCRA requirements.	Release of waste would be reduced but not eliminated.			

TABLE 4

COST ESTIMATE SUMMARY
AA-3 STABILIZE SLUDGE, CONTAMINATED SOIL AND SEDIMENT
DISPOSE IN AN ONSITE CONSTRUCTED RCRA LANDFILL
ONSITE SURFACE WATER TREATMENT

	COST COMPONENT	CONSTRUCTION COST	ANNUAL O&M COST	REPLACEMENT COST* 30	60	90	120
1.	Site Preparation Construction of RCRA Facility	1,000,000	10,000	1,000,000[b]	1,000,000	1,000,000	1,000,00
2.	Excavation, Stabilization and Placement into RCRA Facility	370,000	0	190,00[c]	190,000	190,000	190,00
3.	Backfill Excavation	1,000,000	0	800,000[d]	800,000	800,000	800,00
4.	Monitoring Network & Fence	90,000	6,000	90,000[e]	90,000	90,000	90,00
5.	Surface Water Treatment	600,000	0	0			
	CONSTRUCTION SUBTOTAL	3,060,000	16,000				
	Mobilization, Bonds, Insurance (5%)	150,000					
	Health and Safety (7%)	210,000					
	Bid Contingencies (15%)	460,000	2,000				
	Scope Contingencies (20%)	610,000	3,000				
	CONSTRUCTION TOTAL	4,490,000					
	Permitting and Legal (10%)	450,000					
	Services During Construction (7%)	310,000					
	TOTAL IMPLEMENTATION COST	5,250,000					
	Engineering Design Cost (10%)	530,000					
	TOTAL CAPITAL COSTS	5,780,000					
	Annual O&M Costs		21,000				
	Replacement Costs			2,100,000	2,100,000	2,100,000	2,100,000
	TOTAL PRESENT WORTH[a]			6,120,000	6,130,000	6,130,000	6,130,000

[a]Total present worth costs are defined as the capital costs, present worth of the replacement costs, and present worth of the annual O&M expenses at 10 percent interest at 30, 60, 90 and 120 years. The uniform present worth factors used were 9.427, 9.967, 9.998, and 9.999. The single payment present worth factors used were 0.0573, 0.0033, 0.0002, and 0.00001.

[b]This cost includes construction of a new onsite RCRA facility.

[c]This cost includes of excavation and placement of contaminated waste materials in a new onsite RCRA facility.

[d]This cost included filling, shaping, and seeding at previous site.

[e]This cost included installation of a new groundwater monitoring system.

*Included for present worth analysis