United States
Environmental Protection
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Office of
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Remedial Response

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June 1988

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Superfund Record of Decision:

Southern Maryland Wood, MD

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The Southern Maryland Wood Treating (SMWT) site is located in Hollywood, St. Mary's County, Maryland. The site is situated within a wetland area in a drainage divide such that runoff from the site discharges into Brooks Run and McIntosh Run tributaries, which flow into the Potomac River. The area surrounding the site is predominantly used for agricultural and residential purposes. From 1965 to 1975, SMWT operated as a pressure treatment facility for wood preservation. Currently, part of the site is being used as a retail outlet for pretreated lumber and crab traps. The waste generated at the site included retort and cylinder sludges, process wastes, and material spillage. These wastes were in six onsite unlined lagoons. An onsite freshwater pond became contaminated during the facilities active and inactive periods with VOCs, polynuclear aromatics (PNAs), and base/neutral extractables due to contaminated ground water and surface runoff. Cleanup actions were initiated in 1982 following legal actions by the Maryland Department of Health and Mental Hygiene. Liquids removed from the six lagoons were spray irrigated onto the nearby woods. The six lagoons were excavated, backfilled, and graded, and the freshwater pond was partially excavated. The excavated sludges were mixed with composited sludge and topsoil, and spread in a level treatment area located on the property. The primary contaminants of concern affecting the onsite ground water,
(See Attached Sheet)

17. Document Analysis a. Descriptors

Record of Decision
Southern Maryland Wood, MD
First Remedial Action - Final
Contaminated Media: debris, gw, sediments, soil, sw
Key Contaminants: PNHs, VOCs

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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16. ABSTRACT (continued)

soil, surface water, sediments, and debris include: VOCs, PNA, and base/neutral acid extractables.

The selected remedial action for this site includes: excavation/dredging of soils, sediments, tank liquids, and cement, and treatment using onsite incineration with onsite disposal of non-hazardous residual ash, backfilling, regrading, and revegetating, where necessary; installation of a slurry wall; dewatering of the slurry wall area by a ground water and surface water pumping system, and treatment using activated carbon adsorption or hydrogen peroxide and irradiation with discharge to the onsite pond; installation of a geotextile silt fence, sedimentation basins, and/or diversion; and ground water, surface water, environmental, organic vapor, and dust monitoring.

THE SOUTHERN MARYLAND WOOD TREATING

RECORD OF DECISION

Record of Decision

Declaration

Site Name and Location

Southern Maryland Wood Treating Site
Hollywood, Maryland

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Southern Maryland Wood Treating (SMWT) Site developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986, ("CERCLA") and, to the greatest extent practicable, is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 400.

This decision is based upon the contents of the administrative record for the SMWT Site.

The State of Maryland concurs with this remedy; however, their concurrence is conditioned on the actual cost of the remedy (as determined through the remedial design and bid selection process) being substantially less than that estimated in the feasibility study.

The Maryland Department of the Environment (MDE) believes that substantial reductions in actual costs will be experienced for several of the major cost items identified in the feasibility study. MDE is currently exploring the expected magnitude of those reductions and suggests that EPA give close scrutiny to this issue throughout the design phase of the project. In the event that the expected substantial reductions are not evidenced at the conclusion of the design and/or bid process, MDE has requested and EPA has agreed that the remedy will be re-evaluated.

Description of the Remedy

The selected remedy consists of a final operable unit of on-site thermal treatment of excavated soils, sediments, and other materials at the site that exhibit concentrations of contaminants above the risk-based levels established in the public health evaluation. Soils remaining in the ground would be covered with clean fill and possibly backfilled with non-hazardous ash from the incinerator process. As needed, groundwater and surface water would be treated and discharged on-site.

The function of the selected remedy is to eliminate contaminants at the SMWT site as a source of groundwater and surface water contamination and to reduce or eliminate the risks associated with exposure to contaminated surface water, soils, and sediments.

Declaration

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost effective. The remedy satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. Finally, it is determined that this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. Since this remedy will not result in hazardous substances remaining onsite above health based levels, the five year facility review would not apply to this action.

6-29-88
Date

James M. Seif
Regional Administrator
Region III

The major components of this alternative involve the following activities:

- Dredging of all contaminated sediments to the risk-based cleanup level established for this site, and excavation of contaminated soils at the site to risk-based cleanup levels, and to cleanup levels established for subsurface soils. Included are the following tasks:

- Installation of geotextile silt fences, sedimentation basins, and/or diversion/surface management to control off-site soil transport.

- Installation of a slurry wall to cut off ground-water migration through the process/pond excavation area.

- Dewatering of the area contained within a slurry wall by a well pumping system and treatment of the groundwater/surface water by activated carbon adsorption or hydrogen peroxide (H_2O_2) and UV irradiation with discharge to the onsite pond.

- Excavation of surface and subsurface soils in the pond/process and land treatment areas. Excavation of surface soils in the upper site and northeast tank area. Dredging of sediments in the pond and west tributary.

- Organic vapor and dust monitoring.

- Dewatering of sediments and soils prior to treatment, as necessary; further treatment of the generated waters by activated carbon adsorption or H_2O_2 and UV irradiation; and discharge on-site.

. On-site incineration of the contaminated materials such as the excavated/dredged soils, and sediments, cement, and tank liquids (would require air pollution controls), and on-site disposal of non-hazardous incinerator ash in previously excavated areas.

. Backfill, regrade, and revegetate, where necessary.

. During and post-treatment groundwater/surface water monitoring consisting of selected Hazardous Substance List (HSL) analyses.

. Environmental monitoring consisting of sediment and surface water analysis, benthic and other biological monitoring needed to measure the degree of cleanup achieved at the site.

Record of Decision
ROD Decision Summary

I. Site Name, Location, and Description

The Southern Maryland Wood Treating (SMWT) site is located off Route 235 in Hollywood, St. Mary's County, Maryland. A regional location map is shown in Figure 1. The site comprises approximately 25 acres in the northwest portion of a 96-acre property. About four acres were previously devoted to a wood treatment operation. The site is surrounded by residential and agricultural areas.

The SMWT site is located within the Atlantic Coastal Plain Physiographic province. Topographic relief across the site is about 35 feet, with elevation ranging between approximately 119 to 154 feet above sea level. The SMWT site lies on a drainage divide such that runoff from the site discharges to tributaries that straddle the site to the east and west. Both of these tributaries discharge to the Potomac River via Brooks Run and McIntosh Run. Regionally, the site is located close to the drainage divide between the Potomac and Patuxent River Basins.

II. Site History

The SMWT facility was owned and operated by Southern Maryland Wood Treating Co. from 1965 to 1978 as a pressure treatment facility for wood preservation. A site sketch, indicating the locations of various features, structures, and surface water bodies on the site, as well as the property boundary, is shown in Figure 2.

Available information indicates that creosote and pentachlorophenol (PCP) were used as wood preservatives at the facility. Wood treatment activities are no longer being performed at the site. Presently, however, a portion of the site is leased to Ridge Marine sales for use as a retail outlet for pretreated lumber and crab traps.

The wastes generated at the SWMT site included retort and cylinder sludges, process wastes, and material spillage. Here wastes were disposed of in six unlined lagoons on-site. An on-site freshwater pond became contaminated with volatile organic compounds (VOC's), polynuclear aromatics (PNA's), and other base neutral extractables (BNAS) during the facility's active and subsequent inactive periods from contaminated groundwater and surface runoff.

Pursuant to legal actions taken by the Maryland Department of Health and Mental Hygiene the Potentially Responsible Party (PRP), L.A. Clarke and Sons, Inc., initiated clean-up actions at the site in 1982. Liquids from the lagoons were spray irrigated onto the nearby woods. The six waste lagoons were excavated and the area was backfilled and graded. The freshwater pond was partially excavated. Excavated sludges were mixed with composted sludge, topsoil, and grass seed, then spread in a level treatment area on the property.

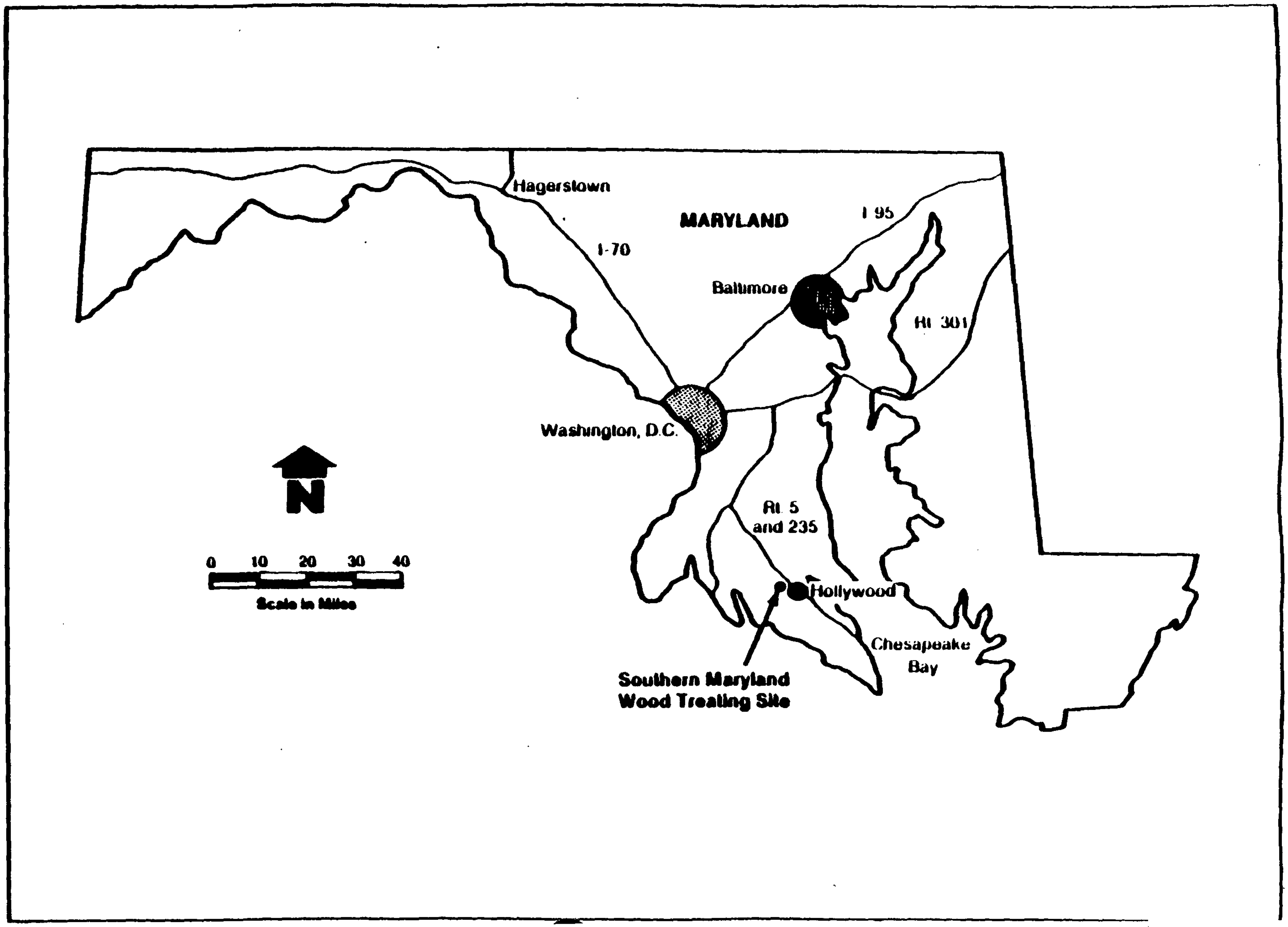
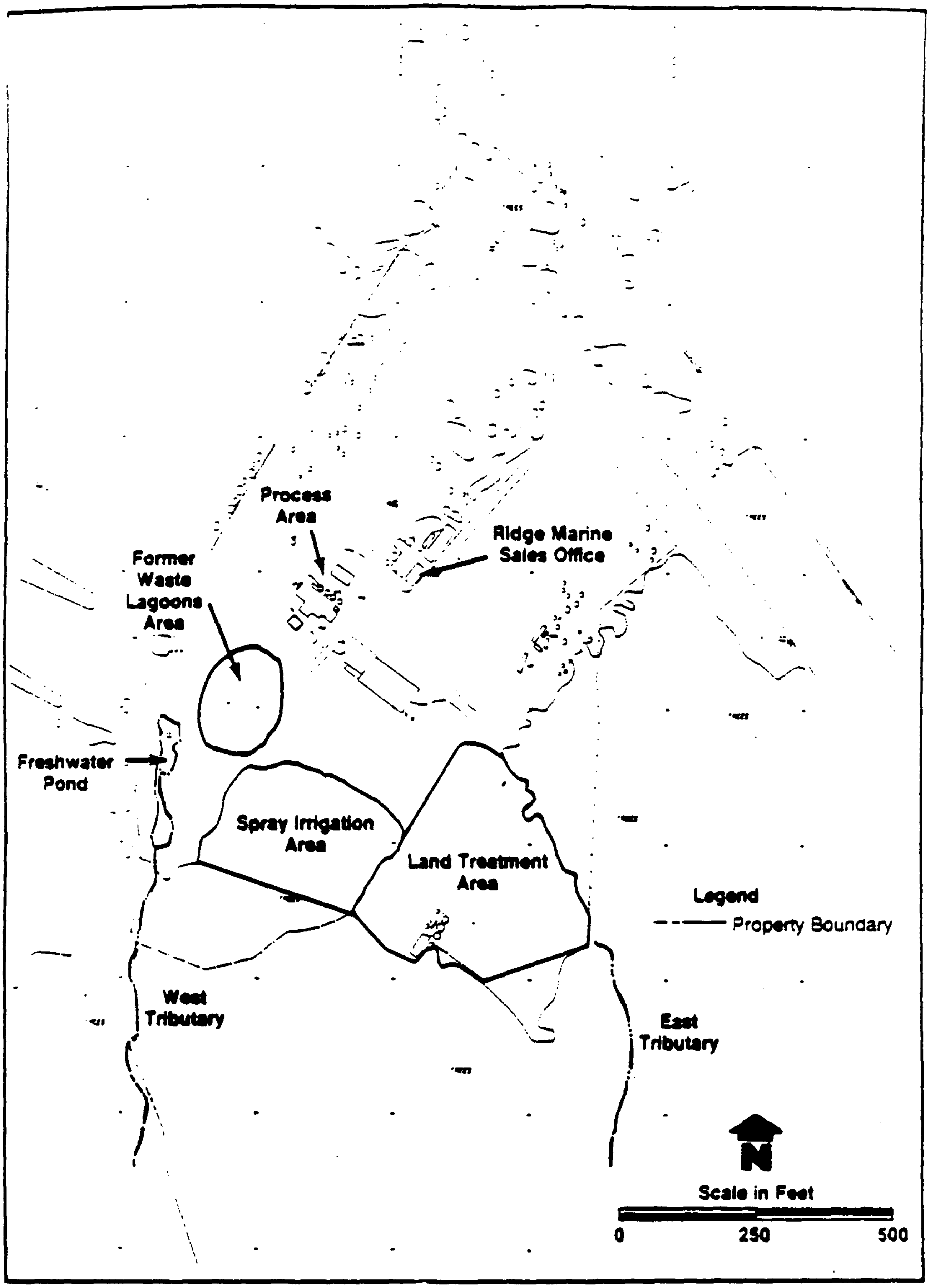

Hagerstown
MARYLAND
I-95
I-70
Baltimore
Rt 301
Washington, D.C.
N
Rt. 5
and 235
0 10 20 30 40
Scale in Miles
Hollywood
Chesapeake
Bay
Southern Maryland
Wood Treating Site

Figure 1.



PRIMARY FEATURES AT THE SMWT SITE

Figure 2

Synopsis of Previous Investigations

August 1982 - Field investigation conducted by EPA Region III. Included Sampling of domestic wells, monitoring wells, surface waters, soils, and sediments.

October 1984 - Site assessment performed by EPA Technical Assistance Team. Sampling results, however, could not be validated.

December 1984 - Domestic Well Sampling revealed no contamination in off-site domestic wells.

January 1985 - Site assessment sampling. Tank, soil core, sediment, surface water and monitor well samples were collected for analyses. Sampling confirmed contamination from PNA and PCP in surface water and sediments of the freshwater pond and west tributary, on-site soils, and an on-site monitoring well. Tank sludge samples were contaminated with chlorinated dibenzodioxins.

Previous Removal Actions

March 1985 - A remedial removal action was begun with 350 samples obtained and analyzed at the site. Data indicated a widespread distribution of contaminants throughout the site. Higher contaminant concentrations were detected in samples from the process area, former lagoon area, land treatment and spray irrigation areas.

April 1985 - Straw filter fences were installed to control downstream migration of sediments along the west tributary.

January 1986 - Approximately 1400 Y/D^3 of soil were excavated from the the northwestern bank of the freshwater pond and stored on-site. The excavated soils were placed onto a synthetic liner to the east of the former lagoon area and capped with a synthetic cover.

Site Characterization

The Remedial Investigation/Feasibility Study (RI/FS) for the SMWT site was performed in a phased manner. The results of each phase were used to focus data requirements of successive phases and provide support to the remedial alternative analysis. The objectives of and scope of the three RI phases for this site are shown in Tables 1, 2, and 3.

The results of sampling and analysis for the RI Phases are summarized below:

I. Groundwater Quality

a) Residential Well Water Quality

No contaminants of concern were detected in any residential well samples off-site from the SMWT facility.

b) On-Site Groundwater Quality

On-site shallow groundwater contamination appears to be localized in an area roughly bounded by monitor wells MW-08, MW-12, and MW-05, as shown in Figure 3. The shallow groundwater flow in the contaminated area is directed towards the on-site pond. The pond, therefore, represents a local discharge point for shallow groundwater and associated contaminants. Seeps of black hydrocarbon-like liquid have been observed along the eastern edge of the on-site pond.

Analytical results from the deep monitor well samples suggest that there is no contamination of the deeper water-bearing strata directly underlying the site. A clay and silt layer separates the shallow groundwater in the upland deposits and the deeper water bearing zone. The clay and silt layer has restricted the downward migration of groundwater contaminants from the shallow zones to deeper zones.

Overall, the Phase II and Phase III analytical results indicate that the groundwater contamination at the site is confined to the saturated deposits above the clay and silt layer in a relatively limited area as shown in Figure 3.

Overview of Phase I RI Activities

Objective	Scope Activities
• Determine the location of monitor wells and soil sampling locations.	• Geophysical investigation using ground penetrating radar and terrain conductivity.
• Determine groundwater flow rate and direction from existing on-site wells.	• Conduct permeability tests and measure water level elevations.
• Define analytical requirements.	• Collection of two soil samples and one sediment sample from areas expected to be highly contaminated. Analysis of these samples for Hazardous Substance List (HSL) parameters.
• Develop a rapid-turn-around field screening method for PNAs.	• Laboratory testing to develop and validate the extraction and analytical techniques.

Table 1

Overview of Phase II RI Activities

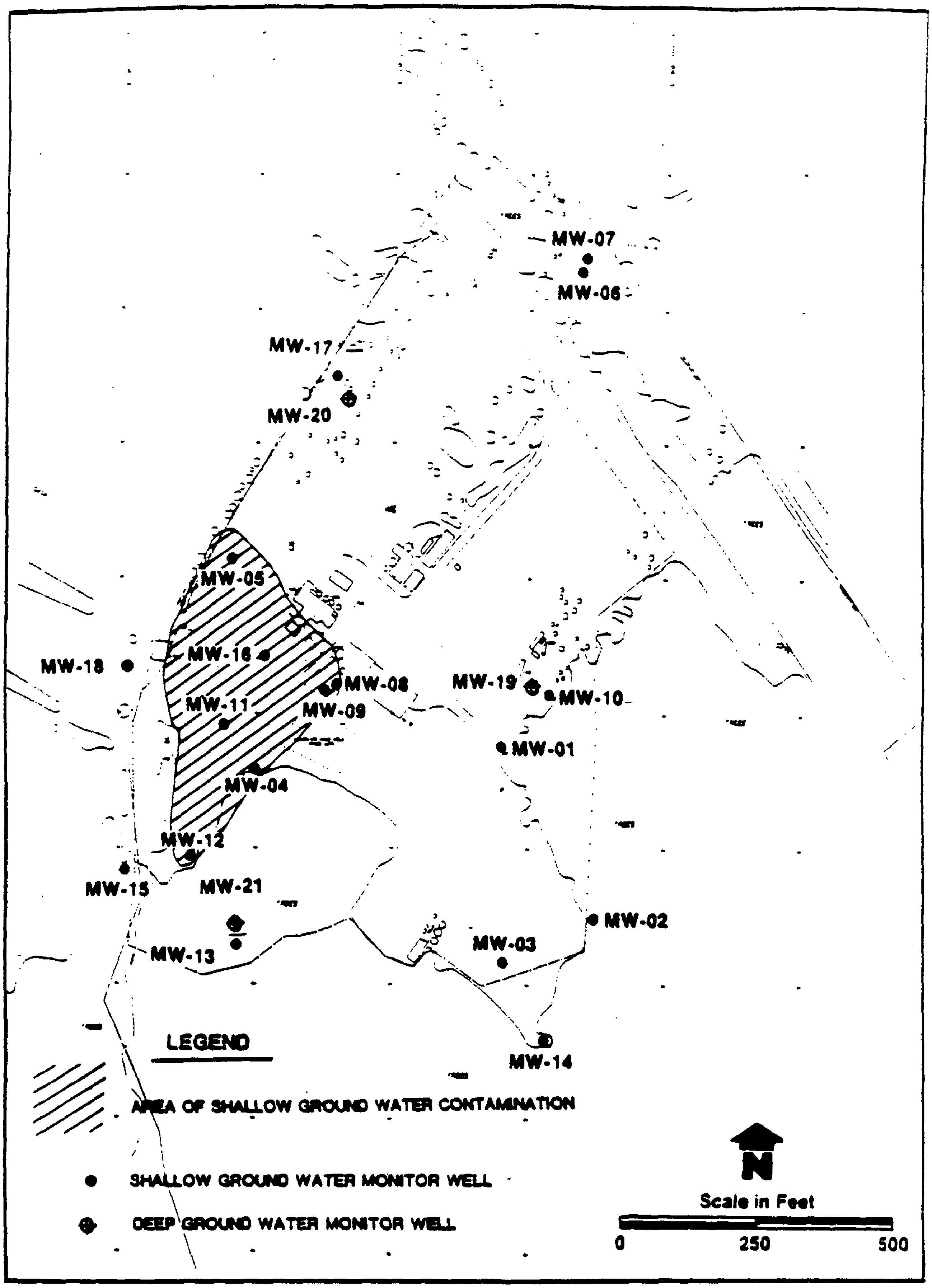
Objective	Scope Activities
• Characterize on-site and local air quality.	• One round of air sampling with analysis for volatile organic compounds, PNAs, and pentachlorophenol. • Real-time air monitoring for volatile organics using HNu and/or OVA and for respirable dust using a mini-RAM.
• Define the type, degree, and extent of soil contamination. Understand the local stratigraphy.	• Construction of soil borings and test pits, and collecttion of soil samples. • Analysis of soil samples by on-site PNA screening, laboratory analytical methods, and geotechnical tests.
• Define the type, degree, and extent of shallow groundwater contamination. Define shallow groundwater flow direction.	• Installation of monitor wells. • Analysis of groundwater samples by on-site PNA screening and laboratory analytical methods.
• Investigate the impact of the site on local residential wells.	• Sampling and analysis of selected residential wells.
• Evaluate the role of surface waters as a contaminant migration pathway.	• Sampling of surface waters and sediments from the east and west tributaries, Brooks Run, and McIntosh Run. Analysis of samples by PNA screening and laboratory analytical methods.
• Characterize the quantities and types of materials in on-site tanks.	• Sampling and analysis of tanks and volumetric determination of tank contents.

Table 2

Overview of Phase III RI Activities

Objective	Scope Activities
• Confirm groundwater flow direction near the freshwater pond.	• Install one shallow well northwest of the freshwater pond.
• Further evaluate the type, degree, and extent of shallow groundwater contamination.	• Sample the one newly-installed shallow Phase III well and resample the 12 existing wells.
• Evaluate the potential for migration of contamination to lower water-bearing zones.	• Install and sample three deep wells to the first water-bearing zone below the upper aquifer.
• Determine the level of contamination of the on-site buildings and sheds.	• Obtain surface samples of on-site buildings and sheds.
• Determine presence of dioxins/furans in site groundwater, subsurface soils, and buildings.	• Analyze samples from groundwater, subsurface soils, and buildings for dioxins/furans.
• Evaluate the technical feasibility of construction technologies proposed in the remedial alternatives.	• Install four shallow soil borings to obtain split-spoon samples for geologic logging and Shelby tube samples for geotechnical analysis.

Table 3



SHALLOW GROUND WATER CONTAMINATION MAP

Figure 3

The shallow-groundwater in the contaminated area contains volatile and semi-volatile contaminants in the tens-to-hundreds of parts per million range (Table 4). The most commonly occurring volatile organics, base neutral/acid extractable and PNA compounds found in the water samples are listed in Table 5. Many of these compounds are at least partially water soluble and would be expected to migrate in the shallow groundwater.

The concentrations of acenapthene, fluorene, and phenanthene in groundwater samples were in excess of the reported solubilities of these compounds in water. Furthermore, a dense, non-aqueous phase liquid was found at the interface of the shallow aquifer and clay layer in wells MW-08 and MW-11.

Groundwater samples from selected shallow-monitoring wells were also analyzed for chlorinated-dibenzodioxins and dibenzofurans. The 2,3,7,8-tetrachloro-dibenzodioxin (TCDD) toxicity equivalent factors (TEF) reported for the groundwater samples were below 0.01 ug/L and are therefore below the action level.

II Ambient Air Quality

Both real-time and time-weighted air monitoring samples taken both on-site and around the site perimeter, showed no contaminants of concern in concentrations that would need to be addressed in a remedial action at the site.

III Soils

a) Surface Soils

Analytical results for surface soil samples (0-2 foot depth interval) are summarized by areas in Table 6. (The areas described are shown in Figure 4). The most frequently identified organic compounds are listed in Table 7; dioxin/furan results are shown in Table 8.

Hazardous Substances List (HSL) organic contamination in the surface soils is widespread and does not follow any specific pattern. The analytical results are consistent with the operating history and remedial activities that have occurred at the site.

Surface soils in the land treatment area are the most contaminated surface soils at the SMWT site, consistent with the land farming of lagoon sludges in this area. The maximum total PNA concentrations in the land treatment area was 4,120,000 ug/kg ppb).

Surface soils in the excavated lagoons area also contain elevated concentrations of PNA's. The northern part of the site, including the northeast tank area and the upper site area, showed widely variable contaminant concentrations. These results are consistent with the use of this area to store finished products.

The surface soil samples from the vicinity of the freshwater pond contained no detectable or low part-per-million levels of contaminants. Soils in the process area contained up to 1290 ug/kg of PNAS; no organic contaminants were detected in surface soil samples from the spray irrigation area.

SUMMARY OF ANALYTICAL RESULTS FOR GROUND WATER SAMPLES
(All results in ug/L)

	BTX		TOTAL PNAS		PCP		OTHER ACID EXTRACTABLES		OTHER BNAS		DIOXINS AND FURANS (1)	
	Phase II	Phase III	Phase II	Phase III	Phase II	Phase III	Phase II	Phase III	Phase II	Phase III	Phase II	Phase III
MW01	ND	ND	ND	ND	ND	ND	4	2	ND	3		
MW01 Dup		ND		ND		ND		ND		6		
MW02	ND	ND	ND	ND	ND	ND	ND	ND	ND	3		
MW02 Dup		ND		ND		ND		ND		3		
MW03	ND	ND	2	ND	ND	ND	2	ND	42	5		
MW04	602	370	5391	972	1300	3300	8000	21700	130	130		0.111
MW05	ND	ND	1647	ND	920	ND	1670	ND	43	ND		0.055
MW06	ND	ND	ND	ND	ND	ND	ND	35	ND	ND		
MW07	ND	ND	ND	ND	ND	ND	ND	ND	ND	2		
MW08	2840	1280	92290	20463	5000	ND	46600	10900	7900	1300		0.089
MW08 Dup												0.184
MW09	123	38	92	1083	ND	3	886	33	19	106	0.000	0.025
MW09 Dup		31		1111		4		40		105		0.031
MW10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
MW11	460	440	9232	13752	1300	670	37600	15200	420	970	(2)	0.203
MW12	300	160	280	2147	500	ND	830	1300	22	63		0.03
MW13	ND	ND	ND	ND	ND	ND	ND	2	ND	11		
MW14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		
MW15	ND	ND	21	ND	ND	ND	ND	ND	ND	ND		
MW16	1420	1360	90200	11599	1500	59	4930	890	4300	670		0.546
MW16 Dup	336		58410		1100		3530		4900			
MW17	ND	ND	1	ND	ND	ND	ND	ND	ND	3		
MW18		ND		ND		ND		ND		2		
MW19		1		ND		ND		ND		ND		
MW20		ND		ND		ND		ND		ND		
MW21		1		ND		ND		2		2		

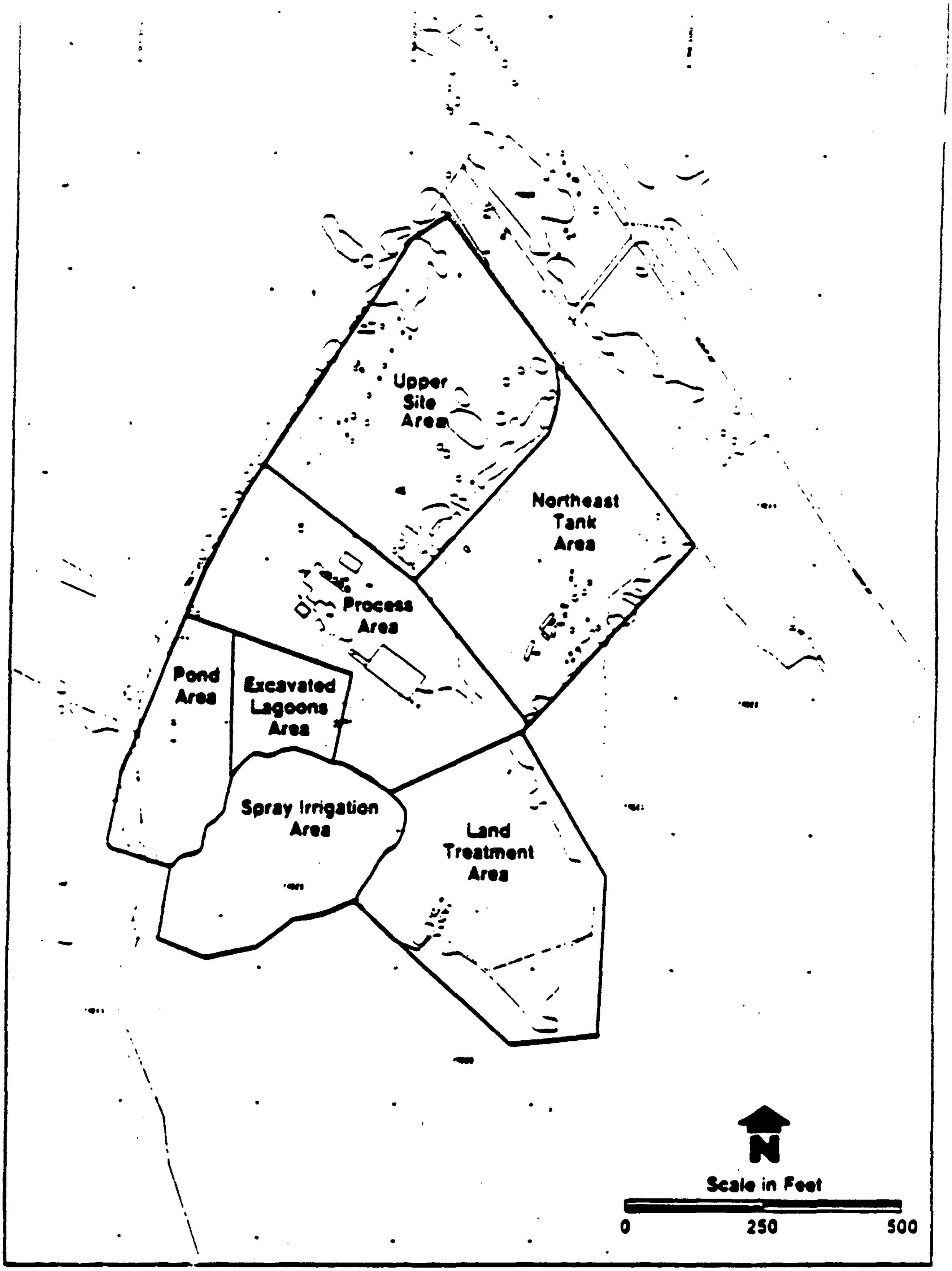
(1) DIOXIN/FURAN DATA IS TOXIC EQUIVALENT FACTOR (TEF) IN ug/L FOR PHASE II AND ng/L FOR PHASE III.
(2) VALUE COULD NOT BE CALCULATED DUE TO SEVERE MATRIX EFFECTS FOR TETRA/PENTA CONGENERS. HEXACHLORINATED DIBENZODIOXINS AND DIBENZOFURANS WERE DETECTED IN THIS SAMPLE.

Table 4

Organic Compounds Most Frequently Identified in Groundwater Samples

Volatile Organic Compounds	Polynuclear Aromatics Hydrocarbons	Other Base/ Neutral/Acid Extractables
Benzene	Anthracene	Pentachlorophenol
Toluene	Acenaphthene	Phenol
Xylene	Chrysene	2-methylphenol
Ethylbenzene	Benzo(a)anthrocene	4-methylphenol
Styrene	Benzo(a)fluoranthene	2-4-dimethylphenol
	Benzo(k)fluoranthene	Dibenzofuran
	Benzo(a)pyrene	
	Naphthalene	
	2-methylnaphthalene	
	Acenaphthylene	
	Fluorene	
	Phenanthene	
	Fluoranthene	
	Pyrene	

Table 5



SITE SKETCH SHOWING DESIGNATED AREAS

Figure 4

SUMMARY OF ANALYTICAL RESULTS FOR SURFACE SOIL SAMPLES

AREA	VOCs (ug/kg)	PAHs (ug/kg)	PCP (ug/kg)	OTHER ACID EXTRACTABLES (1) (ug/kg)	OTHER BASE/NEUTRAL EXTRACTABLES (1) (ug/kg)	FIELD SCREENING FOR PAHs (ug/kg)	OIL AND GREASE (ug/kg)	TOTAL ORGANIC CARBON (ug/kg)	ALUMINUM (mg/kg)	CHROMIUM (mg/kg)	COPPER (mg/kg)	IRON (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	ZINC (mg/kg)
Upper Site	ND	ND - 20,300	ND	ND	ND	ND - 49,000	41,400	6,440,000	3,440 - 13,300	5.3-14	4.4-7.2	3,670 - 10,020	ND-88	0.1	12-26
Northeast Tank Area	ND	ND - 130,000	ND - 120	ND	ND	ND - 43,000	---		8,090 - 20,940	ND-15	3-11	4,020 - 10,400	ND-134	0.1	5-39
Land Treatment Area	ND - 14,200	309 - 4,120,000	ND - 190	ND	ND - 490,000	ND - 53,000	83,600 - 6,120,000	6,660,000 - 14,000,000	7,130 - 9,990	ND-75	ND-82	7,130 - 19,500	ND-52	ND-0.22	[illegible]
Spray Irrigation Area	ND	ND	ND	ND	ND	ND	---		4,090 - 15,230	16	6.5	4,710 - 14,500	ND-6.6	[illegible]	[illegible]
Freshwater Pond Area	ND	ND - 5,920	ND - 360	ND	ND	ND - 2,200,000	---		15,000	15	11	12,000	ND	0.1	65
Excavated Lagoons Area	ND - 2,420	39,100 - 1,690,000	ND - 79,000	ND	1,340 - 230,000	ND - 4,900,000	3,620,000	4,200,000	7,160	9.2	ND-6.6	18,000	ND-18	ND-0.11	[illegible]
Process Area	ND	ND - 1,290	ND	ND	ND	ND - 53,000	<30,600	545,000	ND-25,000	ND-21	ND-9.9	6,630 - 19,200	ND-18	0.08-0.11	2-41

(1) A list of acid extractable and base/neutral extractable compounds is provided with the analytical data in Appendix F. ND - Not Detected

Table 6

Organic Compounds Most Frequently Identified in Surface Soil Samples

Volatile Organic Compounds	Polynuclear Aromatic Hydrocarbons	Other Base/Neutral Extractables
Acetone	Fluroanthene	Dibenzofuran
Toluene	Pyrene	
Ethylbenzene	Benzo(a)anthracene	
Styrene	Benzo(a)pyrene	
Xylenes		

Table 7

Summary of Dioxin/Furan Results
for Surface Soil Samples

Area	Sample Number	Total TEF (ug/kg)
Upper Site	B1-001	0.000
	SS3-001	0.000
Northeast Tank	SS6-002	0.000
	SS6-003	0.000
	T10-002	0.017
	T10-001	0.036
Freshwater Pond	B2-001	0.000
Land Treatment	B3-001	0.426
	B4-001	0.488
Process	B7-001	0.006
	B10-001	0.024
	B9-001	0.765
Excavated Lagoons	B13-001	0.079
	B11-001	0.161

Table 8

The dioxin congeners found in surface soil samples were the more highly chlorinated, relatively less toxic forms. Although hepta-and-octa-chlorinated dibenzodioxins were detected in all surface soil samples, and hexa-chlorinated dibenzodioxims were found in seven of 13 surface soil samples, all of the compounds exist at levels well below EPA's established action level for these compounds. No tetra-chlorinated dibenzodioxin were detected in the surface soil samples.

b) Subsurface Soils

Subsurface soils are defined as those encountered below a depth of two feet. The analytical results for subsurface soils area summarized by area in Table 9. The most frequently identified organic compounds are listed in Table 10.

Except in those areas with a long history of waste disposal, the organic contaminants are confined to the upper 10 feet of soil. In the process and excavated lagoon areas, the contaminants were encountered down to the clay and silt layer. The organic compounds most commonly identified in the subsurface soils include more mobile PNA's (napthalene, 2-methyl-napthalene) and acid extractables (phenol, 2-methylphenol, 2,4 - dimethylphenol). These parameters are also found in groundwater samples, but not commonly found in surface soil samples.

Soil samples collected from the Phase III soil borings were analyzed for chlorinated dibenzo-dioxins/furans. Like the background soils, the hepta - and octa - chlorinated dibenzo - dioxin/furans (the relatively less toxic forms) represent the highest percentage of cogeners found in the subsurface samples.

IV Tanks and Retorts

Excluding a propane storage tank and the boiler treatment water make-up tank, 14 tanks and two retorts were found on site. The locations of these tanks and retorts are depicted in Figure 5. Table 11 summarizes the analytical results for the tank samples.

A total of approximately 11,960 gallons of non-TCDD dioxin contaminated wastes are present in Tanks 3,4,5,9,10, and 12. Due to the similarity of appearance to the material in Tanks 9 and 12, the waste in Tank 10 is also assumed to contain dioxins.

Additionally, a total of approximately 2,140 gallons of tank wastes do not contain dioxins. Of these 2,140 gallons, all contain total volatile organic compounds concentrations greater than 300 ppb, and 2,100 gallons contain total PNA concentrations of 191,000 ppb.

V Surface Water and Sediments

The analytical results for surface water and sediment samples are summarized in Table 12.

Table 9

SUMMARY OF ANALYTICAL RESULTS OF SUBSURFACE SOILS BY AREA

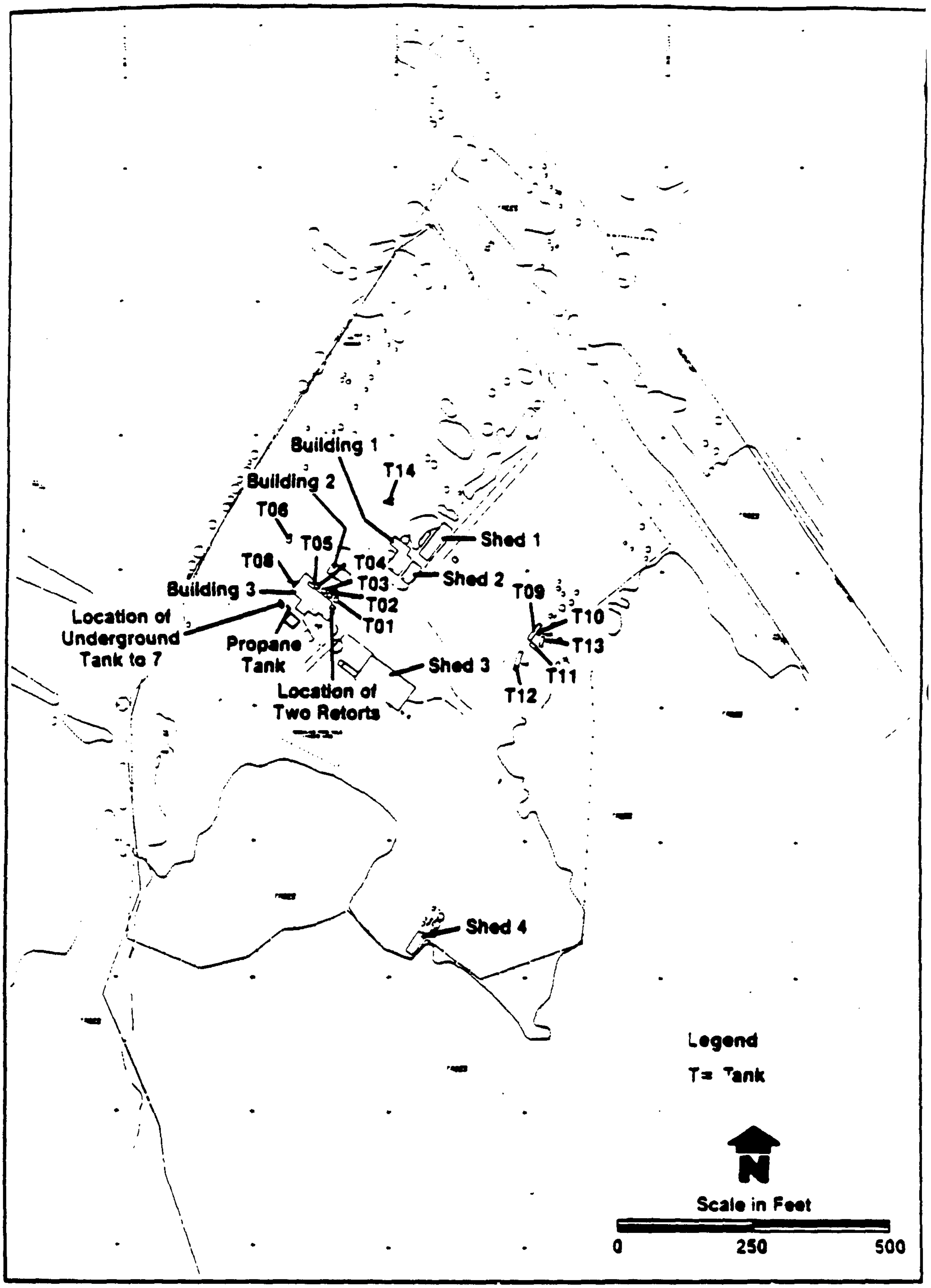
AREA	DEPTH BELOW GROUND SURFACE	VOCs (ug/kg)	PNAs (ug/kg)	PCP (ug/kg)	OTHER ACID EXTRACTABLES (ug/kg)	OTHER BASE/NEUTRAL EXTRACTABLES (ug/kg)	FIELD SCREENING FOR PNAs (ug/kg)	OIL AND GREASE (ug/kg)	TOTAL ORGANIC CARBON (ug/kg)	ALUMINUM (mg/kg)	CHROMIUM (mg/kg)	COPPER (mg/kg)	IRON (mg/kg)	LEAD (mg/kg)	MERCURY (mg/kg)	ZINC (mg/kg)
Upper Site	2-10'	ND-3	ND	ND	ND	ND 600	ND 42,000	<30,300	667,000	1,120 - 14,700	ND	3.5-6	529-10,900	ND	ND-0.1	[illegible]
	10'+	ND	81	ND	ND	ND	ND - 13,000	---	---	4,200	7	3	3,210	2.8	ND	[illegible]
NE Tank Area	2-10'	ND	ND	ND	ND	ND	ND	---	---	12,500	6.9	5.3	9,110	ND	0.1	[illegible]
	10'+	--	--	--	--	--	ND	---	---	---	---	.	---	.		
Land Trt Area	2-10'	ND - 9,700	ND - 4,610	ND - 750	ND - 220	ND - 198	ND - 23,000,000	---	---	4,090 - 13,000	ND-11	2.9-61	2,390 - 17,400	ND-50	ND-0.33	2-129
	10'+	ND	ND	ND	ND	ND	ND - 660,000	---	---	---	---	--	---			
Spray Irrig Area	2-10'	ND	ND	ND	ND	ND	ND	---	---	6,160	ND	4.6	22,600	3.6	ND	[illegible]
	10'+	ND	ND	ND	ND	ND	ND	---	---	8,180	9.5	4.6	16,300	3	0.09	[illegible]
Freshwater Pond Area	12-10'	ND - 70,000	ND - 13,700,000	ND - 76,000	ND - 5,000	ND - 650,000	ND - 150,000,000	<30,300	657,000	8,590 - 9,100	ND-19	3.6	6,320 - 29,900	ND	ND-0.1	2.9-5.8
	10'+	--	--	.	.	--	ND 59,000,000	---	---	---	---	---		.		
Excavated Lagoon Area	2-10'	ND - 361,000	ND - 3,900,000	ND - 90,000	ND - 59	ND - 420,000	ND - 49,000,000	<30,300 - 5,960,000	1,900,000 - 4,050,000	14,000 - 23,300	ND-16	ND-7.2	5,410 - 20,600	ND	ND-0.1	[illegible]
	10'+	ND	3,885	1,700	140	320	53,000 - 82,000,000	---	---	2,430	ND	3	3,240	1.8	ND	[illegible]
Process Area	2-10'	ND - 17,600	ND - 2,530,000	ND	ND - 37	ND - 640,000	ND - 42,000	<30,600	1,270,000 - 2,600,000	3,550 - 4,880	18-19	4.3-7.1	6,600 - 18,600	ND-9.6	ND-0.15	[illegible]
	10'+	ND	ND - 10,300	ND	ND	ND	ND - 1,200,000	<30,300 - 41,500	29,900 - [illegible]	13,760 - 15,900	ND	3.5-8	1,970 - 9,750	ND	ND-0.1	

Note: All results reported on a dry weight basis. ND - Not Detected

Organic Compounds Most Frequently
Identified in Subsurface Soil Samples

Volatile Organic Compounds	Polynuclear Aromatics Hydrocarbons	Other Acid Extractables	Other Base/Neutral Extractables
Toluene	Naphthalene	Phenol	Dibenzofuran
Ethylbenzene	2-methylnaphthalene	22,4-dimethylphenol	
Styrene	Acenaphthene		
Xylenes	Fluorene		
	Phenanthrene		
	Fluoranthene		
	Pyrene		
	Pyrene(k)fluoranthene		

Table 10



SITE STRUCTURES AND TANKS

Figure 5

Table 11

SUMMARY OF TANK SAMPLING AND ANALYTICAL RESULTS

					CONCENTRATION OF ANALYTES (PPM EXCEPT DIOXINS)								
TANK NUMBER	ORIGINAL USE	MATRIX DESCRIPTION	TANK VOLUME (GALLONS)	MATERIAL VOLUME (GALLONS)	VOLATILE ORGANICS	TOTAL PNAS	OTHER BASE NEUTRALS	PCP	DIOXINS(PPB) (SEE NOTES)	OTHER ACID EXTRACTABLES	ALUMINUM & IRON	ZINC & COPPER	LEAD, MERCURY & CHROMIUM
1	RAW MATERIALS	LIQUID	34,000	2,100	1.02	191.	18.0	ND	0.00	ND	492.0	ND	0.26
2	RAW MATERIALS		34,000	EMPTY									
3	RAW MATERIALS	LIQUID	19,000	3,700					22.7				
4	RAW MATERIALS	LIQUID	19,000	5,300					28.3				
COMPOSITE OF 3 & 4					556	84.8	ND	140		ND	46.0	ND	ND
5	PROCESS MAKE UP TANK	LIQUID	2,600	1,600	ND	ND	ND	ND	53.9	ND	144,000	64,200	171
6	WATER	LIQUID	SEE NOTES	SEE NOTES	ND	ND	ND	ND		ND	72,200	926	ND
7	FUEL OIL	LIQUID	SEE NOTES	SEE NOTES	0.16	ND	ND	ND	0.00	ND	36,900	47	8
8	VACUUM CONTROL	N/A	N/A	EMPTY									
9	RAW MATERIALS	SOLID	21,000	920	36.6	1,300	ND	21,000	0.48	ND	23,100	174	90
10	RAW MATERIALS	SOLID	1,960	25									
11	RAW MATERIALS			EMPTY									
12	RAW MATERIALS	SOLID	21,000	415	19.7	70,300	ND	ND	0.60	ND	1,240.	ND	2.7
13	RAW MATERIALS	LIQUID	5,000	10	0.33	ND	197	ND	0.00	ND	2,390	58.8	57.0
14	RAW MATERIALS	LIQUID	5,000	26	0.30	ND	ND	ND	0.00	ND	58,600	849	507

NOTES

- TANK 6 MAY BE BAFFLED, VOLUME AND CONTENTS UNDETERMINED, ASSUMED APPROXIMATELY 20,000 GALLONS.
- TANK 7 UNDERGROUND, VOLUME UNDETERMINED.
- TANK 10 WAS NOT SAMPLED DUE TO SMALL OPENING AND LIMITED AMOUNT OF MATERIAL
- DIOXINS EXPRESSED AS TOXICITY EQUIVALENT FACTOR RELATED TO .,3,7,8 TCDD ALL CHLORINATED DIOXINS AND FURANS DETECTED WERE ASSUMED TO BE 1,2,3,7,8 SUBSTITUTED

Table 12

SUMMARY OF SURFACE WATER AND SEDIMENT ANALYTICAL RESULTS

AREA	SAMPLE STATIONS	VOLATILE ORGANICS (ppb)	PAHs (ppb)	PCP (ppb)	OTHER ACID EXTRACTABLES (ppb)	OTHER BASE/NEUTRAL EXTRACTABLES (ppb)	FIELD SCREENING FOR PAHs (ppb)	OIL AND GREASE (ppb)	TOTAL ORGANIC CARBON (ppb)	ALUMINUM (ppm)	CHROMIUM (ppm)	COPPER (ppm)	IRON (ppm)	LEAD (ppm)	MERCURY (ppm)	ZINC (ppm)
ON-SITE	PC1, SC1, 100															
Sediment		87-197	6,750-85,300	ND	ND	630-3,000	ND-4,600,000	<31,900-46,900	914,000-4,330,000	2,960-4,530	3.3-5.9	ND	6,100-89,300	4.9-7.7	ND	8.2-12
Surface water		20	230	120	136	15	--	--	16,600	ND	ND	ND	6.13	ND	ND	0.049
WEST TRIBUTARY																
50-200 ft from pond	101 to 104															
Sediment		ND-5	51,900-53,400	ND	ND	1,400-2,100	ND-8,200,000	36,500-93,000	1,220,000-3,070,000	2,100-2,860	4.3-4.9	ND	2,630-3,000	2.4-3.5	ND	7.2-12
Surface water		ND	ND-54	10-82	ND-47	ND-10			9,900-10,100	ND-0.469	ND	ND	2.48-2.52	ND	0.0003	0.064-0.137
550-1550 ft from pond	107 to 112															
Sediment		ND	1,600(1)-16,400	ND-260	ND	ND	27,000-370,000	<31,600-<32,500	1,000,000-1,690,000	1,093-2,590	2.1-4.1	ND	1,620-4,320	2.3-8	ND	ND-5
Surface water		ND	ND	ND	ND	ND	-	--	6,100-24,000	ND	ND	ND	2.47-4.23	ND	0.0003	ND-0.064
EAST TRIBUTARY																
100-1,000 ft from fence	U02 to U05	U08														
Sediments		ND-930	ND	ND	ND	ND	ND-32,000	<30,900-255,000	2,090,000-3,240,000	646-7,660	ND-15	ND-6.4	347-7,040	1.9-100	ND-0.2	ND-20
Surface water		ND	ND	ND	ND-4	ND	--	--	2,100-10,200	ND-0.305	ND-0.323	ND	0.431-1.26	ND	ND	0.024-0.055
1,000 ft from fence	U12															
Sediments		2,110	ND	ND	ND	ND	30,000-46,000	<32,300	914,000	6,500	11	ND	21,700	16	ND	14
Surface water		--	--		--	--	-	--	-	-	-	--	-			
AT CONFLUENCE of Tributaries 1900 ft from pond	114															
Sediments		ND	10,000	ND	ND	170	ND-180,000	<32,500	1,070,000	4,060	7.1	ND	32,600	11	ND	ND
Surface water		ND	22	ND	ND	13		--	16,600	0.494	ND	ND	41.4	ND	ND	ND
BELOW CONFLUENCE																
4450-7125 ft from pond	119 to 125															
Sediments		ND	ND-41	ND	ND	ND	ND-430,000	<31,900-<35,300	1,670-1,700,000	1,690-19,200	3.8-28	ND-9.2	2,410-44,000	5.6-34	ND	ND-44
Surface water		ND	ND	ND	ND	ND		--	7,300-17,200	ND-5.31	ND	ND	6.07-29.1	ND-0.012	ND	ND-0.025
<7125 ft from pond	A to E															
Sediments							ND-22,000									
Surface water																

(1) This sample was collected from a [illegible] 12" depth interval

In the sediment samples collected along the west tributary, total PNA concentrations in the tens of parts per million were encountered up to 1,900 feet downstream of the freshwater pond, at the confluence of the east and west tributaries. Surface water concentrations of organic contaminants are in the tens to hundreds of parts per billion along this section of stream.

Along the east tributary, contaminant concentrations in sediments ranged from nondetectable to approximately two parts per million. Surface water contaminants range from nondetectable to parts per billion.

At distances between 4,450 and 7,125 feet from (below the confluence of East and West Tributaries) from the freshwater pond, sediment contamination ranges from nondetectable to 41 ug/kg of PNAs, while surface water contamination was not detected. Table 13 provides a summary of the most frequently identified organic contaminants in surface water and sediments. The contaminants detected in the surface water samples are similar to those compounds found in groundwater. Sediment results are similar to results obtained for the surface soils. This data supports two pathways of contaminant migration at the site. The transport of contaminants from surface soils to stream sediments through surface runoff/erosion is indicated by the data and the low cohesive strength of the site soils. Additionally, the direct discharge of contaminated groundwater into the freshwater pond is supported by the similar contaminants in both media and visual observation of seeps along the pond bank, and the presence of contaminants in surface water and sediments.

Results of 0-to 6 inch and 6- to 12- inch sediment samples analyzed by a UV screening method were compared. This comparison indicates that samples from the 0-to 6- inch and 6- to 12- inch sample intervals typically contain PNA concentrations within the same order of magnitude. This is consistent with the long-term deposition of sediments carrying contaminants from upstream sources and does not indicate significant changes in contaminant concentration over time.

Although dioxins and furans were detected in surface waters and sediments, toxicity equivalent factors were at or below 0.010 ppb. No tetra - or penta - chlorinated dibenzodioxins were detected in surface water or sediment samples.

Community Relation History

There has been community interest in the Southern Maryland Wood Treating site since before the wood treating facility was built in 1965. Several individuals reported that nearby residents informally protested the construction of an industrial facility on the property, as the residents hoped the land would be used for residential development.

After the Southern Maryland Wood Treating plant was built and operations began, residents living nearby complained to county health officials of strong creosote-like odors coming from the site. As a follow-up to these complaints, the St. Mary's County Health Department sampled air quality around the site, but the results of tests were inconclusive.

Table 13

Most Frequently Identified Organic Compounds In Surface Water and Sediments

Volatile Organic Compounds		PNAs		Other Acid Extractables		Other Base Neutral Extractables	
Surface Water	Sediments	Surface Water	Sediments	Surface Water	Sediments	Surface Water	Sediments
Benzene	Benzene	Fluorene	Fluorene	Phenol	--	Dibenzo-furan	Dibenzo-furan
Toluene	Toluene	Fluoran-thene	Phenan-threne	2,4-di-methyl-phenol			
Ethylbenzene	Ethylbenzene	Fluoran-thene					
	Styrene	Pyrene					
	Xylenes	Benzo(a)-anthracene					
	Pyrene	Benzo(k) fluoranthene					
		Benzo(a)-pyrene					

Community Relation History (Cont.)

Local officials and residents have expressed continuing interest in EPA's progress at the site. Both have indicated that they want an effective, permanent remedy and that they wish to be kept appraised of new developments.

Local officials report that no formal community groups have formed in response to the classification of the Southern Maryland Wood Treating site as a hazardous waste site. However, other established community organizations, such as the Potomac River Association and the Patuxent River Association, maintain an interest in site findings and developments. Both groups are concerned with the preservation of the Potomac and Patuxent rivers and keep a watchful eye over conditions and activities that threaten the area's aquatic environment.

In addition, a class of science students attending Chopticon High School in St. Mary's County has taken an interest in the site. Since September 1985, the class has studied the Chesapeake Bay and cleanup initiatives currently being undertaken to preserve the Bay's environment. The teacher of the class believed it was important for students to get a better sense of current events in their community and how those events impact the ecosystem of the Bay. He therefore encouraged students to follow media coverage of the Southern Maryland Wood Treating site and research the contamination problems reported in site findings. As part of that research, a group of students attended the November public meeting conducted by EPA officials and asked a number of questions about the extent and effects of contamination found at the site and the cost of cleanup activities.

Media coverage of the Southern Maryland Wood Treating site has been extensive in the local press. Recent coverage hs included stories on public meetings conducted by EPA officials and the completion of removal activities at the site. County officials report that , in general, the local press is an important communications vehicle in St. Mary's County.

Remedial Action Objective

Utilizing data generated during the RI, a Public Health Evaluation (PHE) was conducted to evaluate the potential impacts on public health and the environment that may result from the release of hazardous substances from the Southern Maryland Wood Treating site. A baseline assessment was conducted evaluating the site in the absence of remediation and then compared with various potential remedial alternatives for this site.

For current use scenarios involving the exposure of trespassers to contaminated soil and sediment, the noncarcinogenic chemicals in the soil or sediments are not expected to pose a threat to human health because the hazard indices for these exposures are less than one. The risks associated with exposure to the carcinogenic chemicals under these scenarios, however, exceed 10^{-6} under the plausible maximum case.

For future use scenarios involving the exposure of construction workers to contaminated soil, the presence of the noncarcinogenic chemicals is not likely to pose a threat to human health because the hazard indices for both the maximum case and the average case scenarios were less than one. The excess risk of lifetime cancer associated with exposure to the carcinogenic chemicals under this scenario, however, exceed 10^{-6} under the plausible maximum case.

For future exposure scenarios involving the exposure of residents to contaminated surface soils, the noncarcinogenic chemicals in the soil are not expected to pose a threat to human health under the maximum or average exposure conditions.

The risk associated with exposure to the carcinogenic chemicals for a lifetime resident under this scenario, however, exceeds 10^{-6} under both the average and the plausible maximum case. This suggests that exposures to the carcinogenic PNAs may pose some threat to human health under the conditions of these assumptions for a potential resident residing at the Southern Maryland Site for a lifetime.

Remedial action objectives are long-term, permanent remedies that eliminate unacceptable risk to human health and the environment. This is accomplished to the maximum extent practicable through treatment and/or destruction of contaminants at the site.

The objectives of the proposed remedial actions are to:

* Reduce or eliminate organic contamination in site surface soils to cleanup levels established for contact and incidental ingestion of carcinogenic polynuclear aromatic hydrocarbons (PNAs) by future residents (2.2 ppm CPNAs based on a maximum 1 x 10^{-6} lifetime cancer risk).

* Reduce or eliminate the organic contamination present in sediments, the pond, and on-site tributaries of Brooks Run to cleanup levels established for on-site future residents (2.2 ppm CPNAs based on 1 x 10^{-6} lifetime cancer risk) and prevent off-site migration of contaminants via the sediment migration pathway.

* Reduce or eliminate organic contamination in site subsurface soils to the cleanup level established from the groundwater infiltration model (1 ppm CPNA based on 1 x 10^{-6} lifetime cancer risk).

* Pumping, collection, and treatment of contaminated liquids from the onsite pond, the pond discharge, and the shallow groundwater (inside the containment area). Treated water will be discharged to the pond tributary after treatment to levels to be established in accordance with appropriate ARARs.

* Reduce or eliminate the threat to the local environment from existing contaminated storage/process tanks and process equipment through demolition/remediation of these and any associated organic contents.

The volume of surface soils, sediments, and subsurface soils exceeding contaminant concentrations above the established risk based cleanup levels were estimated for each area of the site as follows:

. Upper site - Volume was estimated assuming removal of top six inches over 4.9 acres. Estimated volume is 4,000 cubic yards.

. Northeast tank area - Volume was estimated assuming removal of top six inches over four acres. Estimated volume is 3,200 cubic yards.

. Land Treatment Area - Volume was estimated assuming removal of top three feet over 2.9 acres. Estimated volume is 1,400 cubic yards.

- Subsurface Soils/Contained Area - Volume was estimated assuming removal down to the clay and silt layer over an area of 3.3 acres. Estimated volume is 90,000 cubic yards.

- Process Area - Volume was estimated assuming removal of the top six inches of soil over 2.7 acres. Estimated volume is 2,000 cubic yards.

- West Tributary - Volume was estimated assuming stream excavation one-foot deep by five-feet wide to 1900 feet downstream of the on-site pond. Volume is estimated to be 1,000 cubic yards; however, this is most likely a maximum volume and may be less to minimize disturbance to wetlands.

The total volume of contaminated soils and sediments at the Southern Maryland Wood Treating site is estimated to be 102,000 cubic yards.

Alternatives Evaluation

The RI/FS for the SMWT site screened a large number of alternatives which could potentially achieve the remedial objectives at this site, i.e., reduction of contaminant levels in on-site soils, sediments, and ground water to levels which eliminate unacceptable risk to human health or the environment.

A. Preliminary Screening

During the preliminary screening process certain alternatives were eliminated from further consideration for applicability at this site. Each eliminated alternative and the reason for its elimination are listed below:

Alternative	Reason for Elimination from Detailed Analysisly.
Soil Admixtures Cap	Less Costly, equally effective materials are available for capping.
In-situ absorption	Insufficient technology; suitable only for temporary remediation. Technical problems with clogging and saturation of treatment beds.
Supercritical extraction	Insufficient information available for preliminary assessment.

Pyrolysis	Insufficient data available. For this tech-technology. Cannot accept sludge-type material. No data available for dioxin wastes.
Wet Air Oxidation	Limited information for hazardous waste application. Limited to pumpable aqueous wastes. Not recommended for halogenated organic aromatics.
Macroencapsulation	Potential Leaching Problems. May require disposal in RCRA Landfill.
Ion Exchange	Restrictions on solids and organisms contents of wastes. Problems with clogging and regeneration of resin material. High Costs
Membrane Separation	Limited to treatment of aqueous streams with low organic concentrations. Membrane clogging problems. Concentrated waste stream need disposal.

B. Development and Description of Remedial Action Alternatives

Remedial action alternatives were formulated to address the environmental issues and contaminant pathways related to the Southern Maryland Wood Treating site. Alternatives were developed by applying technologies to the site singly or in combination, based on previously developed remedial objectives.

With respect to the SMWT Site, most of the remedial action technologies that remain after screening are under the Source Control Classification (versus migration management). This is because the site contamination and contaminant pathways can best be addressed on-site. Management of migration at the SMWT site applies to the contamination that has migrated off-site via sediment transport mechanisms.

Eight remedial alternatives have been retained for detailed evaluation. A description of each alternative follows, including an estimate of the present worth cost of remediation and the present worth cost of operation and maintenance of each.

I. Alternative 1: No Action

Present worth cost of Remediation: $114,000
Present worth costs of O & M: $107,000

The no action alternative is a baseline remedial alternative against which other alternatives may be compared. Under the no action alternative no additional measures will be used to remediate contaminant sources or their potential migration pathways. The two major components of this alternative are:

* Upgrad· :f site security including the installation of fencing arounc :e west tributary to restrict public access.

* Implementation of a long-term quarterly groundwater/surface water monitoring program.

Implementation of only the above remedial activities at the site allows the existing contaminant sources and migration pathways to remain in place. Current environmental conditions will remain unchanged. Infiltration of precipitation through the surface soils, the flow of groundwater through subsurface soils, and the surface water transport of sediments will continue to result in the migration of contamination to off-site locations.

II. Alternative 2: On-Site Thermal Treatment

Present worth costs of Remediation: $38,163,00
Present worth costs of O & M: $44,000

This alternative consists of on-site thermal treatment of excavated soils, sediments, and other materials at the site that exhibit concentrations of contaminants above the risk based levels established for this site. Soils remaining in the ground would be covered with clean fill and possibly backfilled with non-hazardous ash from the incineration process. Groundwater and surface water would be treated and discharged on-site.

The major components of this alternative include:

* Dredging of all contaminated sediments surface and subsurface soils to cleanup levels established for this site.

* Control of off-site soil transport.

* Installation of a slurry wall (or other means of containment) for control of groundwater migration through the pond/process area.

* Dewatering of the contained area by pumping and treating contaminated ground and surface water.

* Excavation of surface and subsurface soils in the pond/process and land treatment areas; surface soils in the upper site and northeast tank area; and dredging of sediments in the pond and west tributary.

* On-site incineration of contaminated materials and on-site disposal of incinerator ash in previously excavated areas.

* Backfill, regrade, and revegetate, where necessary.

* Concurrent and post-treatment groundwater/surface water/ sediment monitoring and biological assessment.

This alternative will virtually eliminate all on-site sources of organic contaminants and thereby reduce subsequent impact to off-site areas; it is also expected to meet or exceed applicable or relevant and appropriate requirements (ARARS). Some treatability studies may be required to determine the optimum water treatment technology and a trial burn of the hazardous waste would be conducted to demonstrate destruction efficiency for the organic constituents in the soils and dioxins in the tank contents. EPA expects that the residual ash from this process will qualify for hazardous waste delisting prior to backfilling at the site pursuant to 40 CFR 261.22.

III. Alternative 3: Soil Washing/Extraction

Present worth costs of Remediation: $25,147,000
Present worth costs of O & M: $48,000

This alternative consists of on-site treatment of excavated soils and sediments at the site that exhibit concentrations of contaminants above the risk-based levels established for this site.

The major components of this alternative include:

* Dredging of contaminated sediments, surface, and subsurface soils.

* Management of off-site soil transport.

* Installation of a slurry wall to control ground water migration.

* Dewatering the contained area; pumping and treating contaminated groundwater/surface water.

* Excavation of surface and subsurface soils from the pond/process areas, land treatment area, and upper site and northeast tank area. Dredging of sediments in the pond and west tributary.

* On-site soil washing/extraction of contaminated materials using water/chemical solutions.

* On-site treatment of soil washing elutriate stream using conventional wastewater treatment methods.

* On-site discharge of treated process wastewater.

* On-site incineration of tank contents and disposal of ash residue onsite.

* Backfill, regrade, and revegetate, where necessary.

* Groundwater monitoring.

This alternative will virtually eliminate the on-site sources of contamination and reduce the impact to off-site areas.

Laboratory and pilot-scale testing to determine the optimum washing solution, field operating parameters, etc., would be needed before implementing this alternative.

IV. Alternative 4: In Situ Soil Flushing/Bioreclamation

Present worth of Remediation costs: $30,991,000
Present worth of O & M Costs: $25,000

This alternative consists of in situ treatment of the contaminated materials (associated with the area bounded by the process area, the freshwater pond, and the are just east of the excavated lagoons) by soil flushing, followed by in-situ bioreclamation. Included in this alternative is the on-site landfarming of surface soils from the upper site and northeast tank area, and sediments from the west tributary and the pond/process area. The land farming of these soils would occur in the existing land treatment section of the site. Other major components of this alternative include:

* Recovery of the product layer located just above the clay in the excavated lagoon and eastern pond areas.

* Treatment of groundwater/surface water from product recovery and dredging operations and discharge on-site.

* Installation of slurry wall to prevent groundwater migration.

* In situ soil flushing within containment area.

  - Injection/recovery wells
  - Biodegradable surfactant
  - Treatment system to remove contaminants from washing solution
  - Disposal of treated wastewater

* In situ biodegradation in the containment area following the in-situ flushing.

* Groundwater monitoring.

* On-site land treatment of excavated soils from various site areas.

* On-site incineration of tank contents and onsite disposal of ash residue.

Treatability studies would be required to determine the effectiveness of this alternative.

V. Alternative 5: In Situ Vitrification

Present worth of Remediation costs: $51,045,000
Present worth of O & M costs: $48,000

This alternative consists of in situ vitrification of contaminated soils at the SMWT site. Groundwater and surface water would be treated and discharged on-site. The major components of this alternative include:

* Establishment of vitrification zones and the placing of excavated/dredged contaminated surface and subsurface soils and sediments in these treatment zones.

* Control of off-site soil transport

* Vitrification of the soils and sediments

* Treatment and discharge of sediment, surface, and groundwater recovered during the excavation process.

* Groundwater monitoring.

* On-site incineration of tank-contents and onsite disposal of ash residue.

In situ vitrification is a thermal treatment process that converts contaminated soil into a chemically inert, stable glass and crystalline product. The in situ vitrification process has not been extensively tested for organic contaminants, especially low boiling - point organics, treatability studies would be required for this alternative.

VI. Alternative 6: Containment

Present worth of Remediation costs: $10,589,000
Present worth of O & M costs: $585,000

This alternative consists of establishing a containment system that encompasses the process area, the freshwater pond, and the area just east of the excavated lagoons. Contaminated materials excavated from outside this area will be deposited therein. These contaminated materials will be stabilized and then placed under a cover system. The major components of this alternative include:

* Recovery of the product layer located just above the clay in the excavated lagoon and eastern pond area.

* Treatment of groundwater/surface water from product recovery and dredging operations with on-site discharge.

* Diversion of surface water and groundwater around the proposed containment area using surface management techniques and a slurry wall as a subsurface groundwater barrier.

* Excavation of surface and subsurface soils and sediments and transfer to containment area.

* Construction of a surface cap.

* On-site incineration of tank contents and onsite disposal of ash residue.

VII. Alternative 7: Removal/Off-Site Option

Present Worth of remediation costs: $73,490,000
Present Worth of O & M costs: $53,000

This alternative consists of removal by excavation of the sources of contamination at the SMWT site and disposal/treatment of these materials at an EPA-approved off-site facility. The treatment option would be incineration, and the disposal option would be a RCRA-approved landfill. This removal/ off-site option applies to the contaminated soils and sediments at the site that exceed risk-based cleanup levels. Soils remaining in the ground may be covered with clean fill. As needed, groundwater and surface water would be treated and discharged on-site. The major components of this alternative include:

* Dredging of contaminated sediments and excavation of contaminated surface and sub-surface soils to appropriate risk-based levels.

* Backfilling, regrading and revegetation of excavated areas.

* Off-site disposal/treatment as either:
  - -Off-site thermal treatment
  - -Off-site disposal at a RCRA Approved Landfill

* On-site incineration of tank contents and onsite disposal of ash residue.

VIII. Alternative 8: RCRA Containment

Present Worth of remediation costs: $22,799,000
Present Worth of O & M costs: $970,000

This alternative consists of establishing a RCRA - type landfill to contain contaminated materials excavated from the upper site, northeast tank area, land treatment area, excavated lagoons, process and pond areas, and sediments from the west tributary. These contaminated materials will be dewatered prior to placement under a cover system. The excavated areas will be backfilled with clean soil. The major components of this alternative include:

* Removal of the contaminated surface soils from the proposed RCRA landfill location with temporary storage in the northeast tank area pending final disposition in the landfill.

* Construction of a RCRA type landfill, which satisfies the applicable requirements of RCRA.

* Recovery and disposal of the product layer located above the silty clay layer.

* Treatment of groundwater/surface water from product recovery and dredging operation and onsite discharge of treated water.

* Diversion of surface water and groundwater around the proposed excavation in the pond/process area utilizing surface management techniques and a slurry wall as a subsurface groundwater barrier.

* Excavation of surface and subsurface soils and dredging of sediments to established levels. Transfer of excavated soils and sediments to the landfill area.

* Backfilling of excavations with clean fill.

* Construction of a surface cap over the landfill area.

* On-site incineration of tank contents and onsite disposal of ash residue.

* Groundwater monitoring.

The RCRA containment alternative does not reduce the toxicity nor volume of the hazardous substances on-site. Additionally, because there is a relatively shallow water table across the site, an above ground landfill is required.

C. Evaluation of Alternatives

Each alternative described in the preceding section will be evaluated against specific criteria as follows:

1. Overall Protection of Human Health and the Environment

The No-Action alternative would not be protective of human health or the environment since contaminant levels in soils, groundwater and surface water would continue to present an unacceptable risk.

The remaining alternatives are protective of the shallow aquifer, public health and aquatic life by either treating soils to target clean-up levels, removing soils to prevent migration, or containing removing soils to prevent migration. Direct contact Pathways are prevented by placement of a soil cover over the site.

2. Compliance with Applicable or Relevant and Appropriate Requirements

All alternatives except alternative 1 would be subject to land disposal regulations as EPA experts that the residual ash from this process will qualify for hazardous waste delisting prior to backfilling at the site.

The containment altenatives would not actually reduce soil and sediment contaminants to cleanup levels. Rather, soils and sediments exceeding contaminated levels protective of the shallow aquifer would be contained to prevent their migration into the aquifer.

The location,action, and chemical specific ARARs for each alternative are shown in Tables 14 and 15.

3. Long Term Effectiveness and Permanance

The Soil Biodegradation and On-site Thermal treatment alternatives provide solutions that offer a high degree of permanence over the long term, although the biodegradation alternative may not be as effective as thermal treatment because of dioxin contaminated soils. In each case there are few, if any, toxic residuals generated during the treatment of waste and the contaminants of concern are permanently destroyed.

The Soil Washing and Soil Flushing Alternatives will generate large quantities of residuals which will need to be disposed of, most likely by incineration on-site, since these residuals are non-biodegradable.

The Containment Alternative provides a lesser degree of permanance and will require considerable operation and maintenance, possibly significant repairs, and some measure of security. Since compounds of concern are not permanently destroyed, leachate exceeding risk based levels could be released into the ground and/or the aquifer should a leak occur. The RCRA landfill alternative, while more secure and permanent than the containment option, has many of the same inherent risks.

Off-site disposal provides a long term solution for the SMWT site; however, because of future land disposal restrictions, this alternative may not be feasible to implement. Additionally, the Superfund Amendments and Reauthorization Act (SARA) specifies that landfilling without treatment is the least preferred remedial option.

In-situ vitrification technologies have not been sufficiently developed to determine their long term effectiveness or permanence.

4. Reductions of Toxicity, Mobility, or Volume

The Soil Flushing/Biodegradation and thermal treatment alternatives both permanently destroy the compounds of concern, thus reducing the toxicity and volume of the waste to levels which do not present an unacceptable risk to the public or the environment.

The Soil Washing alternative does not reduce the toxicity of the compounds of concern; rather, the contaminants are removed from the soil/sediment and the residuals disposed of separately.

The offsite Removal and Vitrification alternatives may reduce the mobility of the contaminants of concern; however, neither the volume nor the toxicity of contaminants would be permanently reduced.

The Containment and RCRA landfill alternatives would reduce neither the toxicity nor the volume of the contaminants. The mobility of the waste would be reduced by these options; however, due to the possibility of leachate migration due to potential leaks from there alternatives, the permanence of this option is dependent upon the expected life of the landfill.

5. Short-Term Effectiveness

Current conditions at the site do present current risks for the environment. The thermal treatment, off-site disposal, containment and RCRA landfill alternatives would have shorter design and implementation periods than the other alternatives and would therefore be expected to produce positive results in a shorter timeframe.

The Soil Washing/Soil Flushing and Vitrification alternatives would require both longer times for implementation and pilot/bench scale studies during the design phase.

The transportation of contaminated materials under the off-site disposal alternative presents a short-term risk which does not occur with the other alternatives.

Any short term impacts to public health or the environment resulting from implementation of the remedial action will be prevented by ARARs, addressing discharge to air, groundwater, surface water, and wetlands. The ARARs of concern are identified in Tables 14 and 15. To assure the prevention of short term impacts, monitoring of air and water shall be conducted both during and after the implementation of the selected remedy.

6. Implementability

The implementability of the on-site Thermal Treatment alternative could be hampered somewhat by the low heating value of the material and the need to conduct test burns; however, no other obstacles to implementability are forseen.

Soil Washing and Soil Flushing/Biodegradation would need fairly extensive design/treatability studies before implementation could begin. Similar studies would also be needed for the on-site vitrification option. These alternatives have a higher risk of remedy failure than thermal treatment.

The containment and RCRA landfill alternatives require long-term maintenance and monitoring after implementation. Maintenance of the Cap in the Containment alternative and the liner/leachate System in the RCRA alternative is necessary for compliance with RCRA requirments.

Potential problems exist with both off-site options. With respect to off-site thermal treatment, obtaining sufficient capacity at a commercial facility may be a limiting factor. Off-site disposal, on the other hand, will be impacted by the enforcement of the proposed land disposal ban of untreated wastes. The land ban would render this alternative unacceptable.

7. Community Acceptance

A public meeting on the selected remedy was held on June 15, 1988. Although not heavily attended, the general feeling of those present seemed to be that a plan to remediate the Southern Maryland Site and eliminate the public health and environmental threats was acceptable.

A responsiveness summary has been prepared for this site and is attached to, and made part of, this ROD.

8. <u>State Acceptance</u>

The Maryland Department of the Environment (MDE), had concurred with this remedy as conditioned in the Record of Decision Declaration.

9. <u>Costs</u>

The costs of each Alternative are as follows:

		Present Worth Implementation	Present Worth O & M
Alternative	1-No Action	$114,000	$107,000
Alternative	2-On-site Thermal Treatment	$38.1M	$ 44,000
Alternative	3-Extraction/Soil Washing	$25.1M	$ 48,000
Alternative	4-In-Situ Soil Flushing/ Biodegradation	$30.9M	$ 25,000
Alternative	5-In-Situ Soil Vitrification	$51.0M	$ 48,000
Alternative	6-Containment	$10.5M	$585,000
Alternative	7-Off-site Disposal		
	a) Documentation	$84.7M	$ 53,000
	b) Landfill	$66.9M	$ 53,000
Alternative	8-RCRA Landfill	$22.7M	$970,000

Summary of Comparative Analysis

Alternative 1, No-Action, is not protective of human health and the environment. Therefore, it should be eliminated from further consideration.

Among the remaining alternatives, all are expected to be protective of human health and the environment; however, Alternative 6, Containment, and Alternative 7, Off-Site Disposal, are not expected to meet RCRA ARARs. These alternatives would probably not be acceptable to the community because they would not eliminate either the toxicity or volume of the contaminants.

Alternatives 3,4,5, and the incineration option of alternative 7 rate highly in long term effectiveness and permanence. The disposal option of alternative 7 removes contaminants from the site but does not provide a permanent treatment method for those contaminants.

The containment option, alternative 6, neither destroys nor removes contaminants from the site, although their mobility is reduced considerably. Alternative 8, the RCRA landfill alternative, provides a higher degree of permanence than simple containment but, again, provides for no reduction in toxicity or volume.

Each alternative has some short-term impacts to public health and the environment associated with it; however, these effects would be mitigated to the greatest extent possible through careful design and close monitoring of activities during remediation.

All alternatives, with the exception of the disposal option of alternative 7, should be implementable after the completion of test burns and/or treatability studies. The incineration option of alternative alternative 7 may be difficult to implement due to limited off-site incinerator capacity.

All alternatives except alternative 1, would be subject to land disposal restrictions. With alternative 2, however, EPA expects that the residual ash from the incineration process will qualify for hazardous waste delisting prior to back filling at the site.

Selected Remedy

Alternative 2, On-Site thermal treatment is the selected alternative for the SMWT site. This alternative utilizes incineration techniques to permanently destroy contaminants in soil/sediment which present a threat to human health and the environment. In addition, contaminated groundwater at the site will be treated to remove contaminants and the contents of tanks and reactors on site will also be incinerated. This alternative achieves a long-term, permanent solution and is relatively, implementable.

As required by Section 121 of CERCLA, Alternative 2 is protective of human health and the environment, reduces the volume and toxicity of contamination, will attain ARARs, and utilizes permanent solutions and alternate treatment technologies to the maximum extent practicable. The selected remedy also satisfies the statutory preference for employing treatment which significantly reduces the mobility, toxicity and/or volume of hazardous substances as a principal element. This alternative is the most cost effective remedy in that it achieves the Remedial Action Objectives and offers the best balance among the nine criteria in comparison with the other alternatives. The remedy provides effective and long term remediation by destroying or removing contaminants of concern at the site, is readily implementable, and provides for achievement of the remediation objectives over a 3 to 4 year period. The requirements of 40 CFR 265.193(a)(2) (Tank Storage) will be met to the extent practicable.

The selected alternative will effectively remove the source of contaminants at the SMWT site, remediate the contaminated groundwater, and prevent further threats to public health and the environment by eliminating contaminant migration from the site. Additionally, this remedy will be protective by reducing direct contact soil/sediment concentrations to levels protective of the shallow aquifer below the site and protective of those persons potentially or actually coming into direct contact with the contaminated soils/sediments, and surface waters. These levels are also protective of aquatic life in downgradient surface waters. The design of the remedy and monitoring before, during and after remedy implementation will control contaminant releases during remedial action. Functional controls that are necessary to maintain the site during and after remedial action shall be developed.

All Federal, State, and local ARARs will be met by the selected remedy. The ARARs of concern are identified in the ARAR Compliance Matrix. The ash residue from incineration of contaminated soils, sediment, and tank contents is expected to meet Best Demonstrated Available Technology (BDAT) for this remediation. EPA also expects to delist the ash residue pursuant to 40 CFR 261.22 prior to backfilling of th eash onsite.

Statement of Findings Regarding Wetlands

The RI/FS for the SMWT site has determined that site wetlands contain site-related contaminants at levels which constitute an unacceptable risk to public health and the environment. Excavation and/or treatment of the sediments of concern will be required to eliminate this unacceptable risk. All remedial alternatives, except No Action, will require excavatic of these sediments.

The excavation and fill activities of concern shall be conducted in a manner consistent with provisions of Appendix A of 40 CFR Part 6. The subject regulations have been entitled " Statement of Procedures on Floodplain Management and Wetland Protection." These procedures constitute policy and guidance for carrying out provisions of Executive order 11990. This order addresses Protection of Wetlands.

The Remedial Design of the Remedial Action shall be developed in a manner consistent with Appendix A of 40 CFR Part 6 to assure that potential harm and adverse effects to the wetlands is minimized. The Remedial Design has not yet been initiated at this time. Therefore, specific steps to minimize impacts have not yet been identified. In addition, the effect of the Remedial Action on the wetlands cannot accurately be assessed at this time.

While all remedial measures shall be designed to minimize harm to wetlands, it is possible that some adverse effects may be unavoidable. Should remedial activity be expected to create such effects, restorative and/or mitigative measures shall be developed during the Remedial Design and reviewed by EPA and the State. Should anticipated adverse effects occur, these measures shall be implemented as part of the Remedial Action.

Surface water, sediment, and benthic sampling to be conducted during the remediation and O & M process will provide data on nature and extent of any mitigative/restorative measures needed.

Evaluation of Alte[redacted]tives Table 15

Alternative	Present Worth Implementation	Present Worth O & M	Total Present Worth	Protective of Human Health & Environment	Compliance with ARARs	Long Term Effective-ness
(1) No-Action	$114,000	$107,000	$221,000	No.	No.	None
(2) On-Site Thermal	$38.1M	$44,000	$38,144,000	Yes- Soils, sediment, g.w. treated to clean-up levels.	Yes-All ARARs are expected to be met.	Permanent Remedy Contaminants Destroyed/ treated.
(3) Extraction/ Soil Washing	$25.1M	$48,000	$25,148,000	Same as Alt. 2	Same as Alt. 2	Contaminants Extracted/ Residuals Destroyed.
(4) In-Situ Flushing Biodegradation	$30.9M	$25,000	$30,925,000	Same as Alt. 2	Same as Alt. 2	Contaminants Treated.
(5) In-Situ Vitrification	$51M	$48,000	$51,048,000	Same as Alt. 2	Same as Alt. 2	Contaminants Immobilized.
(6) Containment	$10.5M	$585,000	$11,085,000	Yes	No.	Contaminants contained needs signi-ficant main-tenance.
(7) Off-Site Dis-posal a) Incineration b) Landfill	a) $84.7M b) $66.9M	$53,000 $53,000	$84,753,000 $66,953,000	Yes-Soils, sediments exceeding clean-up levels removed from the site.	a) Yes b) No	a) Contaminants Destroyed. b) Land Ban Restrictions.
(8) RCRA Landfill	$22.7M	$970,000	$23,670,000	Yes	Yes	Significant Maintenance Needed.

Alternative	Reduction & Mobility, Toxicity, or Volume	Short-Term Effectiveness	Implementability	Community Acceptance	State Acceptance
(1) No Action	None	None	Readily Implementable	Not Acceptable	Not Acceptable
(2) On-Site Thermal	**Complete elimination of on-site contaminants.**	Short term risks will be mitigated thru design and monitoring.	Readily Implementable needs test burns. Remediation over a four year period.	No significant comments.	Concur subject to conditions stated in declaration.
(3) Extraction/ Soil Washing	Contaminants eliminated on-site and removed for off-site disposal.	Same as Alt. 2	Need Treatability Studies. Remediation over in a four year period.	Same as 2	Deferred until State acceptance of alternative 2
(4) In-Situ Flushing/ Biodegradation	Contaminants eliminated on site.	Same as Alt. 2	Treatability Studies needed. Remediation over a 10 year period.	Same as 2	Same as 3
(5) In-Situ Vitrification	Eliminates Mobility and Toxicity.	Same as Alt. 2	Treatability Studies required. Remediation over a three year period.	Same as 2	Same as 3
(6) Containment	Reduces Mobility	Same as Alt. 2	Maintenance Required-Long Term.	Same as 2	Same as 3
(7) Off-Site Disposal a) Incineration b) Landfill	Contaminants removed off-site.	Same as Alt. 2	Incinerator Capacity questionable. Land Ban restrictions may apply.	Same as 2	Same as 3
(8) RCRA Landfill	Reduces Mobility	Same as Alt. 2	Long Term Maintenance and monitoring required.	Same as 2	Same as 3

DRAFT RESPONSIVENESS SUMMARY

FOR THE

SOUTHERN MARYLAND WOOD TREATING SITE

ST. MARY'S COUNTY, MARYLAND

From May 27, 1988 through June 24, 1988, the U.S. Environmental Protection Agency (EPA) held a public comment period on the Proposed Plan and the Remedial Investigation/Feasibility Study (RI/FS) for the Southern Maryland Wood Treating Superfund site in St. Mary's County, Maryland. The RI/FS and other information utilized by EPA to select a preferred remedial alternative is included in the Administrative Record which has been available to the public since the beginning of the public comment period. In addition, copies of the Proposed Plan were distributed at the public meeting held on June 15, 1988 in Hollywood, MD. This responsiveness summary summarizes comments on these documents as expressed by residents, local officials, and other interested parties during the public comment period and provides EPA's responses to the comments. Public comments were submitted verbally during the public meeting.

SUMMARY OF MAJOR COMMENTS AND EPA RESPONSES

The public meeting was held at the Hollywood Fire House on June 15, 1988 at 7:30 p.m. Those attending the meeting included representatives from EPA, the Maryland Department of the Environment (MDE), area news reporters, and approximately 12 community residents. The EPA representatives included Mr. Ray Germann, Mr. Tony Dappolone, and Mr. Thomas Voltaggio. The MDE representative was Mr. Mike Kilpatrick. Prior to the public meeting, EPA and State officials also met with St. Mary's County officials. During these meetings, EPA staff presented an overview of the events that have occurred at the site, described how the Superfund cleanup program works, described the proposed remedial alternatives, and explained why EPA recommends Alternative 2 (on-site thermal treatment) as the preferred alternative. The MDE representative described MDE's past experience with the site and the State's desire to work with the public and EPA in selecting a cleanup remedy. Following these presentations, EPA answered questions from citizens and county officials about the proposed remedy and cleanup of the site. In addition, citizens were given the opportunity to ask questions of the Maryland Department of the Environment representative.

Questions and comments received during these meetings and throughout the comment period are summarized below and are categorized into the following topics: 1) Incineration; 2) Previous Site Studies; 3) Human Health and Safety; 4) Nature and Extent of Contamination; 5) Other Remedies; 6) Cost of Cleanup; 7) Site Sampling; and 8) Status of the Land After Cleanup. Each comment is followed by EPA's or MDE's response. The questions and responses summarized here are also contained in the official transcript of the meeting. Copies of the transcript are available at the St. Mary's County Memorial Library and Health Department in Leonardtown, MD.

INCINERATION

<u>Question:</u> A County official at the EPA/County meeting and later, at the public meeting, a local resident, Mr. Robert Larrabee, asked what would be the chemical composition of the ash resulting from incineration of the hazardous waste.

<u>Response:</u> EPA will conduct a test burn to analyze the chemical content of the ash. Before the technology is implemented at the site, the test results must indicate that the ash is non-hazardous. Studies of incineration have shown that this process renders hazardous material non-hazardous.

<u>Question:</u> Mr. Larrabee asked if incineration would: 1) volatize the contaminants and cause an air quality problem; 2) if the air emissions would be washed; and 3) if the emissions would reach neighboring homes.

<u>Response:</u> Remedies for cleanup of Superfund sites must meet all federal, State, and local environmental standards; this includes air quality standards. If the emissions do not meet air quality standards, they will be cleaned. Whether or not the emissions are washed depends upon the type of incinerator actually used at the site.

<u>Question:</u> A County official asked if there would be any off-site impacts.

<u>Response:</u> If Alternative 2 is selected, the off-site impacts will be short-term and could include an increase in truck traffic on and off the site, increased noise levels, and dust emissions that may be perceived as an air pollution problem. The cleanup work on the site must comply with State soil erosion control laws and noise standards.

If an off-site remedy is selected, the off-site impacts will be greater and vary with the option.

<u>Question:</u> A County Commissioner asked if the incinerator could be used after the cleanup for waste incineration.

<u>Response:</u> The discussion in the proposed plan is limited to the selection of a remedy and does not address the possible future uses of the incineration facility. Detailed investigation as well as federal and State permits and public acceptance would be required prior to use of the incinerator for ongoing waste disposal.

Question: Mr. John Combs, an area resident, and Mr. Larrabee were interested in [illegible] incineration has been used to clean up hazardous waste.

<u>Response:</u> The MDE representative, Mr. Mike Kilpatrick, responded that commercially operating hazardous waste incinerators are located in New Jersey and in the southwest U.S. The EPA will mail further information to Mr. Combs and Mr. Larrabee.

Question: Mr. Larrabee asked if dioxins have been treated by incineration.

Response: Mr. Kilpatrick responded that incineration has been used successfully at a Missouri Superfund site to dispose of the most toxic form of dioxins. He added that the dioxins at the Southern Maryland Wood Treating site are of a less toxic nature.

Question: Mr. Combs inquired as to why EPA has not shipped samples from the site to an incinerator for testing.

Response: The materials will be tested before an incineration remedy is fully implemented at the site.

Question: Mr. Combs asked if anyone attending the meeting had seen an incinerator.

Response: Mr. Thomas Voltaggio of EPA responded that he has seen incinerators in operation. He described the process at a facility and said the process is tightly controlled and monitored.

He added that incineration destroys 99.99% of the hazardous substance from the material being cleaned. When dealing with dioxins, the material must be cleaned to 99.9999%. If the technology at the site cannot achieve this level, then it will not be used.

PREVIOUS SITE STUDIES

Question: Mr. Combs asked what background information EPA used to prepare the Feasibility Study and resulting recommendations.

Response: There were three phases to EPA's work. First the contaminants were identified, then the site and contaminants were characterized, and finally the location of the contamination was established.

Thirty technologies were screened for use at the site. Many were discarded because of impracticality or because they were too experimental. The eight alternatives presented in the Proposed Plan have all been used in research or at actual site locations. Because each site differs, it is unclear if a selected remedy will work at a particular site until it is tested for that site.

Question: Mr. Combs asked why EPA did not incinerate the hazardous materials, especially the dioxins, during its past activities at the site.

Response: Past work at the site was solely for controlling the spread of contamination from the site and not to clean up the site. The present efforts are aimed at cleaning up the site.

HUMAN HEALTH AND SAFETY

Question: A County official asked what were the hazards to workers from the original work done at the site.

Response: Although the EPA staff attending the meeting did not know, they could get an opinion from the Agency for Toxic Substances and Disease Registry of the National Centers for Disease Control. Normally, the type of contaminants found at this site are chronic in nature and would pose a health risk only if the workers were exposed over a long period of time.

A County official noted that the County had arranged for site workers to be screened at a local facility but only two workers chose to bear the expense. There were no findings and no subsequent follow-up with those workers.

Question: A County official asked if the materials in the West Tributary are immediately hazardous to human health.

Response: The contaminants include creosote, pentachlorophenol, and dioxins. Although these contaminants are toxic to humans, they are in the streambed sediments of the West Tributary and are mostly toxic to aquatic life. They would pose a problem to human health if an individual were to have direct contact with the streambed sediments.

Question: Mr. Peter Gamble, an area resident, asked why someone still works at the site when it is contaminated.

Response: The individual is not working in a highly contaminated part of the site. The EPA does not regulate worker safety and does not own the property.

NATURE AND EXTENT OF CONTAMINATION

Question: How far downstream of the West Tributary has the contamination reached?

Response: Contaminants have migrated 1900 feet down the West Tributary. The migration of contamination has slowed because the Removal Action removed the concentrated source of contamination.

Question: How many years would it take for the contaminants to break down naturally?

Response: The contaminants are persistent in the environment and do not decompose readily when in high concentrations.

OTHER REMEDIES

Question: Has the State used biodegradation before at the site?

Response: Biodegradation was attempted at the site, although not by the State, but this method was unsuccessful. This process required careful maintenance and was more of a chemical process than a simple solution involving earth tilling.

Question: Mr. Combs suggested building a concrete vault to store the contaminated materials at the site.

Response: Alternative 8 in the Proposed Plan does suggest on-site containment.

COST OF CLEANUP

Question: A County official asked how much the incinerator will cost and who is going to pay.

Response: The cost estimates for the alternatives in the Proposed Plan include the cost for the equipment and treatment. Much of the treatment cost for Alternative 2 is in the excavation of the soils because excavation involves moving large volumes of hazardous waste contaminated media. The cost of the equipment will vary depending on the vendor hired and the incinerator type selected.

The federal Superfund program will cover 90 percent of the cost and the State will cover 10 percent of the cost. Funding is available to implement the cleanup as soon as a remedy is selected.

SITE SAMPLING

Question: Ms. Joy Buddenbohn, an area resident, asked when the last sampling was done at the site and how far downstream samples were collected from the West Tributary.

Response: Sampling was last conducted between 18 to 24 months ago. The samples were taken from the stream and streambed sediments as far as 7000 feet downstream. The data indicate that the contamination is not moving very quickly.

STATUS OF LAND AFTER CLEANUP

Question: A County official asked what the land's status would be once the four year cleanup period is over.

Response: Future use of the site depends upon the cleanup alternative selected. If Alternative 2 is selected, there will be little limitation, if any, on future land use.

In addition, the Federal government will sue to recover the cost of the cleanup, and this may affect future ownership of the land.

Action - Specific and Location Specific ARARs Matrix Table 14

Action/ARAR	Alt. 1 No Action	Alt. 2 - On-site Thermal Treatment	Alt. 3 Soil Washing /Extraction	Alt. 4 - In-situ Soil Flushing/ Bioreclamation	Alt. 5 In-situ Vitrificatio
1. Discharge of dredge/fill material into navigatable waters.	N/A	Dredging of contaminated sediments in pond and west tributary (and of same) backfilling may constitute such a discharge and, if so, must be performed in accordance with substantive requirements of clean Water Act {404; 40 C.F.R. {230.10; 33 CFR {{320.330.	Same as Alt. 2	Same as Alt. 2	Same as Alt.
2. Discharge of treated ground water and surface water into pond.	N/A	Direct discharge of treated groundwater and surface water into pond, a "water of the United States", must satisfy substantive standards of Clean Water Act {402 (a)(1). Clean Water Act {304 Water Quality Criteria; Clean Water Act {302 water quality standards; implementing regulations at 40 CFR {{122, 125 and 136.	Same as Alt. 2	Same as Alt. 2	Same as Alt.
3. On-site incinerator for treatment of soils and/or tank contents (hazardous wastes).	N/A	Must be performed in accordance with applicable construction and operation requirements of 40 C.F.R. {264.1-.178 and subpart O.	N/A	N/A	N/A
4. Disposal of ash from incineration of soils and/or tank contents on-si	N/A	See Action #7 and #20	Same as Alt. #2	Same as Alt. #2	Same as Alt. #2

Table 14 Action/ARAR - Cont'	Alt. #6 Containment	Alt. #7 Removal Off-site	Alt. #8 RCRA Containment
1. Discharge of dredge/fill material into navigatable waters.	Same as Alternative #2	Same as Alternative #2	Same as Alternative #2
2. Discharge of treated groundwater and surface water into pond.	Same as Alternative #2	Same as Alternative #2	Same as Alternative #2
3. On-site incinceneration for treatment of soils and/or tank contents (hazardous wastes).	N/A	N/A	N/A
4. Disposal of ash from incineration of soils and/or tank contents on site.	Same as Alt. #5	Same as Alt. #5	Same as Alternative #5

Construction & operation of	Alt. #1 No Action	Alternative #2 on-site Thermal Treatment	Alternative #3 soil Washing/Extraction	Alternative #4 In-situ soil Flushing
5. Backfilling, regrading, vegetation of dredged/excavated areas with treated soil and/or clean fill.	N/A	See Action #1 for backfilling with cleanfill See Action #7 and #20 for backfilling with treated soils.	Same as Alt.#2	Same as Alt. #2
6. Release of air emissions from soil movement and incineration soils and/or tank contents.	N/A	Any air emissions generated by the remedial Alternative must be in compliance with Maryland's State Implementation Plan.	Same as Alt. #2	Same as Alt. #2
7. Land Disposal of hazardous waste.	N/A	Placement of ash from incineration of contaminated tents constitutes "land disposal" of wastes. Must be conducted in accordance with RCRA Sections 3004 (e), (g) (h) and 40 C.F.R. Part 268.	Placement of excavated site soils and lagoon sludges treated by soil washing constitues "land disposal," placement of ash from incineration of tank contents constitutes "land disposal" of listed hazardous wastes. All such land disposals must be conducted in accordance with RCRA {3004 (e), (g) and (h) and 40 C.F.R. {268.	Placement of soils from upper sites, in the NE tank area, west tributary and pond/process area into former land treatment area (a "new hazardous waste management facility" subject to regulations under RCRA) constitutes "land disposal" of listed hazardous wastes. Backfilling of other site areas with soil treated in former land treatment area constitutes land disposal of the same listed as hazardous wastes. Placement of ash from incineration of tank contents and recovered product layer constitutes land disposal of listed hazardous wastes. All such land disposal must be conducted in accordance [illegible] RCRA {3004 (e)., (g) and (h)

Construction & Operation of	Alt. #5 In-Situ Vitrification	Alt. #6 Contain-ment	Alt. # 7 Removal Off-site	Alt. #8 RCRA Containment
5. Backfilling, regrading, vegetation of dredged/exca-vated areas with treated soil and/or clean fill.	Clean fill only. (See Action #1)	Same as Alt. #5	Same as Alt. #5	Same as Alt. #5
6. Release of air emissions from soil movement and incineration of soils and/or tank contents.	Same as Alt. #2	Same as Alt. #2	Same as Alt. #2	Same as Alt. #2
7. Land disposal	Placement of dredged sediments & excavated soils from other site areas into former waste lagoon areas and former land treatment areas constitutes "land disposal" of listed hazardous wastes. Placement of ash from incineration of tank contents constitutes "land disposal" of listed hazardous waste. All such land disposal must be conducted in accordance with RCRA {3004 (e), (g) and (h), and 40 C.F.R. {268.	Placement of soils from former land treatment area constitutes "land disposal" of listed hazardous wastes. Placement of ash from incineration of tank contents constitutes "land disposal" of listed hazardous wastes. All such land disposals must be conducted in accordance with RCRA Section 3004 (e), (g) and (h), and 40 C.F.R. {268.	Off-site thermal incineration of soils and tank contents constitutes "land disposal" of listed hazardous wastes. Off-site Disposal-Placement of soils from sites in off-site landfills constitutes" land disposal" of listed hazardous wastes. Placement of ash from incineration of tank contents constitutes" land disposal" of listed hazardous wastes. All such land disposal must be conducted in accordance with RCRA Section 3004 (e), (g)	Placement of soils from former lagoon area & former land treatment areas into new RCRA land-fills constitutes "land disposal" of listed hazardous wastes. Place-ment of ash from incine-rator of tank contents into new RCRA landfill constitutes" land dispo-sal". All such land disposal must be con-ducted in accordance with RCRA Section 3004 (e), (g) and (h) and 40 C.F.R. {268.

	Alt. #1 No-Action	Alt. #2 On-site Thermal Treatment	Alt. #3 Soil Washing/ Extraction	Alt. #4 In-situ soil Flushing/ Bioreclamation
8. Construction of or/ operation of a new hazardous waste management unit.	N/A	Incinerator, treatment tanks for groundwater, surface water (and process wastewaters) and landfill area for ash backfilling are RCRA regulated units which must be constructed and operated in accordance with 40 C.F.R. { 264.1-.178 and subparts O, J and N, respectively.	Incinerator, soil washing tanks(s) for groundwater, surface water and process water, landfill(s) for backfilling of washed soil and ash, are RCRA-regulated units which must be constricted and operated in accordance with 40 C.F.R. { 264.1-.178 and Subparts O,J, and N, respectively.	Incinerator, treatment tank(s) for groundwater, surface water and process wastewater, landfill for backfilling of ash and treated soils, land treatment areas for bioreclamation of treated soils are RCRA-regulated units which must be constricted and operated in accordance with 40 C.F.R. { 264.1-.178 and Subparts O,J,N and M, respectively.
9. Closure of hazardous waste management unit	Former waste lagoons, former product tanks and former land treatment area are RCRA-regulated units which must be closed in accordance with 40 C.F.R. { 264.110-.116 and 40 C.F.R. { 264.228, and .19.280, respectively.	Same as Alternative #1. In addition, incinerator, treatment tank(s) for groundwater, surface water [and process wastewaters] and landfill area for ash backfilling are RCRA-regulated units which must be closed in accordance with 40 C.F.R. { 264.351, .197 and .310, respectively.	Same as Alternative #1. In addition, incinerator, soil washing tank and tank(s) for treatment of groundwater, surface water [and process wastewaters] and landfill(s) for backfilling of ash and washed soil are RCRA-regulated units which must be closed in accordance with 40 C.F.R. {264.110-.116 and 40 C.F.R. {264.351, .197 and .310, respectively.	Same as Alternative #1. In addition, incinertor, treatment tank(s) [illegible] groundwater, surface water (and process waste water), land treatment areas (to the extent they differ from former land treatment area) and landfill for backfilling of ash and any treated soil, are RCRA - regulated units which must be closed in accordance with 40 C.F.R {264.110-.116 and 40 C.F.R. {254.351, .197, .280 and .310, respectively

Alternat[redacted] #5 In-Situ Vitrification	Alternative #6 Containment	[redacted]ernative #7 Removal Off-Site	Alternative #8 RCRA Containment
Incinerator treatment tank for ground water, surface water (and process wastewater), landfill areas for vitrification and backfilling of incinerator ash are RCRA regulated units which must be constructed and operated in accordance with 40 C.F.R. {264.1 - .178 and supports O, J and N, respectively.	Incinerator, treatment tank(s) for ground water surface water (and process waters), landfill area for excavated soils, sediments and ash are RCRA regulated units which must be constructed and operated in accordance with 40 C.F.R. {264.1 - .178 and Subparts O, J and N, respectively.	Incinerator, treatment tank(s) for ground water, surface water (and process water), (landfill for backfilling of ash?) are RCRA regulated units which must be constructed and operated in accordance with 40 C.F.R. {264.1 - .178 and Subparts O, J (and N?), respectively.	Incinerator, treatment tank(s) for ground water, surface water (and process water?), new landfills are RCRA-regulated units which must be constructed and operated in accordance with 40 C.F.R. {264.1 -.178 and Subparts O, J and N, respectively.
Same as Alternative #1. In addition, incinerator, treatment tank(s) for ground water, surface watr (and process wastewaters), landfill areas for vitrification and backfilling of ash are RCRA-regulated units which must be closed in accordance with 40 C.F.R. {264.110 - .116 and 40 C.F.R. {264.351, .197 and .310.	Same as Alternative #1. In addition, incinerator, treatment tank(s) for ground water, surface water (and process wastewater), and landfill (containment) area for soils and ash backfilling are RCRA regulated units which must be closed in accordance with 40 C.F.R. {264.110 - .178 and 40 C.F.R. {264.351, .197 and .310, respectively	Same as Alternative #1. In Addition, incinerator, treatment tank(s) for ground water, surface water (and process wastewater), (and landfill for backfilling of ash) are RCRA-regulated units which must be closed in accordance with 40 C.F.R. {264.110 - .116 and 40 C.F.R. {264.351, .197 (and .310).	Same as Alternative #1. In addition, incinerator, treatment tank(s) for ground water, surface water (and process wastewaters), and new landfill are RCRA-regulated units which muste be constructed and operated in accordance with 40 C.F.R. {264.1 - .178 and 40 C.F.R. {264.351, .197 and .310.

		Alternative #1 No Action	Alternative #2 On-Site Thermal Treatment	Alternative #3 Soil washing/ Extraction	Alternative #4 In-Situ Soil Flushing/Bio-reclamation	Alternative #5 In-Situ Vitrification
10.	Closure of contaminated areas which are not hazardous waste management units	The closure standards of 40 C.F.R. § 264.110-.116 and .310 (landfills) are "relevant and appropriate" for non-RCRA - regulated areas of the site.	Same as Alternative #1	Same as Alternative #1	Same as Alternative # 1	Same as Alternative # 1
11.	Post-closure care of a hazardous waste management unit.	Units described in Action #9 Alternative 1, must comply with any applicable post-closure care requirements in 40 C.F.R. § 264.228, .197 and 280	Same as Alternative #1. In addition, units described in Action #9, Alternative #2, must comply with any applicable post-closure care requirements in 40 C.F.R. § 264.117-.120 and 40 C.F.R. § 264.351, .197 and .310, respectively.	Same as Alternative #1. In addition, units described in Action #9, Alternative #3, must comply with any applicable post-closure care requirements in 40 C.F.R. §264.351, .197 and .310, respectively.	Same as Alternative #1. In addition, units described in Action #9, Alternative #4, must comply with any applicable post-closure care requirements of 40 C.F.R. § 264.351, .197, .280 and .310, respectively.	Same as Alternative #1. In addition, units described in Action #9, Alternative #8, must comply with any applicable post-closure care requirements of 40 C.F.R. § 264.351, .197 and .310, respectively.

		Alterntive #6 Containment	Alternative # 7 Removal Off-Site	Alternative #8 RCRA Containemnt
10.	Closure of contaminated areas which are not hazardous waste management units	Same as Alternative # 1	Same as Alternative # 1	Same as Alternative #1
11.	Post-closure care of a hazardous waste management unit.	Same as Alternative #1. In addition, units described in Action #9, Alternative #6, must comply with any applicable post-closure care requirements of 40 C.F.R. § 264.351, .197 and .310, respectively	Same as Alternative #1. In addition, units described in Action #9, Alternative # 7, must comply with any applicable post-closure care requirements of 40 C.F.R. § 264.351, .197 [and .310], respectively.	Same as Alternative # 1. In addition, units described in Action #9, Alternative #8, must comply with any applicable post-closure care requirements of 40 C.F.R. § 264.351, .197 and .310, respectively.

Action	Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/Extraction	Alternative # 4 In-Situ Soil Flushing/Bio-reclamaation
12. Post-closure care for contaminated areas which are not RCRA-regulated hazardous waste management units	The post-closure care requirements of 40 C.F.R. § 264.117-.120 and §264.310 are "relevant and appropriate" for non-RCRA regulated areas of the site.	Same as Alternative # 1	Same as Alternative # 1	Same as Alternative # 1
13. Off-site shipment of hazardous waste (For incineration or land disposal)	N/A	N/A	N/A	N/A

	Alternative # 5 In-Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
12.	**Same as Alternative # 1**	Same as Alternative # 1	Same as Alternative # 1	Same as Alternative # 1
13.	N/A	N/A	Contaminated Soils, sediments [and ash] containing listed hazardous wastes F021, U051, U242 and K001 must be transported off-site in accordance with substantive requirements of 40 C.F.R. § 264.262 and 263. In addition, such wastes must be handled in accordance with CERCLA § 121(d)(3).	N/A

	Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/Bioreclamation	Alternative # 4 In-Soil Flushing/ Bioreclamation
14. Actions at Site which would require the facility to obtain a RCRA operating or post-closure permit absent a CERCLA clean-up	Closure of the former waste lagoon area in a manner other than in accordance with "clean closure" requirements of 40 C.F.R. { 264. 228. (a)(1) will require a post-closure permit for such unit. Closure of the former land treatment area in a manner other than in accordance with the requirements of 40 C.F.R. { 264.280 (d) will require a post-closure permit for such unit. Post-closure care requirements of 40 C.F.R. { 264. 310 are "relevant and appropriate" for closure of nonRCRA-regulated of the site. Accordingly, the corrective action requirements of RCRA {3004(u), 42 U.S.C. { 6924(u) and implementing regulations are both applicable and relevant and	Same as Alternative # 1. In addition, constriction and operation of new RCRA units described in Action 8, this Alternative, will require a RCRA operating permit. Accordingly, the corrective action requirements of RCRA {3004(u), 42 U.S.C. {6924(u), and implementing regulations are both applicable and relevant and appropriate.	Same as Alternative # 2	Same As Alternative # 2

Alternative # 5 In-Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
Same As Alternative # 2	Same as Alternative # 2	Same as Alternative # 2	Same as Alternative # 2

	Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/ Extraction	Alternative # 4 In-Situ Soil Flushing/Bioreclamation
15. Excavation/ dredging of contaminated soils/sediments	**N/A**	Excavation/dredging of contaminated soils/sediments constitutes "generation" of hazardous waste. Sec. 40 C.F.R. § 264._____. Generator must comply with substantive requirements of 40 C.F.R. §264.263.	Same as Alternative # 2	Same as Alternative # 2
16. Soil Washing	N/A	N/A	Soil Washing constitutes treatment of hazardous wastes in a tank. Tank must be constructed and operated in accordance with 40 C.F.R. § 264.1-.178 and subpart J, closed in accordance with 40 C.F.R. § 264.110-.116 and .197 and given post-closure care in accordance with 40 C.F.R. § 264.197.	N/A

	Alternative # 5 In-Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
15.	**Same as Alternative # 2**	Same as Alterntive # 2	Same as Alternative # 2	Same as Alternative # 2
16.	N/A	N/A	N/A	N/A

	Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/ Extraction	Alternative # 4 In-Situ Soil Flushing/ Bioreclamation
17. In-Situ Soil Flushing	N/A	N/A	N/A	No ARARs identified.
18. Bioreclamation	N/A	N/A	N/A	Bioreclamation of contaminated soils, sediments constitutes "land treatment" of hazardous wastes. Land treatment unit(s) must be constructed and operated in accordance with 40 C.F.R. { 264.1-.178 and subpart N, closed in accordance with 40 C.F.R. { 264.110-.116 and .280 and provided with Post-closure care under 40 C.F.R. { 264.117-.120 and .280.

	Alternative # 5 In-Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
17.	N/A	N/A	N/A	N/A
18.	N/A	N/A	N/A	N/A

	Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/ Extraction	Alternative # 4 In-Situ Soil Flushing/Bioreclamation
19. On-Site Incineration of contaminated soils, sediments and/or tank contents	N/A	Incineration of contents must be conducted in accordance with the applicable requirements of 40 C.F.R. § 264.1-.178 and Subpart O.	Same as Alternative # 2	Same as Alternative # 2
20. On-Site containment (landfilling) of contaminated soils and sediments	N/A	Backfilling of ash from incinerator of contaminated soils, sediments and tank contents constitutes landfilling of hazardous waste. Landfilling must be constricted, operated, closed and given post-closure care in accordance with applicable requirements of 40 C.F.R. § 264.1-.178 and subpart M.	Backfilling of washed soils and sediments and ash from incineration of tank contents constitutes landfilling of hazardous wastes. Landfill must be constructed, operated, closed and given post-closure care in accordance with applicable requirements of 40 C.F.R. § 264.1-.178 and subpart M.	Any backfilling of land-treated soils and sediments and/or ash from incineration of tank contents constitutes landfilling of hazardous wastes. Landfill must be constructed, operated, closed and given post-closure care in accordance with applicable requirements of 40 C.F.R. § 264.1 - .178 and Subpart M.

	Alter. ive # 5 In-Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
19.	Same as Alternative # 2	Same as Alternative # 2	Same as Alternative # 2	Same as Alternative # 2
20.	Backfilling of ash from incineration of tank contents constitutes landfilling of hazardous wastes. Landfill must be constricted, operated, closed and given post-closure care in accordance with the applicable requirements of C.F.R. §264.1-.178 and Subpart M.	Placement of contaminated soils and sediments and ash from incineration of tank contents in containment area and constitutes landfilling of hazardous wastes. Landfill must be constricted, operated, closed and given post-closure care in accordance with the applicable requirements of 40 C.F.R. § 264.1-.178 and Subpart M.	N/A	Placement of Same as Alternative # 6

	Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/ Extraction	Alternative # 4 In-Situ Soil Flushing/Bioreclamation
21. Vitrification	N/A	N/A	N/A	N/A

	Alternative # 5 In Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
21.	Disposal of contaminated soils and sediments on-site after vitrification, and backfilling of ash from incinerator of task contents constitutes landfilling of hazardous wastes. Landfill must be constricted, operated, closed and given post-closure care in accordance with the applicable requirements of 40 C.F.R. § 264.1 - .178 and Subpart M.	N/A	N/A	N/A

	Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/ Extraction	Alternative # 4 In-Situ Flushing/Bioreclamation
22. On-Site treatment of contaminated groundwater surface water and/or process wastewaters in a tank(s)	N/A	Unless exempt under 40 C.F.R. § 264.____ as a "wastewater treatment unit", tank(s) must be constricted, operated, closed and given post-closure care in accordance with the applicable requirements of 40 C.F.R. § 264.1-.178 and Subpart J.	Same as Alternative # 2	Same as Alternative # 2
23. Recovery of product layer	N/A	N/A	N/A	No ARARs identified

	Alternative # 5 In-Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
22.	Same as Alternative # 2	Same as Alternative # 2	Same as Alternative # 2	Same as Alternative # 2
23.	N/A	No ARARs identified	N/A	N/A

		Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/ Extraction	Alternative # 4 In-Situ Soil Flushing/Bioreclamation
24.	Underground injection of fluids	N/A	N/A	N/A	The underground injection of soil washing fluids must meet applicable standards of 40 C.F.R. Part 144 (Class V well)
25.	Activity within a floodplain	Executive Order 11988, Protection of floodplains, 40 C.F.R. Part 6, App. A. Action must be taken to avoid adverse effects, minimize potential harm, restore and preserve national and beneficial values.	Same as Alternative # 1	Same as ALternative # 1	Same as Alternative # 1

	Alternative # 5 In-Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
24.	N/A	N/A	N/A	N/A
25.	Same as Alternative # 1	Same as Alternative # 1	Same as Alternative # 1	Same as Alternative # 1

		Alternative # 1 No Action	Alternative # 2 On-Site Thermal Treatment	Alternative # 3 Soil Washing/ Extraction	Alternative # 4 In-Situ Soil Flushing/Bioreclamation
26.	Activity within a wetlands	Executive Order 11990, Protection of Wetlands, 40 C.F.R. Part 6, App A. Action must be taken to Minimize the destriction, loss or degradation of wetlands.	Same as Alternative # 1	Same as Alternative # 1	Same as Alternative # 1

	Alternative # 5 In-Situ Vitrification	Alternative # 6 Containment	Alternative # 7 Removal Off-Site	Alternative # 8 RCRA Containment
26.	Same as Alternative # 1	Same as Alternative # 1	Same as Alternative # 1	Same as Alternative # 1

TABLE 15

Chemical Specific ARARs

Chemical/Containant	Safe Drinking Water Act Contaminant Level (MCL) u/l	Clean Water Act Ambient Water Quality Criteria u/l
Benzene	5	Ø.67
Pentachlorophenol	-	Ø.ØØ1
Phend	-	Ø.ØØ35
Toluene	-	Ø.Ø15