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AMENDED
RECORD OF DECISION
OPERABLE UNIT 1

AMERICAN CREOSOTE WORKS SITE

Pensacola, Escambia County, Florida

Prepared by:

U.S. Environmental Protection Agency

Region 4

Atlanta, Georgia

AMENDED
RECORD OF DECISION
OPERABLE UNIT 1
AMERICAN CREOSOTE WORKS

1. DECLARATION

SITE NAME AND LOCATION

American Creosote Works Site
Pensacola, Escambia County, Florida

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for Operable Unit 1 at the American Creosote Works (ACW) site ("the Site") in Pensacola, Florida, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, 42 U.S.C 9601 et seq., and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the Administrative Record for this Site.

The Florida Department of Environmental Protection (FDEP) has provided input as the support agency for the Site in accordance with 40 CFR 300.430. Based on FDEP's comments to date, EPA expects that concurrence on this remedy will be forthcoming, although a formal concurrence letter has not yet been received.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Amended Record of Decision (AROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

The remedy selected by EPA for the ACW Site is being conducted in two operable units. Operable Unit 1, described in this AROD, addresses contaminated sludge, soil, and sediment, which represent the source of contamination at the Site. Operable Unit 2, which is currently underway, addresses groundwater contamination. The amended remedy selected in this AROD addresses the source of contamination at the Site by consolidating and containing contaminated sludge, soil, and sediment beneath an on-site surface cap. The function of the remedy is to isolate the Site as a source of groundwater and surface water contamination and reduce the risks associated with exposure to the contaminated materials. The major components of the selected remedy include the following:

- Demolish, decontaminate, and dispose process area foundations and debris in an off-site landfill;
- Excavate contaminated surface and subsurface soil in residential areas and the Pensacola Yacht Club (PYC) which exceed EPA's remedial goals and consolidate these materials on the ACW property;
- Backfill excavated areas with clean fill, regrade, and landscape disturbed areas;
- Excavate contaminated sediment in the PYC drainage ditch which exceeds EPA's remedial goal (to a maximum depth of 3 ft.) and consolidate this material on the ACW property;
- Regrade, revegetate, and restore the disturbed areas of the ditch;
- Construct a surface cap over consolidated materials and contaminated areas of the Site which meets Resource Conservation and Recovery Act (RCRA) closure requirements under 40 CFR 264.228(a)(2);
- Install drainage channels, a stormwater retention pond, and other drainage improvements to manage stormwater runoff from the Site;
- Repair or replace existing security fence around the Site as needed;
- Provide periodic sampling of sediment in the PYC drainage ditch and regular mowing and maintenance of the surface cap on the ACW Site, and;
- Conduct groundwater monitoring as needed to evaluate the effectiveness of the containment system.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site. Because treatment of the principal threats at the Site were accomplished through previous response actions and the anticipated volume of source materials (over 80,000 cubic yards) render cost-effective treatment of the source materials impracticable, further treatment was not found to be practicable. Thus, the remedy in this OU does not satisfy the statutory preference for treatment as a principal element of the remedy.

Because this remedy will result in hazardous substances remaining onsite above levels that allow for unlimited use and unrestricted exposure, a review will be conducted within five years after initiation of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Richard D. Green, Director
Waste Management Division
U.S. EPA Region 4

21 MAY 99

Date

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2. DECISION SUMMARY

1.0 Site Name, Location, and Description

The American Creosote Works (ACW) site ("the Site") occupies 18 acres in a moderately dense commercial and residential district of Pensacola, Florida. The Site is located about one mile southwest of the intersection of Garden and Palafox Streets about 600 yards north of Pensacola Bay and Bayou Chico (see Figure 1). Several businesses lie directly north of the Site, including a lumber company, an auto body shop, and an appliance sales and repair shop. Residential areas are next to the ACW facility on the east and south, and the Pensacola Yacht Club (PYC) is southwest of the Site.

The Site is generally flat, with elevations ranging between 12 and 14 feet above sea level. The land slopes gently southward at about 25 feet per mile toward Pensacola Bay. Primary access to the plant is from West Gimble Street. The Site is fenced, and EPA's groundwater recovery and treatment system (Operable Unit 2) currently occupies the western portion of the Site. A few building foundations and miscellaneous debris piles are scattered throughout the remainder of the Site. Current site conditions are depicted in Figure 2.

2.0 Site History and Enforcement Activities

2.1 Site History

Wood-preserving operations were carried out at the ACW facility from 1902 until December 1981. Prior to 1950, creosote was used exclusively to treat poles. Use of pentachlorophenol (PCP) started in 1950 and steadily increased in later years of operation. Dioxins at the Site resulted from the use of PCP as a wood treating chemical, since dioxins are a common impurity in commercial grade PCP.

Four former surface impoundments were located in the western portion of the ACW facility. The Main and Overflow Ponds, located adjacent to L Street, were used for disposal of process wastes. Prior to about 1970, wastewater in these ponds was allowed to overflow through a spillway, flow through the streets and storm drains into a ditch on the PYC property, and from there flow into Bayou Chico and Pensacola Bay. In later years, liquid wastes were drawn off the larger lagoons and collected in the smaller Railroad Impoundment and Holding Pond or were spread on the ground in designated "Spillage Areas" onsite. However, the ponds overflowed during periods of heavy rainfall.

In 1980, the City of Pensacola found oily creosote-like material in the groundwater near the intersection of L Street and Cypress Streets. In 1981, the U.S. Geological Survey (USGS) installed nine groundwater monitor wells in the vicinity of the Site. Samples taken from those wells revealed that a contaminant plume was moving in a southerly direction toward Pensacola Bay. EPA placed the Site on the National Priorities List (NPL) in 1983.

EPA conducted a Superfund investigation in 1983 to sample onsite soil, wastewater sludge, drainage ditch sediment, and groundwater. The major contaminants identified were polynuclear aromatic hydrocarbons (PAHs), which are common constituents of creosote. Later that year, the main and

Figure 1. Site Location Map

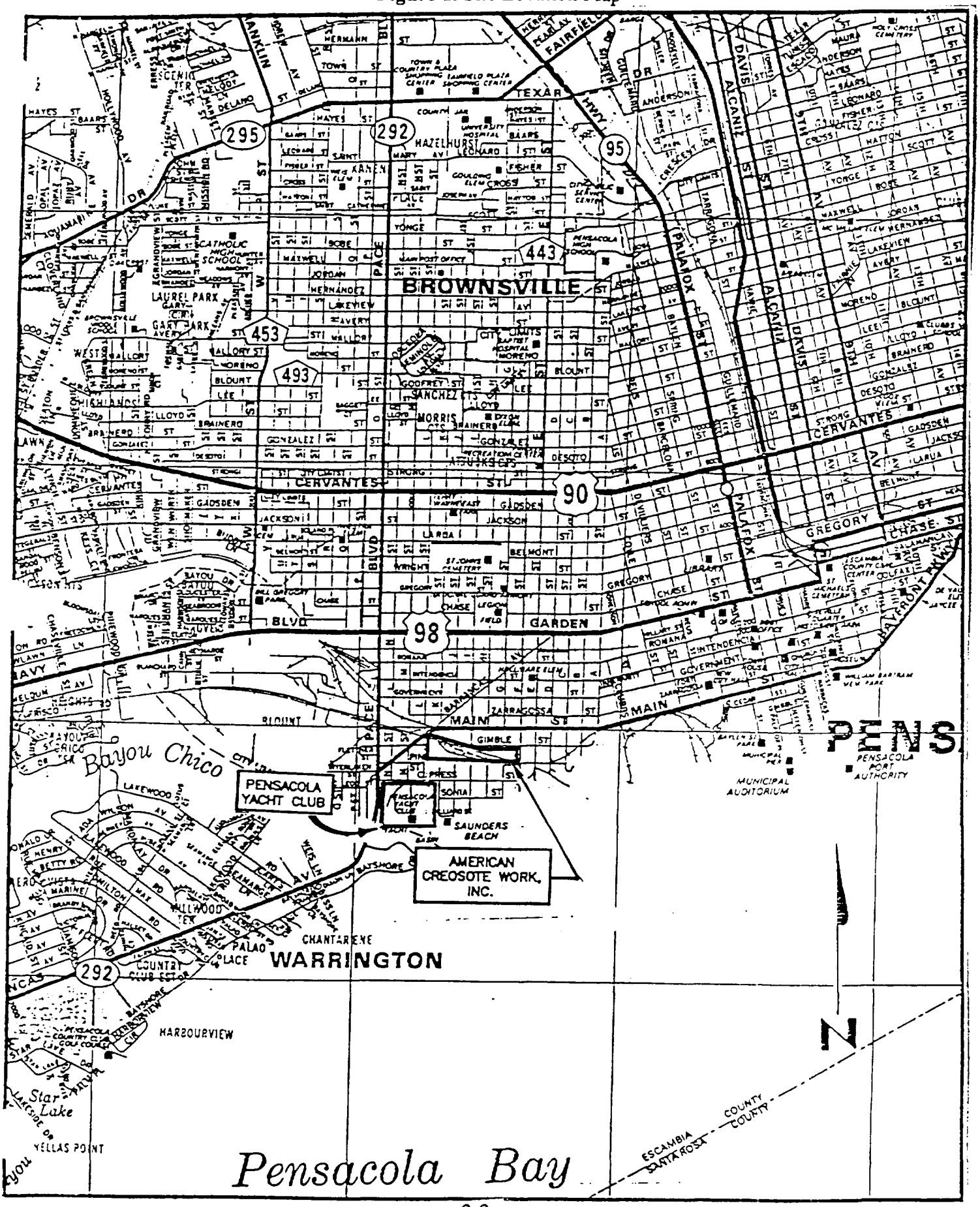
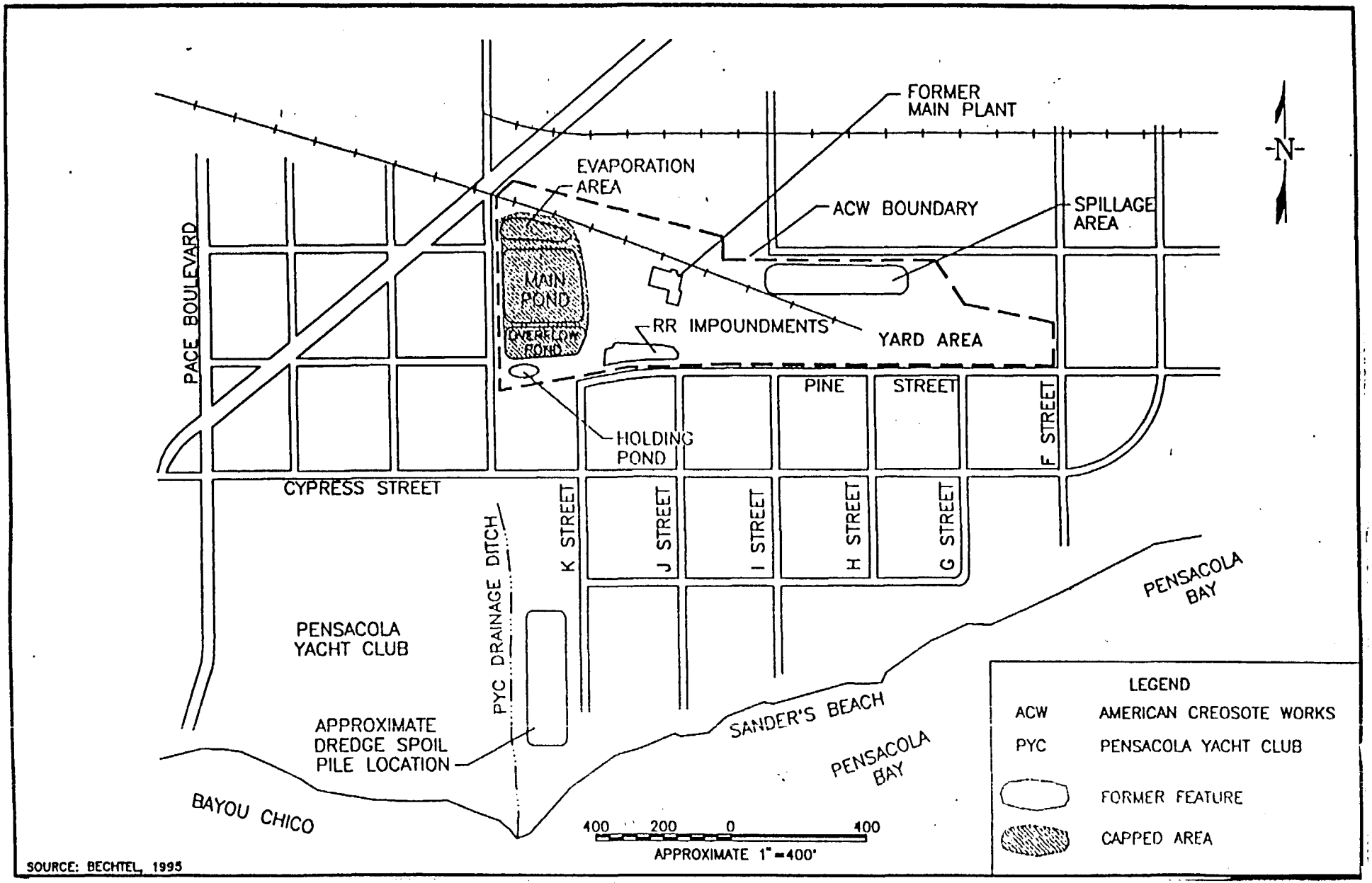


Figure 2. Site Layout



overflow ponds were about to overflow due to heavy rains and flooding, so EPA performed an emergency cleanup to prevent contamination from migrating off-site. The emergency action involved draining the lagoons, treating the wastewater, solidifying the sludge in the lagoons with lime and fly ash, and constructing a temporary clay cap over the lagoons.

In 1985, EPA completed a Remedial Investigation and Feasibility Study (RI/FS). Based on this study, EPA signed a ROD in September 1985 which called for construction of an onsite landfill in which all contaminated surface soil, sludge, and sediment would be disposed. Groundwater cleanup was not included in this ROD. However, the Florida Department of Environmental Regulation (predecessor agency to FDEP) did not concur with this decision, citing the need to evaluate additional treatment technologies.

Consequently, EPA performed an additional study in 1988 (the Post-RI) to provide further information on the extent of contamination in surface soil. Based on the results of this study, EPA completed a revised risk assessment and a "Post-FS" and signed a ROD in 1989 which selected bioremediation for treatment of contaminated surface soil. The 1989 ROD called for treatability studies to be conducted during the design to determine the most effective type of biological treatment. While these studies indicated that slurry-phase biotreatment was more effective than solid-phase treatment (landfarming) for addressing many site-related compounds, neither technology was effective at destroying PCP and some carcinogenic PAHs. For this reason, EPA is issuing this amended ROD (AROD) to select another cleanup plan for addressing soil, sludge, and sediment contamination at the Site.

Several additional field studies were conducted following the 1989 ROD to better characterize the extent of dioxin, PCP, and PAH contamination in groundwater, solidified sludge, soil, surface water, and sediment. These studies are summarized in a subsequent section of this AROD.

EPA also completed a supplemental risk assessment and FS in 1993 which addressed groundwater, solidified sludge, and subsurface soil. Based on the results of these studies, EPA selected a groundwater cleanup plan in 1994 which called for extraction and recycling of dense non-aqueous phase liquids (DNAPLs) followed by in-situ/ex-situ biological treatment of contaminated groundwater. Construction of the DNAPL recovery system was completed in September 1998, and the system is currently being operated for EPA by the U.S. Army Corps of Engineers, Mobile District.

2.2 Enforcement Summary

The earliest documented incident of a release of any type from the ACW plant occurred in the summer of 1978, when a spill of liquids flowed onto a nearby street and then onto the property of a yacht sales company. A flood in March 1979 resulted in a similar spill. These incidents resulted in increased regulatory attention to ACW by FDER.

In 1980, ACW filed an incomplete application with FDER for construction of an industrial wastewater treatment system. FDER issued a Notice of Violation (NOV) for corrective action in

1981, alleging contamination of soil and groundwater. This enforcement action called for ACW to cease operations until a permit was issued, submit a restoration plan, install a groundwater monitoring system, and remove contaminated soil. In January 1981, FDER completed a responsible party search, a title search, and a financial assessment for the Site, and in March 1981, FDER and ACW entered into an administrative consent order which incorporated the previous NOV requirements and allowed ACW to continue operations. The Order included schedules for completing construction of the wastewater treatment system and meeting the other NOV requirements.

Throughout 1981 and 1982, FDER encountered difficulty with ACW's compliance efforts, and in March 1982, ACW announced that environmental regulations were forcing the company to go out of business. As a result, FDER filed a Petition for Enforcement and Agency Action and a Complaint for Permanent Injunction and Civil Penalties in April 1982 because of ACW's failure to make progress toward compliance. One month later, in May 1982, ACW, Inc. of Florida filed for reorganization in bankruptcy court. In 1984, the parties presented a stipulation to the court for approval. The stipulation provided that half of the proceeds of any sale or lease of the ACW property would go to EPA and FDER. The remaining 50 percent would go to Savings Life Insurance Company which holds a mortgage on the property in the principal sum of $675,000. The stipulation was approved and entered by the court in 1988.

In 1985, EPA sent a notice letter to Burlington Northern Railroad requesting removal of a railroad spur line along their right of way on the Site. The railroad company completed this work in 1986.

3.0 Reasons for the ROD Amendment

In accordance with the requirements of the 1989 ROD, EPA conducted treatability studies during design to determine the most effective type of biological treatment. The first of these studies was performed by Southern Bio Products, Inc., under the supervision of EPA's Environmental Research Laboratory in Gulf Breeze, Florida. This bench-scale study evaluated and compared the effectiveness of solid-phase (e.g. land farming) and slurry-phase bioremediation in reducing levels of PAH and PCP contamination in surface soil from the Site. The study concluded that solid-phase bioremediation was slow and ineffective, especially with respect to the carcinogenic PAHs and PCP. Although slurry-phase treatment was much more effective, persistent contaminants such as cPAHs and PCP were not effectively degraded.

The study also evaluated the effectiveness of both types of bioremediation in addressing stabilized sludge (called "sediment" in the report) from the Site. Solid-phase treatment was non-effective. However, slurry-phase treatment with pH adjustment resulted in relatively rapid and extensive biodegradation of cPAHs and PCP. None of the treatability tests evaluated the effectiveness of biological treatment on dioxin contamination in soil or sludge from the Site.

EPA later tasked the OU1 design contractor to evaluate the entire treatment train for slurry-phase biotreatment, which would involve soil washing as a pre-treatment step. This study concluded that the proposed treatment process was incapable of adequately treating the surface soil most heavily

contaminated with PAHs. In addition, the report concluded that the proposed soil treatment technology was not appropriate for reduction of dioxin in soil from the Site.

On the basis of these treatability test findings, EPA determined that the selected remedy for surface soil of slurry-phase biological treatment would not be effective in addressing surface soil contamination at the Site. Therefore, this AROD presents the other alternatives EPA considered and identifies EPA's selected remedy for addressing all contaminated solid media at the Site.

4.0 Highlights of Community Participation

In accordance with Sections 113 and 117 of CERCLA, as amended, EPA has conducted community involvement activities at the ACW Site to solicit community input and to ensure that the public remains informed about site activities. EPA's Proposed Plan Fact Sheet for this amended remedy was mailed to the public on April 28, 1998, and a copy of the Administrative Record was made available in the information repository at the West Florida Regional Library. A public notice was published in the *Pensacola News Journal* in Pensacola, Florida, on April 30, 1998, advising the public of the availability of the administrative record and the date of the upcoming public meeting. EPA held a public meeting on May 14, 1998, at the Sanders Beach Community Center in Pensacola, Florida, to answer questions and receive comments on the Agency's preferred alternative. A public comment period was also held from May 1, 1998 through July 1, 1998. EPA's responses to comments received during the public meeting and the public comment period are included in the Responsiveness Summary in Section 3 of this Amended ROD.

5.0 Scope and Role of the Response Action

As with many Superfund sites, the problems at the ACW Site are complex, so the work has been divided into the following phases referred to as Operable Units (OUs): OU1 is remediation of contaminated soil, sludge, and sediment; OU2 is remediation of contaminated groundwater.

Prior to 1994, EPA defined the OUs at the Site in a different way. OU1 referred to surface soil contamination from 0 to 3 ft., and OU2 referred to contaminated groundwater, subsurface soil, and solidified sludge from the former waste lagoons. Many documents contained in the Administrative Record, including the OU2 FS, the OU2 Risk Assessment, and the 1989 OU1 ROD reflect this old definition. However, in 1994, to streamline Site cleanup decisions, EPA grouped all solid media into OU1, including surface soil, subsurface soil, solidified sludge, and PYC ditch sediment. OU2 was redefined to include only groundwater, and in February 1994, EPA signed a ROD for OU2 outlining EPA's cleanup plan for addressing groundwater contamination.

In 1989, EPA signed a ROD selecting biological treatment to address surface soil contamination at the Site. However, following further treatability testing of this technology, EPA determined this remedy would not be fully effective for all contamination. Therefore, this AROD addresses the changes needed to the surface soil cleanup plan and presents the alternatives EPA considered for addressing subsurface soil, solidified sludge, and PYC ditch sediment.

6.0 Summary of Site Characteristics

Since issuance of the 1989 ROD, EPA has conducted the following investigations to further characterize soil and sediment contamination:

- o Phase II RI, September 1990
- o Phase III RI, August 1991
- o Dye Dispersion and Sediment Sampling Study, September 1991
- o Supplemental Site Characterization Sampling and Treatability Study, November 1991
- o Phase IV RI, February 1994
- o Sanders Beach Community Area Study, December 1997

Samples were taken from the following media: surface soil, subsurface soil, stabilized pond sludge, and sediment from Pensacola Bay and the PYC ditch. In general, the results of these new investigations confirm those reported in the Post-RI and the 1989 ROD and provide updated information on dioxin levels. The maximum concentration of chemicals of concern detected in each medium based on the most recent data are summarized in Table 1. A summary of contaminant information for each medium is provided below. In accordance with EPA's Area of Contamination Policy, EPA has designated the area shown in Figure 3 as an area of contamination (AOC) which requires remediation.

6.1 Surface Soil

On-site surface soil data collection efforts subsequent to 1989 focused primarily on characterizing the extent of dioxin contamination. Results from the Phase II and Phase III RIs and the Supplemental Site Characterization indicate surface soil contaminant concentrations exceed EPA's industrial remedial goals for the Site of 2.5 parts per billion (ppb) for dioxin and 50 parts per million (ppm) for carcinogenic PAHs (cPAHs). A discussion of the remedial goals for each medium and the rationale for their selection is presented in Section 7.1.1 of this AROD.

Residential soil data from the Post-RI indicated elevated levels of PAH contamination in the drainage pathways south of the ACW facility. Surface soil sampling after 1989 focused on dioxin and PAH contamination, since PCP was not detected. Data from the Supplemental Site Characterization and the Sanders Beach Study identified one location just south of the ACW property where dioxin exceeds the site-specific remedial goal for residential soil of 1.0 ppb. Only one residential lot and three other lots with potential residential use exceeded the remedial goal for benzo(a)pyrene, the most potent of the cPAHs. An estimated 24,000 cubic yards (cy) of surface soil on the ACW facility and an estimated 4,000 cy of surface soil in other areas require remediation.

6.2 Subsurface Soil

For the ACW Site, subsurface soil is defined as soil from 3 ft. below the surface to the top of the water table. PAHs and low levels of dioxin were detected in this medium, but no PCP was detected. Subsurface soil exceeding remedial goals is limited to an area south of the former sludge ponds.

Table 1
Chemicals of Concern
Maximum Concentrations Detected (ppm)

Compound	Surface Soil ACW Facility[a]	Surface Soil Residential Area[a]	Subsurface Soil[a]	Stabilized Sludge[b]	PYC Sediment[c]
Volatile Organics					
Benzene	.005	ND	ND	.087	ND
Non-Carcinogenic PAHs					
Acenaphthene	1,300	.82	100	410	43
Fluoranthene	2,400	12.0[f]	230	610	140
Naphthalene	1,100	.48[f]	53	1,100	33
Anthracene	1,000	2.3	81	360	30
Fluorene	1,600	.78	120	520	53
Pyrene	2,000	9.5	150	440	91
Phenanthrene	4,500	6.7	350	1,100	170
Carcinogenic PAHs					
Benzo(a)Pyrene	160	5.9[f]	.27	49	20
Benzo(a)Anthracene	300	6.6[f]	12	130	39
Benzo(b&k)Fluoranthene	240	14.0[f]	3.7	63	39
Chrysene	500	8.3	9.9	100	31
Indeno(1,2,3-c,d) Pyrene	46	9.2	.61	.0022	9.2
Dibenzo(a,h)Anthracene	12	4.7	ND	ND	ND
Phenols					
Pentachlorophenol	110	.54	ND	250	ND
Dioxins/Furans					
Dibenzofuran	1,100	.41	85	330	29
2,3,7,8-TCDD (TEQ)	.01[d]	.0023[f]	.00019	.051	.0000046

ND - non-detect

[a]Source: Post-RI, 1989, unless otherwise noted.

[b]Source: Post-RI, 1989; Phase II RI, 1990.

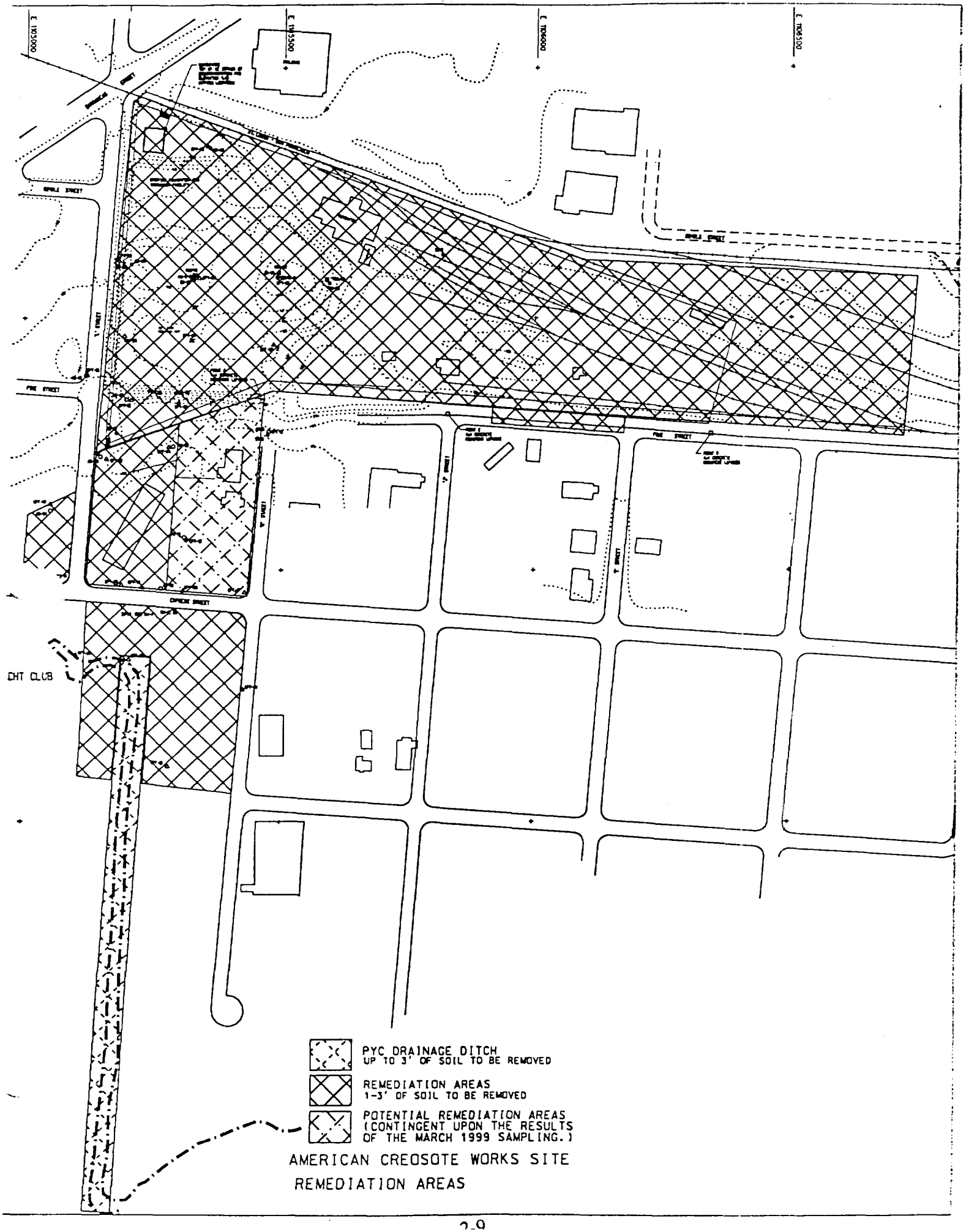
[c]Source: Phase IV RI, 1994.

[d]Source: Phase II RI, 1990.

[e]Source: Phase III RI, 1991.

[f]Source: Sanders Beach Community Area Study, 1997.

Figure 3. Area of Contamination



6.3 Stabilized Sludge

The stabilized sludge located on the western portion of the ACW facility resulted when the former lagoons were drained and the remaining sludge was stabilized by the addition of lime and fly ash. The estimated volume of this material above the water table (to a depth of about 6.5 ft. below land surface) along with the small amount of subsurface soils identified above is 50,700 cubic yards. Results from the Post-RI indicate that PAH concentrations in this material are as high as 27,200 ppm. PCP concentrations as high as 250 ppm were also detected. The pH of this material is also expected to be high because of the addition of the stabilizing agents. Soil borings drilled during the Phase II RI indicated that significant PAH contamination (above 50 ppm) extends below the water table to a depth of at least 60 ft. However, contamination below the water table is being addressed as part of EPA's groundwater remedial action.

6.4 Drainage Ditch Sediment

In 1991, EPA conducted the Dye Dispersion and Sediment Sampling Study to determine the presence and concentration of site-related compounds within the area of Pensacola Bay influenced by surface water drainage from the PYC drainage ditch. Based on the results of a dye tracer study, water stage and elevation measurements, water current readings, and fathometer transects, EPA selected 18 sediment sampling locations within the PYC ditch, Bayou Chico, and Pensacola Bay. Samples were analyzed for extractable and purgeable organic compounds, pesticides and PCBs, and metals. The results of the study indicated that no organic compounds were detected within the upper stratum of the bay sediments. In addition, levels of organics and metals in the surface waters were within normal ranges found throughout southeastern estuarine systems. However, sediment data from two sampling stations in the PYC ditch and its delta indicated the presence of numerous PAHs which exceeded the National Oceanic and Atmospheric Administration (NOAA) toxic effects levels for sediment. Samples from the Phase IV RI confirmed cPAH levels in the PYC ditch sediment as high as 138 ppm. No PCP was detected, and dioxin concentrations ranged from 0.069 to 5 ng/kg (parts per trillion or ppt) TEQ. After consulting with the Ecological Technical Advisory Group (ETAG), which includes EPA ecological experts and natural resource trustees, EPA concluded that the only sediment requiring remediation is the sediment in the PYC drainage ditch. The estimated volume of contaminated sediment requiring remediation ranges from 833 to 2,500 cubic yards, depending upon the depth of remediation.

6.5 Volume of Contaminated Material

The total volume of contaminated soil, sediment, and stabilized sludge requiring remediation is estimated to be 80,500 cy. This volume was used to generate the cost estimate for each alternative.

7.0 Summary of Site Risks

The Baseline Risk Assessment (BRA) includes an evaluation of whether existing or future exposure to Site contamination could pose a risk to people or the environment. In estimating potential Site

risks, EPA assumes no further action would be taken to address contamination at the Site. This evaluation then serves as a baseline for determining whether cleanup of Site media is necessary. EPA has performed two BRAs for the ACW Site. The first, completed in 1989, evaluated the risks associated with surface soil at the ACW facility and in residential areas and PYC ditch sediment. Although the toxicologic criteria values for some Site contaminants have changed slightly in the last 10 years, the risk calculations and remedial goals presented in the 1989 BRA remain protective. The second BRA, completed in 1993, evaluated risks associated with subsurface soil, stabilized sludge, and groundwater. This AROD addresses the risks associated with contaminated soil, stabilized sludge, and PYC ditch sediment. The risks associated with groundwater contamination were addressed in the 1994 ROD for OU2. The risk assessments include a human health evaluation which addresses the four components summarized below and an ecological risk evaluation.

7.1 Human Health

The human health portion of the BRA is designed to evaluate the baseline risk posed by the Site to people if no action is taken to address Site contamination and to assess if actual or threatened releases of chemical contamination from the Site pose health risks to exposed individuals under current or potential future conditions. The ACW property itself is currently fenced and abandoned, and a temporary clay cap has been placed over the former sludge lagoons. Although groundwater in the unconfined aquifer beneath and down gradient of the facility is contaminated above drinking water standards, neither private nor public potable water supplies are drawn from the surficial aquifer.

7.1.1 Chemicals of Concern

EPA identified chemicals of concern for the ACW Site based on past disposal practices, frequency of detection, and toxicity of contaminants. Over 100 different compounds were identified in the analyses of soil, sludge, and sediment samples on and around the Site. Of these, 17 were selected as chemicals of concern (COCs) because of the risk they pose. A list of chemicals of concern for each medium and their associated remedial goals is shown in Table 2.

The 1989 ROD identified remedial goals for cPAHs, PCP, and 2,3,7,8-TCDD in surface soil on the ACW facility which correspond to an excess lifetime cancer risk of $1x10^{-5}$. These remedial goals were determined to be protective for the anticipated future industrial use of the ACW property.

For residential (and PYC) surface soil, EPA evaluated the data from the Sanders Beach Community Area Study against FDEP's residential soil screening levels to determine whether any areas warranted further attention. Only 4 samples exceeded FDEP screening levels and EPA's Contract Laboratory Program (CLP) contract required quantitation limit (CRQL) of 330 ug/kg for benzo(a)pyrene. EPA determined from this analysis that the remedial goal for benzo(a)pyrene in residential surface soil should be set at the CRQL of 330 ug/kg. In addition, in all instances where another compound exceeded FDEP's surface soil guidance concentration, the benzo(a)pyrene result exceeded the CRQL, indicating that benzo(a)pyrene is an appropriate indicator compound, and there is no need to set residential surface soil remedial goals for the other PAHs.

Table 2
Remedial Goals for Chemicals of Concern (ppm)

Compound	PYC Sediment[a]	Subsurface Soil/Sludge[b]	Surface Soil	
			Residential	ACW Facility[e]
Non-Carcinogenic PAHs				
Acenaphthene		876		
Anthracene		145		
Fluoranthene		1,450		
Fluorene		78		
Naphthalene		235		
Phenanthrene		148		
Pyrene		1,070		
Carcinogenic PAHs (cPAHs)				
Total cPAHs (listed below)	.655			50
Benzo(a)Anthracene		740		
Benzo(a)Pyrene			0.33[c]	
Benzo(b&k)Fluoranthene		153,065		
Chrysene		2,090		
Dibenzo(a,h)Anthracene				
Indeno(1,2,3-c,d)Pyrene				
Phenols				
Pentachlorophenol		138,000		30
Dioxins/Furans				
Dibenzofuran		24		
2,3,7,8-TCDD (TEQ)			.001[d]	.0025

[a]Sediment Quality Assessment Guideline Toxic Effect Level (TEL) for high molecular weight PAHs, from the Approach to the Assessment of Sediment Quality in Florida Coastal Waters, Volume 1: Development and Evaluation of Sediment Quality Assessment Guidelines, November 1994
[b]Site-specific groundwater protection standards, OU2 Risk Assessment, 1993
[c]Contract required quantitation limit (CRQL) from EPA's Contract Laboratory Program Statement of Work. Although the FDEP soil screening level for benzo(a)pyrene is 0.1 mg/kg, the remedial goal was limited by the CRQL.
[d]Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites (OSWER Directive 9200.4-26)
[e]1989 Record of Decision for Operable Unit 1

With respect to dioxin in residential surface soil, OSWER Directive 9200.4-26, "Approach for Addressing Dioxin in Soil at CERCLA and RCRA Sites" (4/13/98), was followed in obtaining a preliminary remediation goal (PRG) of 1 ppb (TEQ) for dioxin in residential surface soil. This level was selected as the final remedial goal since there were no recognized extenuating circumstances to indicate that the PRG level was not protective. However, because the 1 ppb residential surface soil remedial goal for dioxin is subject to review and possible revision once EPA's Final Dioxin Reassessment effort is complete, EPA and FDEP have agreed to designate the cleanup of residential areas as an interim action. This approach allows the Agencies to achieve significant risk reduction immediately rather than deferring action at the Site while EPA completes the dioxin reassessment. EPA will review the dioxin cleanup level for residential surface soil following the release and analysis of the reassessment report and issue a final ROD for residential surface soil if necessary.

EPA will use the remedial goals developed in the OU2 BRA for subsurface soil and solidified sludge. These remedial goals were developed by EPA's groundwater technical support section to ensure that contaminant leaching from subsurface soil and solidified sludge did not result in exceedance of the alternate concentration limits (ACLs) adopted as remedial goals for groundwater in the OU2 ROD.

For sediment in the PYC drainage ditch, a Site-specific remedial goal for carcinogenic PAHs in ditch sediment of 1.6 mg/kg was calculated in Appendix B of the Focused Feasibility Study based on the most likely exposure scenario of an adolescent trespasser (age 7 to 16) playing in the ditch. However, following issuance of the Proposed Plan and during development of this AROD, FDEP requested that their Sediment Quality Assessment Guidelines Toxic Effect Levels (TEL) be considered in the development of a remedial goal for sediment. Based on these guidelines, EPA has established a remedial goal for the PYC ditch sediment of 0.655 mg/kg for carcinogenic PAHs.

7.1.2 Exposure Assessment

The exposure assessment identified and evaluated the potential routes and pathways through which current residents, trespassers, or future residents could be exposed to Site contaminants. The BRA identified the following pathways in which people could come into contact with contaminated solid media under both current and future conditions:

1. Ingestion of (eating) or dermal contact with (touching) surface soil by current or future residents or trespassers in the following locations:

Area I	American Creosote Works facility
Area II	Residential areas
Area III	PYC drainage ditch area
Area IV	Condominium block[1]

[1]In the 1989 BRA, the "condominium block" (Area IV) is the city block north of Cypress Street between L and K Streets which includes the Yachtsman Cove Condominiums. The "residential area" (Area II) includes the remaining residential properties south of the Site.

2. Inhalation (breathing) of dust from ACW surface soil by current or future residents.
3. Consumption of vegetables grown in contaminated soil by current or future residents.

7.1.3 Toxicity Assessment

The toxicity assessment evaluated possible harmful effects of exposure to chemicals of concern. Many compounds found at the Site, including PAHs, PCP, and dioxins, have the potential to cause cancer (carcinogenic). These and other chemicals of concern, (e.g. naphthalene), may cause health risks not related to cancer, such as liver damage or reproductive effects. For carcinogenic compounds, cancer slope factors (CSFs) have been developed by EPA. These factors are chemical-specific numbers that indicate their potency as a carcinogen. A chemical's CSF is multiplied by the estimated intake (dose) of a that chemical by all routes and pathways of exposure to provide an upper-bound estimate of the excess lifetime cancer risks associated with exposure at that level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CSF. Use of this approach makes under-estimation of the actual cancer risk highly unlikely. Cancer slope factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

References doses (RfDs) have been developed by EPA for predicting the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, that are thought to be without adverse affects. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied. These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur. The CSFs and RfDs for the chemicals of concern at the Site are listed in Table 3.

As an interim procedure until more definitive Agency guidance is established, EPA has adopted a Toxicity Equivalency Factor (TEF) methodology for evaluating the toxicity of chlorinated dioxins and furans. This methodology relates the relative potency of each dioxin/furan compound to the potency of 2,3,7,8-tetrachlorodibenzodioxin (TCDD), the most toxic dioxin compound. For example, the compound 1,2,3,7,8-pentachlorodibenzodioxin (PeCDD) is considered only 50% as toxic as 2,3,7,8-TCDD, so its concentration is multiplied by 0.5 to estimate its concentration relative to TCDD. After this is done for each of the 29 specific dioxin and furan compounds of concern to EPA, the concentrations are added to provide a single concentration value known as TCDD equivalents (TEQs). All of the dioxin values discussed in this AROD are presented in TEQs.

7.1.4 Risk Characterization

The risk characterization combines the other components of the risk assessment to estimate the overall risk from exposure to Site contamination. For carcinogenic compounds, risk is a probability that is expressed in scientific notation. For example, an excess lifetime cancer risk of $1x10^{-6}$ means

Table 3

Toxicologic Criteria Values for Chemicals of Concern (Source: 1989 Baseline Risk Assessment for ACW Site)

Compound	Cancer Slope Factor (CSF)		Reference Dose (RfD)	
	Oral	Inhalation	Oral	Inhalation
Non-Carcinogenic PAHs[a]	NA	NA	4.00E-01	NA
Carcinogenic PAHs (cPAHs)[b]	11.5	6.10	NA	NA
Phenols[c]	NA	NA	5.00E-02	NA
Pentachlorophenol	NA	NA	3.00E-02	NA
2,3,7,8-TCDD	1.56E+05	NA	1.00E-12	NA

NA - No criteria value available for this chemical under this pathway.

[a]The RfD for naphthalene was used to represent noncarcinogenic PAHs.
[b]The CSF for benzo(a)pyrene was used to represent carcinogenic PAHs.
[c]The RfD for cresols was used to represent phenols

that an individual has an additional 1 in 1,000,000 chance of developing cancer as a result of Site-related exposure over an estimated 70 year lifetime. EPA has established a target risk range for Superfund cleanups of between 10^{-4} and 10^{-6}. The reasonable maximum (90^{th} percentile) excess lifetime cancer risk associated with ingestion and dermal exposure to dioxins and cPAHs in surface soil by a trespasser on the ACW facility (Area I) were estimated to be $1.2x10^{-3}$, which exceeds EPA's acceptable risk range. Excess cancer risk estimates for the PYC ditch (Area III) and the Condominium Block (Area IV) were at the upper end of EPA's risk range.

For compounds which cause toxic effects other than cancer, EPA compares the concentration of a contaminant found at the Site with a reference dose (RfD) representing the maximum amount of a chemical a person could be exposed to without experiencing harmful effects. The ratio of the actual concentration to the RfD for a particular compound is the hazard quotient. The sum of the hazard quotients of all chemicals of concern within a particular media (e.g. surface soil) is known as the hazard index (HI). EPA considers an HI of 1.0 to be a threshold for considering remedial action. For the ACW Site, the BRA indicates the potential for non-carcinogenic health risks on the ACW facility (Area I) and in the condominium block (Area IV) due to ingestion and dermal exposure to dioxins and dibenzofurans. Non-carcinogenic risks are not predicted to be a hazard for exposure to surface soil in Areas II and III.

Based on analytical data collected in 1988 during the Post-RI , excess lifetime cancer risks associated with the vegetable consumption pathway fell within EPA's acceptable risk range. Non-carcinogenic risks were not calculated for the vegetable pathway because no non-carcinogenic COCs were known to be present in the residential areas at elevated concentrations. Risks from dioxins and dibenzofurans were not calculated for this pathway because the literature suggested that these compounds were not taken up by plants to a significant extent, and thus did not pose an exposure pathway for these chemicals.

7.2 Ecological Evaluation

Since the ACW facility itself is industrial, and it is surrounded by commercial and residential areas, the primary areas of ecological concern near the Site are Pensacola Bay and Bayou Chico. To evaluate the potential for ecological impacts from the Site, EPA conducted the Dye Dispersion and Sediment Sampling Study in 1991 to determine the presence and concentration of Site-related compounds within the area of Pensacola Bay influenced by surface water drainage from the PYC drainage ditch. Based on the results of a dye tracer study, water stage and elevation measurements, water current readings, and fathometer transects, EPA selected 18 sediment sampling locations within the PYC ditch, Bayou Chico, and Pensacola Bay. Samples were analyzed for extractable and purgeable organic compounds, pesticides and PCBs, and metals. The results of the study indicated that no organic compounds were detected within the upper stratum of the bay sediments. In addition, levels of organics and metals in the surface waters were within normal ranges found throughout southeastern estuarine systems. However, sediment data from two sampling stations in the PYC ditch and its delta indicated the presence of numerous PAHs which exceeded the National Oceanic and Atmospheric Administration (NOAA) toxic effects levels for sediment. Samples from the Phase IV RI confirmed cPAH levels in the PYC ditch sediment as high as 138 ppm. No PCP was detected, and dioxin concentrations ranged from 0.069 to 5 ng/kg (parts per trillion or ppt). EPA provided the

information from the Dye Dispersion and Sediment Sampling Study and the Phase IV RI to the Ecological Technical Advisory Group (ETAG), which includes EPA ecological experts and natural resource trustees. Based on this data, the ETAG concluded that ACW Site-related contamination in the PYC ditch sediment may represent a potential continuing source of contamination to the bay if left unaddressed, recommending that remedial action be taken to address contamination in the ditch.

7.3 Risk Summary

A 90th percentile excess lifetime cancer risk of 1.2×10^{-3} associated with ingestion and dermal exposure to dioxins and cPAHs in surface soil by a trespasser on the ACW facility (Area I) exceeds EPA's risk range. With respect to non-carcinogenic health risks, the hazard indices associated with ingestion and dermal exposure to dioxins and dibenzofurans on the ACW facility (Area I) and in the condominium block (Area IV) exceed EPA's threshold value of 1.0, indicating the need to consider remedial action. In addition, sediment data suggests that Site-related contamination in the PYC ditch represents a potentially unacceptable risk to both human and environmental receptors. In summary, actual or threatened releases of hazardous substances from the ACW Site, if not addressed by EPA's selected remedy, may present a current or potential threat to public health and the environment.

8.0 Description of Alternatives

Following issuance of the 1989 ROD, EPA conducted additional feasibility study activities to identify and evaluate remedial alternatives for addressing contaminated soil, sludge, and PYC ditch sediment. The Feasibility Study Report for Operable Unit 2, published in November 1993, evaluated six alternatives for addressing subsurface soil and solidified sludge. The Focused Feasibility Study (FFS) Report for the Pensacola Yacht Club Drainage Ditch, published in August 1995, developed and evaluated four alternatives for addressing sediment contamination in the PYC drainage ditch. The FFS assumed that any sediment removed from the PYC ditch would be treated or disposed in the same manner that soil and sludge from the ACW facility would be handled. Since the 1993 FS for OU2 only addressed subsurface soil and solidified sludge and EPA had determined that the 1989 remedy for surface soil would have to be amended, the FFS also included cost estimates for addressing all solid media (surface and subsurface soil, solidified sludge, and sediment) under each of the alternatives developed in the 1993 FS. A description of each alternative and the original remedy selected in the 1989 ROD are presented below.

8.1 Alternatives for Addressing Soil and Sludge

8.1.1 Remedy from the 1989 ROD

The 1989 ROD specifies excavation and treatment of contaminated surface soil (to a depth of 3 feet) using solid phase, slurry phase, or in situ bioremediation. The most effective form of bioremediation is to be determined through treatability tests. Treated soil is disposed onsite, and debris and the contents of drums containing investigation-derived wastes are disposed off-site. The fence and existing cap are to be repaired. The estimated capital costs of the 1989 remedy range from $1,956,000 to $2,928,000, depending upon the bioremediation methodology selected. The net

present worth operation and maintenance costs would range from $319,000 to $330,000, resulting in a total present worth cost ranging from $2,275,000 to $3,258,000.

8.1.2 Alternative SS1 - No Action

The National Contingency Plan (NCP) requires the development of a no action alternative as a basis for comparison to other alternatives. Under the no action alternative, the Site is left "as is" and no funds are expended for monitoring, control, or cleanup of the contaminated soil and sludge. The net present worth cost of this alternative is $0.

With the exception of the remedy in the 1989 ROD and the No Action alternative, the following activities are common to all of the remaining soil/sludge alternatives:

- Demolish, decontaminate, and dispose process area foundations and debris in an appropriate off-site landfill
- Excavate contaminated soil from residential areas and the PYC property and consolidate this material on the ACW facility
- Regrade and revegetate the Site and install stormwater controls
- Fence the Site and impose land-use restrictions
- Conduct periodic Site mowing and maintenance

8.1.3 Alternative SS2 - Capping

Alternative SS2 involves construction of a multi-layer cap over the stabilized surface impoundments and other contaminated areas of the facility in compliance with minimum technology requirements of the Resource Conservation and Recovery Act (RCRA) for hazardous waste surface impoundments. Drainage channels would be installed around the perimeter of the cap to manage stormwater runoff. Groundwater monitoring in addition to that required as part of the groundwater remedy may be necessary to evaluate whether contamination remaining in Site soil is leaching into the groundwater. Capital costs associated with Alternative SS2 are $1,341,100. With an estimated annual O&M cost of $4,800, the net present worth cost of this alternative over a 30 year period is $1,400,700.

8.1.4 Alternative SS3 - Slurry Biotreatment

Although similar to the remedy selected in the 1989 ROD, this alternative applies slurry phase biotreatment to all of the contaminated solid media at the Site. After the soil and sludge are excavated, they are put through grinders and screens to remove large clods. The stabilized sludge is then washed to reduce its volume by segregating the finer, more contaminated soil particles. Contaminated soil is then mixed into a slurry with water, nutrients (fertilizer), and oxygen to give the naturally-occurring bacteria in the soil the things they need to destroy the contaminants. The soil is then dewatered and placed back into the excavations, and process water is treated and discharged to Pensacola Bay or a publicly owned treatment works (POTW). The capital costs associated with Alternative SS3 are $12,454,100. Annual O&M costs are $4,800, for a net present worth cost over a 30 year period of $12,513,700.

8.1.5 Alternative SS4 - In-Situ Vitrification

This alternative involves the use of electric current passing through electrodes imbedded in the ground to melt contaminated soil in place. The heat destroys soil contaminants, and, once cooled, the soil is a solid glass-like monolith. Gases generated during the process are captured in a hood covering the treatment area and are routed to an air emissions treatment system prior to discharge. The vitrification process results in a 10 to 20 percent volume reduction, so clean soil may need to be imported to fill the resulting void. Capital costs for Alternative SS4 are estimated to be $51,377,900. Annual O&M costs are estimated at $4,800, for a 30 year net present worth cost of $51,437,500.

8.1.6 Alternative SS5 - Onsite Incineration

Alternative SS5 involves the use of incineration to destroy contaminants in the soil. Excavated soil is sorted and screened to remove debris and then conveyed into the first chamber of the incinerator where combustion of organic contaminants occurs at temperatures of 1,400 to 1,600°F. Vapors are then destroyed in a secondary chamber at temperatures of 1,600 to 2,000°F. A proof of performance test is required prior to full scale treatment to define appropriate operating parameters. Treated soil is then disposed on the facility property. Capital costs for this alternative are estimated to be $71,818,600. Annual O&M costs are estimated at $4,800, for a net present worth cost over a 30 year period of $71,878,200.

8.1.7 Alternative SS6 - Onsite Thermal Desorption

Thermal desorption involves heating contaminated soil to temperatures above the boiling points of the contaminants (800 to 1,200°F) to physically separate them from the soil through volatilization. Desorption usually takes place in a low-oxygen atmosphere so that little or no combustion of contaminants occurs. Volatilized contaminants are then cooled to condense them to liquid form. A much smaller volume of liquid contamination can then be shipped off-site for recycling or incineration, and treated soil is disposed on the ACW facility. Although this closed system results in very few air emissions, appropriate air treatment equipment would be in place to address any fugitive emissions. Estimated capital costs for this alternative are $31,190,400. Annual O&M costs are estimated to be $4,800, for a net present worth cost over 30 years of $31,250,000.

8.2 PYC Ditch Sediment Alternatives

Since previous FS reports did not adequately address contaminated sediment in the PYC drainage ditch, EPA conducted a Focused FS (FFS) to evaluate alternatives for the ditch. To address comments from the Pensacola Yacht Club and FDEP, Alternative SD4 was modified from its original form in the FFS to include excavation of all contaminated sediment exceeding the remedial goal (to a maximum depth of 3 ft.). With the exception of Alternative SD1, the following activities are common to the remaining sediment alternatives:

- Clear and grub dense vegetation as needed along the ditch
- Divert surface water flow during construction and/or dewater the ditch
- Regrade and restore landscape to PYC specifications

8.2.1 Alternative SD1 - No Action

Under the no action alternative, the PYC ditch is left "as is" and no funds are expended for monitoring, control, or cleanup of the contaminated sediment. The net present worth cost is $0.

8.2.2 Alternative SD2 - Total Sediment Removal

Under this alternative, all contaminated sediment exceeding the remedial goal (to an estimated maximum depth of 3 ft.) is excavated and transported to the ACW facility for handling with contaminated soil and sludge. Excavated areas of the ditch are backfilled with clean fill. The costs associated with this alternative are all capital expenses, with an estimated present worth of $148,700.

8.2.3 Alternative SD3 - Partial Sediment Removal & Lining of Ditch

This alternative involves partial removal of the most contaminated sediment to a depth of about 1 ft. Excavated sediment is transported to the ACW facility and addressed with contaminated soil and sludge, and excavated areas of the ditch are backfilled with clean fill. The ditch is then lined with an appropriate material such as concrete or an impermeable synthetic liner. Periodic maintenance of the liner and drainage channel is required. Since contamination remains, land use restrictions are imposed to prevent inappropriate development along the ditch. Capital costs associated with this alternative are $141,600, with annual O&M costs of $3,600 associated with monthly inspection and maintenance of the ditch. The net present worth of this alternative over a 30 year period is $186,300.

8.2.4 Alternative SD4 - Total Sediment Removal, Extend Culvert, and Backfill Ditch

Under this alternative, all contaminated sediment exceeding the remedial goal (to a maximum depth of 3 ft.) is excavated and transported to the ACW property for handling with contaminated soil and sludge. The appropriate subgrade is then placed in the ditch, the City of Pensacola storm sewer culverts are extended to Pensacola Bay, the necessary backfill and topsoil are placed over the culverts, and the area is revegetated. Periodic maintenance of the storm sewer is needed to prevent Bay sediment from blocking the discharge pipe. Capital costs for this alternative are $284,696, with annual O&M costs estimated to be $1,000. The 30 year net present worth costs are $297,100.

9.0 Comparative Analysis of Alternatives

EPA has established nine criteria for use in assessing the relative advantages and disadvantages of each alternative. The performance of each alternative (including the 1989 ROD remedy) relative to these criteria and the other alternatives is discussed below. Soil and sludge alternatives are evaluated in Section 9.1, and PYC ditch sediment alternatives are evaluated in Section 9.2.

9.1 Evaluation of Soil and Sludge Alternatives

9.1.1 Overall Protection of Human Health and the Environment

With the exception of Alternative SS1, all of the soil/sludge alternatives are protective of human health and the environment by eliminating, reducing, or controlling risk through a combination of treatment, engineering controls, and institutional controls. Though considered protective for surface soil, the 1989 remedy does not address solidified sludge or subsurface soil, so additional measures developed in the other alternatives would have to be added to address these media.

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

All alternatives except SS1 can be designed to comply with all Federal and State applicable or relevant and appropriate requirements (ARARs). Alternative SS1 does nothing to reduce risks to within EPA's acceptable risk range or prevent soil and sludge from leaching contamination into the groundwater. Additional components must be added to the original 1989 remedy to prevent contaminant leaching into the groundwater.

Because Alternative 1 does not meet the threshold criteria of protection of human health and the environment and compliance with ARARs, this alternative will be dropped from further consideration. In addition, since the original 1989 remedy only addresses surface soil, the merits of applying bioremediation to subsurface soil and sludge at the Site will be addressed under Alternative SS3.

9.1.3 Short Term Effectiveness

Alternatives SS2 and SS4 are expected to have the best short-term effectiveness since very little handling of contaminated materials is necessary. For Alternative SS2, cap construction could be completed in a relatively short time-frame. Although large amounts of clean fill materials for cap construction would have to be brought to the Site in trucks, this traffic could be routed to avoid residential areas. Alternative SS4 would be conducted in-situ, but careful monitoring and management of off-gases would be required during treatment. Alternatives SS3, SS5, and SS6 are expected to have similar short-term impacts associated with the excavation and handling of contaminated materials, such as dust and vapor generation and physical construction hazards.

9.1.4 Long Term Effectiveness and Permanence

Alternatives SS4, SS5, and SS6 are all thermal treatment remedies which result in the destruction of contaminants, thereby affording the greatest degree of long-term effectiveness. Alternative SS2 serves to contain the contaminated materials under a cap, thereby eliminating the potential for exposure and reducing the leaching of contamination into the groundwater. However, perpetual maintenance and repair of the cap will be necessary to maintain the long-term effectiveness of this remedy. The results of Site-specific treatability studies have indicated that Alternative SS3 would have limited effectiveness in addressing principal Site contaminants.

9.1.5 Reduction of Mobility, Toxicity, or Volume through Treatment

Alternative SS4 not only provides a significant reduction in contaminant volume, but it also results in a 10 to 20 percent reduction in the volume of the contaminated media. Alternatives SS4, SS5, and SS6 provide the greatest reduction of toxicity and mobility by destroying contaminants through thermal treatment of contaminated materials. Although bioremediation under Alternative SS3 would destroy some contaminants, treatability tests have shown that the effectiveness of biotreatment is limited for addressing principal Site contaminants (cPAHs, PCP, and dioxin). Alternative SS2 is expected to reduce mobility by preventing rainfall infiltration, thereby reducing the potential for further contaminant leaching into the groundwater. This alternative would have no effect on toxicity or volume.

9.1.6 Implementability

Alternative SS2 is the most easily implemented alternative because it involves standard, widely available construction services. Alternatives SS5 and SS6 involve thermal treatment technologies which are commercially available. As presented, both would require excavation and handling of contaminated materials, although thermal desorption is now available as an in-situ technology. Both would also require a proof of performance (POP) test prior to full-scale operation. Alternative SS6 may have limited effectiveness in addressing the former lagoon sludge because the stabilizing agents may tend to bind contaminants within the stabilized matrix. Alternative SS4 requires minimal waste handling, but commercial availability is limited. Bioremediation under Alternative SS3 is commercially available, but extensive excavation, segregation, and mixing of the waste materials prior to treatment is required, and treatability test results suggest that additional treatment would be necessary. For all of the alternatives, care will have to be taken to safeguard the existing DNAPL recovery wells and treatment system on the west end of the ACW facility.

9.1.7 Cost Effectiveness

Alternative SS2 is the lowest cost alternative that is protective of human health and the environment. Although Alternative SS3 has the next lowest cost, it is not expected to be effective in reducing contaminant levels to health-protective levels. Therefore, Alternative SS6 is the next most cost-effective alternative, providing a greater degree of long-term effectiveness than capping, but at a significantly higher (20-fold) cost. Alternatives SS5 and SS4 provide a degree of long-term effectiveness similar to SS6 at a much greater cost.

9.1.8 State Acceptance

As the support agency, FDEP has been actively involved in the development and issuance of the Proposed Plan and this AROD. Based upon FDEP's comments to date, EPA expects that concurrence on the remedy selected in this AROD will be forthcoming, although a formal concurrence letter has not yet been received. Because the 1 ppb residential surface soil remedial goal for dioxin is subject to review and possible revision once EPA's Final Dioxin Reassessment effort is

complete, EPA and FDEP have agreed to designate the residential cleanup effort as an interim action. This approach allows the Agencies to achieve significant risk reduction immediately rather than deferring action at the Site while EPA completes the dioxin reassessment.

9.1.9 Community Acceptance

EPA published a Proposed Plan Fact Sheet in April 1998 outlining the alternatives EPA considered and identifying EPA's preferred alternative for addressing soil, sludge, and sediment contamination at the Site. A public meeting was held on May 14, 1998, to explain the alternatives EPA considered and to receive oral comments on the Proposed Plan. A copy of the transcript from this meeting is included in the Administrative Record for the Site, and any significant comments have been addressed in the Responsiveness Summary section of this AROD. In addition, EPA held a 60-day comment period from May 1, 1998 through July 1, 1998, during which numerous written comments were received. Community comments focused primarily on the adequacy of EPA's residential sampling activities and the proposed remedy for the PYC ditch.

9.2 Evaluation of PYC Ditch Sediment Alternatives

9.2.1 Overall Protection of Human Health and the Environment

With the exception of Alternative SD1, all of the sediment alternatives are protective of human health and the environment by eliminating, reducing, or controlling risk through a combination of removal, containment, engineering controls, and institutional controls.

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

Although there are no promulgated Federal or State cleanup levels for sediment, EPA has developed a Site-specific risk-based standard for sediment in the PYC ditch. However, all alternatives can be designed to comply with Federal and State requirements associated with dredging and filling in a wetland. Alternative SD1 does not trigger wetlands ARARs, and Alternative SD2 results in the least impact to potential wetlands of the "action" alternatives. The design of the stormwater outfall in Alternative SD4 would comply with appropriate State regulations and the NPDES requirements under the Clean Water Act.

Because Alternative SD1 does not comply with one or more of the threshold criteria, this alternative will be dropped from further consideration.

9.2.3 Short-Term Effectiveness

Alternatives SD2, SD3, and SD4 would all require the transport of contaminated sediment through the community from the Yacht Club to the ACW facility, generating some traffic congestion along L and Cypress Streets. Construction activities at the Yacht Club could produce nuisance noise levels and impede access to the little-used eastern portions of the Yacht Club property.

9.2.4 Long-Term Effectiveness and Permanence

Alternative SD2 and SD4 provide the greatest degree of long-term effectiveness by removal of all contaminated sediment. Although groundwater may re-contaminate sediment as it discharges into the ditch under Alternative SD2, EPA's groundwater remedy is expected to eliminate this problem in the long-term. The City has identified the need for periodic maintenance to clean out the culverts under Alternative SD4. Alternative SD3 involves removal of the most heavily contaminated sediment and lining of the ditch. Regular maintenance of the liner under Alternative SD3 would be critical to ensuring the long-term effectiveness of this alternative.

9.2.5 Reduction of Toxicity, Mobility or Volume through Treatment

Alternatives SD2 and SD4 provide the greatest reduction of toxicity, mobility, and volume through removal of all contaminated sediment. Alternative SD3 provides a lesser degree of reduction by removal of the most contaminated sediment and lining of the ditch to prevent further movement of contaminants between the groundwater and the ditch.

9.2.6 Implementability

All alternatives utilize standard construction methods which are widely available. Alternative SD2 represents the least complex alternative. The administrative feasibility of Alternative SD4 is more complex in that it requires careful coordination with local, State, and Federal authorities to extend the storm sewer to Pensacola Bay and backfill the ditch.

9.2.7 Cost Effectiveness

Alternative SD2 is the lowest cost alternative that is protective of human health and the environment. Based on information received during the comment period, maintenance requirements associated with Alternative SD4 no longer make it a more attractive long-term solution than Alternatives SD2 and SD3 as stated in the Proposed Plan.

9.2.8 State Acceptance

Based upon discussions with FDEP concerning comments received during the comment period favorable toward Alternative SD2, FDEP supports Alternative SD2 as the selected remedy for sediment contamination in the PYC ditch.

9.2.9 Community Acceptance

EPA received a number of comments from the Pensacola Yacht Club, the Bayou Chico Association, the City of Pensacola, and others identifying specific concerns about the implementation of the various alternatives for sediment. These comments reflected a preference for Alternative SD2, and they have been addressed in the Responsiveness Summary, which is included as Part 3 of this AROD.

10.0 Selected Remedy

Based upon consideration of the requirements of CERCLA, the NCP, the detailed analysis of the alternatives using the nine criteria, and State and public comments, EPA has determined that a combination of Alternative SS2 and Alternative SD2 is the most appropriate amended remedy for addressing soil, sludge, and sediment contamination at the ACW Site in Pensacola, Florida.

10.1 Components of the Selected Remedy

The selected remedy involves the construction of a RCRA cap and surface drainage controls. A conceptual layout of the RCRA cap and drainage features are shown on Figure 4. Future uses of the property would also be limited by the application of deed restrictions. Since EPA retains a 50% interest in the ACW property through a bankruptcy settlement, EPA would secure an agreement with any prospective purchaser identifying appropriate land use restrictions and maintenance requirements.

A low permeability cap which meets Resource Conservation and Recovery Act (RCRA) closure requirements under 40 CFR 264.228(a)(2)(iii) shall be constructed over the stabilized material in the former surface impoundments, consolidated materials from other areas within the AOC, and other contaminated areas of the ACW facility. The cover system shall be designed and constructed to achieve the following criteria:

- Provide long-term minimization of the migration of liquids through the contained area;
- Function with minimum maintenance;
- Promote drainage and minimize erosion or abrasion of the final cover; and
- Accommodate settling and subsidence so that the cover's integrity is maintained.

In addition to minimizing the infiltration of rainwater into the containment area, the cap also eliminates the potential for direct contact by humans and fauna with contaminated soil at the ACW facility. In order to reduce the height of the cap, the U.S. Army Corps of Engineers has developed the low-profile cap design shown in Figure 5. The cap consists of the following layers: a composite layer consisting of clay and geosynthetic sandwiched between two 40 mil geomembranes; a 12 inch layer of random fill; a 12 inch layer of sand for drainage; a geotextile fabric over the drainage layer to prevent clogging; an 18 inch layer of random fill; and a 6 inch layer of topsoil. The final (topsoil) layer of the cap would be graded to a minimum slope of 1 percent and a maximum of 5 percent based on the current Site topography. Some grading of the contaminated soil and solidified sludge may be required to achieve these slopes. A vegetative cover of native grass would be established to minimize cap erosion. To accommodate potential future uses of the property, facilitate the addition of extraction wells for the groundwater remedy, and reduce the height of the cap, alternative cap designs which can provide equivalent functional performance will also be considered during the Remedial Design. The cap is expected to extend onto privately-owned property adjacent to the southwest corner of the ACW property which was heavily contaminated by historical discharges from the former lagoons. In order to effect the construction of the cap, EPA will need to address appropriately the long-term status of this parcel.

Figure 4. Conceptual Layout of Surface Cap and Drainage Features

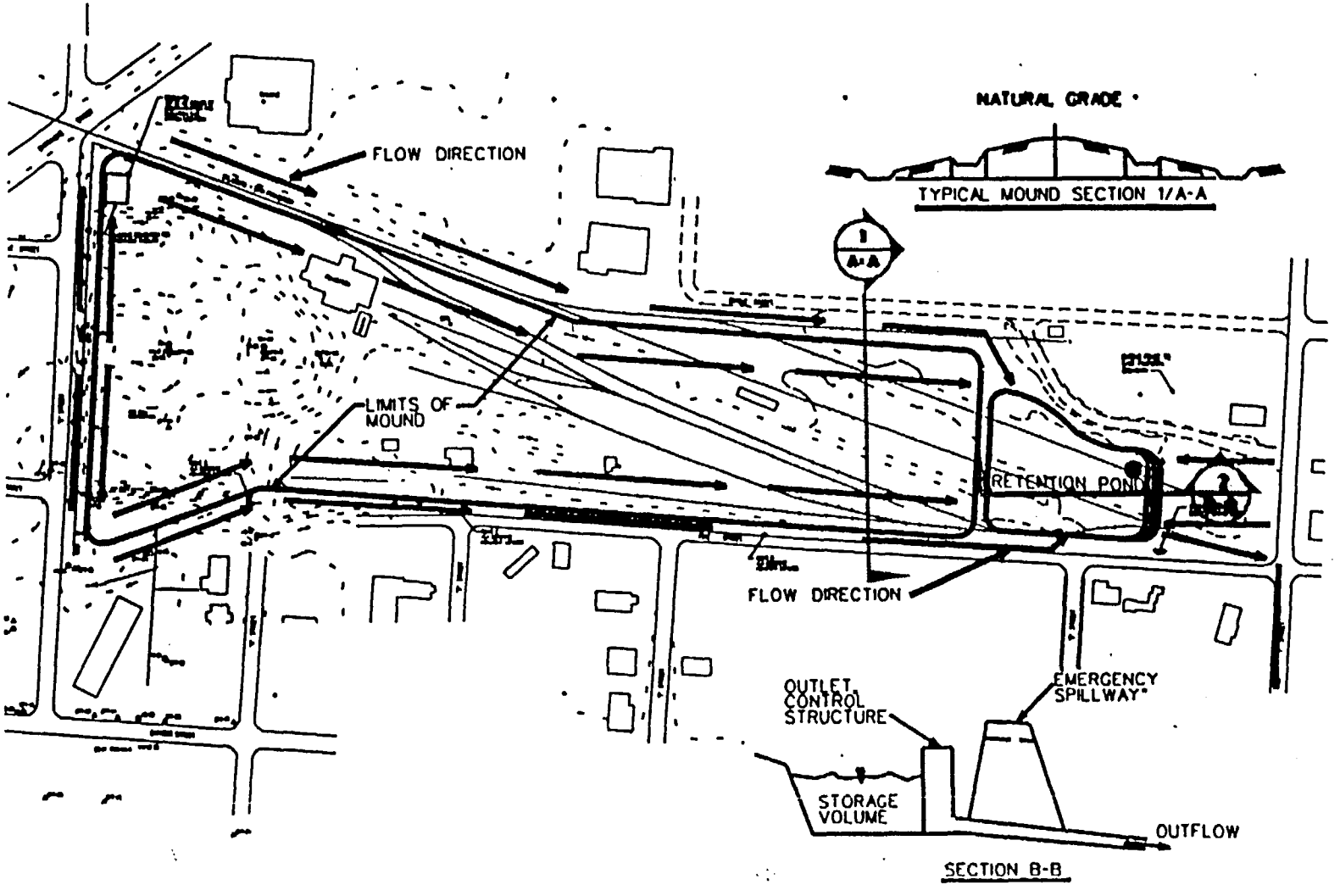
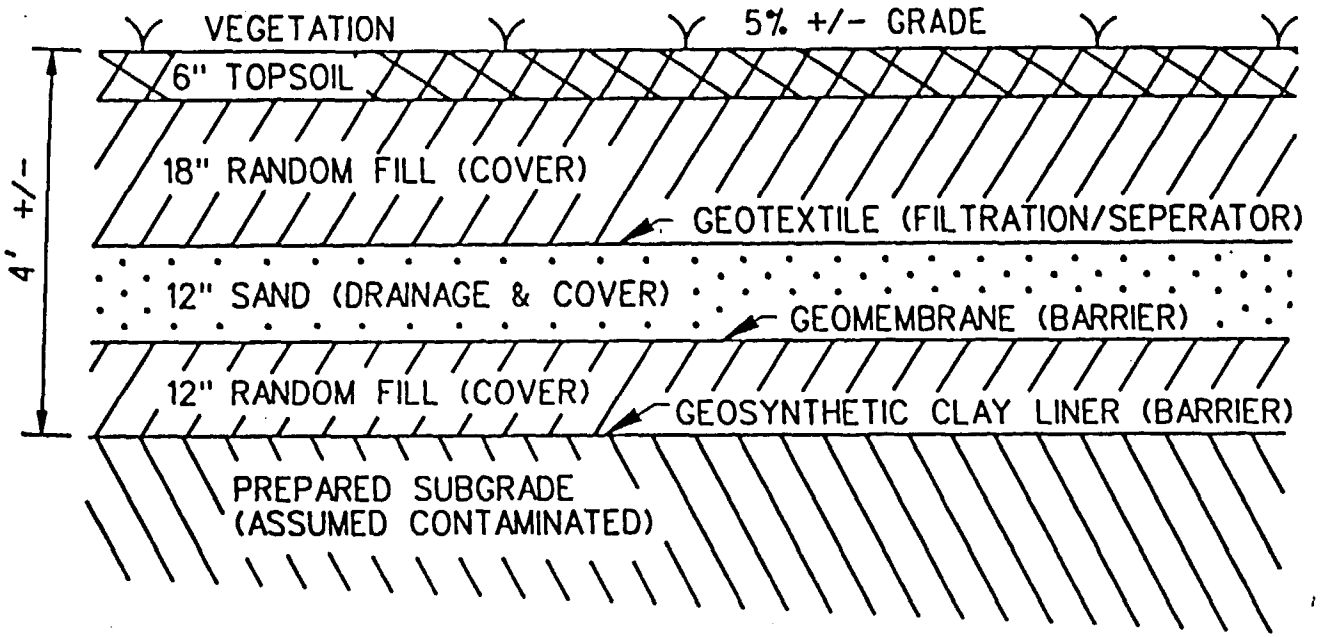


Figure 5. Typical Cross Section of Low-Profile Surface Cap



LANDFILL CAP - TYPICAL SECTION

SCALE $\frac{1}{2}$" = 1'-0"

12" 0 1 2 3 4 5 FT.

Surface drainage controls including drainage ditches and a stormwater retention pond will be constructed to manage runoff from the Site. The retention pond will be located on the east end of the ACW property, and improvements to the City of Pensacola storm sewer system will likely have to be constructed to provide adequate capacity to route the water to Pensacola Bay.

Because the contaminated soil could potentially act as a source of groundwater contamination as the groundwater level rises and subsides, Alternative SS2 includes periodic groundwater monitoring for an assumed period of 30 years. Periodic maintenance of the RCRA cap and surface drainage channels will also be required during this period.

To address contamination in the PYC drainage ditch, sediment from the ditch which exceeds the remedial goal for sediment (to a maximum depth of 3 feet) will be excavated and transported to the ACW property for disposal beneath the surface cap. Confirmation samples will be collected from the excavated area to determine if the remedial goal has been met. Prior to dredging of the ditch, clearing and grubbing of vegetation and dewatering of the ditch may be necessary to facilitate the removal of contaminated sediment. A pump may be needed to temporarily redirect stormwater from the City storm sewer to Chico Bayou. The ditch excavation will then be backfilled with clean soil, regraded to approximate its original profile, and revegetated. The banks of the ditch will be stabilized using degradable netting until thick vegetative cover is established. Permanent rip-rap dams or other features may be placed at intervals in the bottom of the ditch to reduce flow energy and erosion. The proposed area of remediation is estimated to be a 25-foot-wide area along the 900-foot length of the ditch.

The City of Pensacola has a tree ordinance which regulates the damage or removal of protected tree species which exceed a certain diameter. EPA will coordinate the clearing of the ACW property and the PYC ditch area with the City to ensure compliance with this local ordinance to the maximum extent practicable. Since groundwater which may discharge into the ditch is not expected to reach EPA remedial goals for several years, periodic sampling of the ditch sediment will be conducted pursuant to a Site-specific operation and maintenance plan.

Clearing, dredging, and backfilling the PYC drainage ditch are activities which may constitute a discharge of dredged and fill material into waters of the United States, which is regulated by Section 404 of the Clean Water Act (CWA), 33 U.S.C. Section 1344. The requirements of CWA Section 404 and the associated Section 404(b)(1) Guidelines at 40 CFR Part 230 are therefore applicable to the implementation of these activities. Nationwide Permit 38 applies to cleanup of hazardous and toxic wastes in wetlands, but does not apply to activities undertaken entirely on a CERCLA site as required by EPA. Accordingly, Nationwide Permit 38 is not applicable here. However, the General Conditions of this nationwide permit are relevant and appropriate requirements, and the remedy must meet the substantive requirements of CWA Section 404 and the Section 404(b)(1) Guidelines. The Guidelines require a hierarchical approach to mitigation measures which includes impact avoidance, impact minimization, and compensatory mitigation. Compliance with this three step process with respect to the selected remedy for the ACW Site is evaluated below:

Impact Avoidance

The Section 404(b)(1) Guidelines require EPA to avoid any direct or indirect impacts to wetlands if there is a practicable alternative to the proposed discharge that would have less adverse impact to the aquatic ecosystem, as long as the alternative does not have other significant adverse environmental consequences. EPA has determined that the selected remedy may have a direct adverse impact on an estimated 0.5 acre of wetland area along the length of the PYC drainage ditch. Dredging and restoring the ditch could change the surface water and groundwater hydrology temporarily.

EPA has determined that contamination from the Site has impacted the wetland area associated with the PYC ditch. Both routine and storm-related releases of contaminated waste material from the former lagoons on the ACW facility have resulted in sediment contamination in the PYC ditch. In addition, contaminated groundwater resulting from the Site is potentially discharging into the ditch. EPA's Dye Dispersion and Sediment Sampling Study and the FFS document that taking no action to address contaminated sediment in the PYC ditch would not be protective of human health and the environment, potentially allowing continuing contamination of Pensacola Bay and Bayou Chico. Therefore, EPA has determined that no practicable alternative to the selected remedy exists that would have less impact to the aquatic ecosystem without significant adverse environmental consequences.

Impact Minimization

If a discharge cannot be avoided, the Guidelines at 40 CFR Part 230.10(d) require that all appropriate and practicable steps be taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. Subpart H of 40 CFR Part 230 sets forth the steps which can be taken to minimize the effects of fill activities. Section 230.75(d) states that habitat development and restoration techniques may be used to minimize adverse impacts and to compensate for destroyed habitat. The selected remedy involves removing contaminated sediment and restoring the ditch as closely as possible to its original condition and function. This alternative results in the least adverse impact to the ditch among the alternatives considered. Therefore, EPA believes that adverse impact has been minimized to the extent practicable.

Compensatory Mitigation

Appropriate and practicable compensatory mitigation may be required for unavoidable adverse impacts which remain after all appropriate and practicable minimization has been attained. The "Memorandum of Agreement between the U.S. Army Corps of Engineers and the EPA Concerning the Determination of Mitigation Under the 404(b)(1) Guidelines" (MOA) states that mitigation includes wetland restoration, enhancement, and/or creation. The evaluation of the appropriate level of mitigation

requires a case-specific determination and is based solely on the values and functions of the wetland that is impacted. According to the MOA, mitigation should provide at a minimum one for one functional replacement with an adequate margin of safety to reflect the expected degree of success associated with the mitigation plan. Better characterization of the wetlands (including a functional assessment and delineation) are necessary before specific mitigation actions can be identified. Therefore, a wetlands delineation and function assessment shall be conducted during the RD. EPA believes that the removal of contaminated sediment and the restoration of the ditch represent a one for one functional replacement of any potentially impacted wetland.

Based upon comments received during the public meeting, additional soil sampling was conducted in specific residential areas prior to issuance of this AROD. First, high PAH levels were detected in a vacant lot in the 1700 block of West Sonia Street without a plausible route of migration from the ACW facility. EPA collected surface soil samples from this property and determined that the high PAH levels were not Site related, but were linked to the use of creosote treated blocks in the construction of a walkway for a residence that formerly stood on the property. This property has therefore been dropped from EPA's remediation plans. Another residential property southeast of the ACW facility exceeded the Site residential surface soil remedial goals. Although the migration of Site-related contamination to this property along the railroad right-of-way may have been possible, EPA believes an interview with the site owner and additional soil sampling is needed before this property is excavated. If additional information collected during design confirms the theory that the property was contaminated by the ACW Site, then excavation will proceed. Otherwise, the property will be dropped from the remediation plan. At the request of FDEP, limited surface soil sampling will be conducted during design in commercial areas north and west of the ACW property to evaluate compliance with remedial goals.

In addition, during the public meeting, residents requested that the extent of subsurface soil contamination near the facility be further evaluated in the city block between L and K Streets north of Cypress. To that end, EPA tasked the U.S. Army Corps of Engineers to collect subsurface samples in this area. The report on this investigation was not available before issuance of this AROD, but will be considered during design to further define the AOC requiring remediation.

As part of the Remedial Action activities for Operable Unit 2, EPA's contractor repaired the existing 6-foot chain link fence and extended it to encompass the entire perimeter of the ACW property. During construction of the OU1 remedy, it may be necessary to temporarily remove portions of the fence, but the fence will be restored, repaired, or replaced as necessary following construction. Warning signs and placards are currently posted at 100-foot intervals along the perimeter of the fence in accordance with Florida regulation FAC 62-730.181(3), Warning Signs at Contaminated Sites.

The net present worth cost of the selected remedy is $1,560,500. A detailed breakdown of these costs is shown in Table 4.

Table 4
COST ESTIMATE - Alternative SS2 - RCRA CAP

Item	Quantity	Units	Unit Cost($)	Capital Cost($)	Annual Cost($/Yr)
Mobilization/Demobilization	1	LS	10,000.00	10,000	
Site Prep					
Clearing, grubbing, removal	13	acre	5,150.00	67,000	
Fencing	3,600	ft	5.65	20,300	
Debris Removal/Disposal	2,525	cy	52.27	132,000	
Drum Removal/Disposal					
Personal Protective Equipment	10	drums	148.40	1,500	
Empty Drums (Nonhazardous)	90.00	drums	44.59	4,000	
Preliminary Grading	13	acre	500.00	6,500	
30 mil HDPE Liner (installed)	450,600	sf	0.40	180,200	
Clay (compacted/installed)	30,000	cy	6.00	180,000	
Geotextile & Drainage Net	450,600	sf	0.50	225,300	
Top soil (grading)	30,000	cy	4.00	120,000	
Hydro seeding	23,400	sy	0.40	9,400	
Deed Restriction	1	LS	2,000.00	2,000	
Maintenance Mowing	12	Events/Yr	300.00		3,600
Security	12	Visits/Yr	100.00		1,200
Subtotal				958,200	4,800
Bid Contingencies (10%)				95,800	
Scope Contingencies (10%)				95,800	
Construction Total				1,149,800	
Permitting and Legal (3%)				34,500	
Construction Services (5%)				57,500	
Total Implementation				1,241,800	
Engineering Design (8%)				99,300	
Total Capital				1,341,100	
Total Annual					4,800
Present Worth (30 years of operation)*				1,400,700	

*7% APR
All costs rounded to the nearest $100

Table 4 (continued)
Cost Estimate - Alternative SD2

Item	Quantity	Units	Unit Cost ($)	Capital Cost ($)	Annual Cost ($/yr)
Mobilization/Demobilization	1	LS	$3,500.00	$3,500	
Clear, Grub, and Remove	2	Acres	$5,150.00	$10,300	
Install Security Fencing	2550	LF	$5.65	$14,408	
Dewater Ditch					
Flow Rerouting Pump	1	Pump	$18,500.00	$18,500	
Flow Rerouting Piping	930	LF	$4.10	$3,813	
Wellpoints (dewatering in 100 ft. sections for 1 month)	100	LF	$415.00	$41,500	
Remove/Transport Sediments					
Dredge ditch to maximum of 3 ft. depth	2490	CY	$2.25	$5,603	
Transport sediments to ACW property	2490	CY	$3.25	$8,093	
Confirmation sample analysis (EPA Method 8270)	9	samples	$315.00	$2,835	
Backfill excavation and regrade to original profile	2490	CY	$6.30	$15,687	
Hydro seeding	1000	SY	$0.25	$250	
Inspection and Maintenance	2	Visits/yr	$500.00		$1,000
Subtotal				$124,489	$1,000
Bid Contingencies (5%)				$6,224	
Scope Contingencies (5%)				$6,224	
Construction Total				$136,937	
Permitting and Legal (1%)				$1,369	
Construction Services (1.5%)				$2,054	
Total Implementation				$ 40,360	
Engineering Design (5%)				$7,018	
Total Capital				$147,378	
Total Annual					$1,000
Present Worth (30 years of operation @ 7% discount)				$159,787	

10.2 Performance Standards

The purpose of this response action is to control risks posed by ingestion, inhalation, and direct contact with soil, sludge, and sediment contamination through a combination of excavation, treatment, and containment. All contaminated soil, sludge, and sediment which has been identified as exceeding the respective remedial goals in Table 2 will be consolidated and isolated beneath the cap on the ACW property, thereby eliminating the risk associated with direct contact, ingestion, or inhalation. Confirmation sampling will be conducted following excavation to confirm that the remaining soil or sediment does not exceed the relevant remedial goal.

The low permeability layer of the surface cap shall achieve a maximum in-place saturated hydraulic conductivity of $1x10^{-7}$ cm/sec. The drainage layer shall achieve a minimum hydraulic conductivity of $1x10^{-2}$ cm/sec.

11.0 Statutory Determinations

Pursuant to CERCLA Section 121, EPA must select remedies that are protective of human health and the environment, comply with applicable or relevant and appropriate requirements, are cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

11.1 Overall Protection of Human Health and the Environment

The selected remedy satisfies the statutory requirement to be protective of human health and the environment. The potential human health and ecological risks associated with direct contact, ingestion, and inhalation of contaminated soil, sediment, and sludge are reduced or eliminated through the consolidation and isolation of these media within the containment system.

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

The selected remedy satisfies the statutory requirement to comply with all applicable or relevant and appropriate Federal and State ARARs. EPA has consulted with FDEP, and no other promulgated State requirements which are more stringent than the Federal requirements listed below have been identified. The ARARs which apply to the selected remedy and other non-enforceable guidance and criteria which are "to be considered" (TBC) are presented below:

Federal ARARs

Resource Conservation and Recovery Act (RCRA)

- 40 CFR Part 264.228. RCRA requirements for the closure of surface impoundments are **relevant and appropriate** to the capping of the former sludge lagoons and other portions of the Site. This includes by reference the requirements for closure and post-closure care in 40 CFR 264 Subpart G.

Clean Water Act (CWA)

- The substantive requirements of Section 404 of the Clean Water Act (CWA), 33 U.S.C. Section 1344, the Section 404(b)(1) Guidelines, 40 CFR Part 230, and Nationwide Permit 38, may be **relevant and appropriate** to the dredging and restoration of the PYC drainage ditch.

- 40 CFR Part 403. Requirements under the National Pollutant Discharge Elimination System (NPDES) program are **applicable** to the discharge of stormwater from the Site to Pensacola Bay.

State ARARs

- Regulation of Stormwater Discharge, FAC 62-25.025, 62-25.027, 62-25.040. Substantive requirements for the design, construction, and operation and maintenance of stormwater discharge facilities are **applicable** for stormwater management features at the Site.

- Surface Water Quality Criteria, FAC 62-302.530. Florida surface water quality criteria are **applicable** for the treatment and discharge of groundwater and surface water associated with the dewatering activities in the PYC drainage ditch.

- Florida Rules on Hazardous Waste Warning Signs, FAC 62-730.181(3). Requirements for the design, location, and spacing of warning signs are **applicable** to the posting of signs around the perimeter and at entrances of the Site.

To Be Considered

- Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments, EPA/530-SW-89-047. Guidelines for the design of final covers for surface impoundments shall be considered in the development in the surface cap for the Site.

- Considering Wetlands at CERCLA Sites, EPA/540/R-94/019.

11.3 Cost Effectiveness

The selected remedy meets the statutory criteria of being cost effective. Alternative SS2 is the least expensive alternative which meets the threshold criteria. Although treatment alternatives are available which would provide a greater degree of long-term permanence and a greater reduction in the toxicity, mobility, or volume, the selected remedy provides an equivalent level of public health protection at less than 5% of the cost of the next lowest cost alternative. Alternative SD2 is the most protective and least expensive of the sediment alternatives. It minimizes the adverse impact to the potential wetlands associated with the ditch, ultimately resulting in a one for one functional replacement of the impacted wetland. After considering community comments on the preferred alternative from the Proposed Plan (Alternative SD4), EPA agrees that Alternative SD2 offers additional treatment of stormwater before it enters Pensacola Bay and will actually minimize maintenance costs by eliminating the need to clean out sediment accumulation at the point where the culverts would have entered the Bay.

11.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance of trade-offs in terms of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, and cost.

The selected remedy for soil and sludge ranks the highest against the other alternatives with respect to the criteria of short-term effectiveness, implementability, and cost. While the thermal treatment technologies associated with Alternatives SS4, SS5, and SS6 provide the greatest degree of treatment, their implementation costs range from 20 to 50 times more than the selected remedy for a similar reduction in risk. Although Alternative SS3 provides a much lower cost for treatment, treatability tests have demonstrated that this technology would not be effective in addressing the wastes at the Site. The selected remedy is easily implemented using conventional construction methods, and by limiting the amount of waste disturbed, it minimizes the short-term impacts to workers and the public during implementation.

Because the ACW Site was listed on the NPL in 1983 and this AROD represents the third attempt in selecting a remedy for source control at the Site, EPA believes that community sentiment runs against the selection of an innovative technology or other type of treatment alternative requiring extensive treatability or performance testing which could slow actual implementation. For this reason, Alternative SS2 offers a cost effective remedy which can be designed and constructed without the prospect of delay or failure due to treatability or implementation problems.

11.5 Preference for Treatment as a Principal Element

EPA has already addressed the principal threat wastes at the Site through previously implemented or ongoing response actions. During the removal actions in 1983 and 1984, EPA addressed the principal threat wastes of wastewater and bottom sludge in the onsite lagoons by draining and treating the wastewater and stabilizing the bottom sludge through treatment with lime and fly ash. More recently, pursuant to the ROD for Operable Unit 2, EPA is actively addressing another principal threat waste by extracting DNAPL from the subsurface and recycling it off-site.

EPA has determined that the remaining wastes being addressed by the response action in this AROD do not constitute principal threat wastes. EPA believes that those wastes which are liquids or represent mobile or highly toxic source material have been appropriately addressed through previous or ongoing response actions. Therefore, this remedy utilizes a combination of engineering and institutional controls to address the remaining low level threat wastes at the Site.

Because treatment of the principal threats at the Site have been accomplished through previous response actions and the recalcitrant nature of contaminants and the anticipated volume of source materials (over 80,000 cubic yards) render cost-effective treatment of these wastes impracticable, further treatment was not found to be feasible. Thus, although the remedy in this OU does not satisfy the statutory preference for treatment as a principal element of the remedy, EPA considers that on the whole, treatment technologies have been utilized in all of the response actions taken at the Site to the maximum extent practicable.

12.0 Documentation of Significant Changes

The Proposed Plan for the ACW Site was released for public comment in April 1998, identifying a combination of Alternatives SS2 and SD4 as the preferred alternative for the amended remedy. Whereas Alternative SD4 called for removal of contaminated sediment from the PYC ditch and installation of culverts to replace the storm water management function of the ditch, Alternative SD2, also presented in the Proposed Plan, called for excavation of contaminated sediment and restoration of the PYC ditch to its original condition. Comments received during the public comment period from the City of Pensacola Office of the Engineer identified long-term maintenance concerns associated with sediment buildup in the culvert outfall in Pensacola Bay. In addition, the City, PYC, the Bayou Chico Association, and the National Oceanic and Atmospheric Administration indicated that backfilling the ditch eliminated an important treatment function of the existing ditch in allowing sediment in storm water to settle out before reaching the Bay. Therefore, EPA , in consultation with FDEP, decided to select Alternative SD2 for addressing the PYC ditch.

In addition, based on surface soil sampling results following the Proposed Plan, EPA has eliminated the residential property located in the 1700 block of West Sonia Street from the AOC requiring remediation. Discussions with the owner and recent sampling data suggest that the high PAH levels encountered in this location are not Site-related, but are associated with partially buried creosote-treated blocks used in a former walkway.

The Proposed Plan identified a remedial goal for carcinogenic PAHs in PYC ditch sediment of 1.6 mg/kg based on the most likely exposure scenario of an adolescent trespasser (age 7 to 16) playing in the ditch. However, following issuance of the Proposed Plan and during development of this AROD, FDEP requested that their Sediment Quality Assessment Guidelines Toxic Effect Levels (TEL) be considered in the development of a remedial goal for sediment. Based on these guidelines, EPA has established a remedial goal for the PYC ditch sediment of 0.655 mg/kg for carcinogenic PAHs.

13.0 Documentation of Five-Year Remedy Review for OU1

The 1989 ROD indicates that a review would be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. In August 1990, EPA issued an Explanation of Significant Difference Fact Sheet identifying several additional cleanup activities not specifically addressed in the 1989 ROD. These tasks included site preparation, fence repair, drum sampling, analysis, and disposal, demolition of buildings and removal of debris, well closure, cap repair, and revegetation. The initiation of construction of these additional site preparation tasks in February 1991 by EPA's contractor, Roy F. Weston, Inc., technically triggered the need to conduct a Five-Year Review. The field work was completed in May 1991, and the remedial action was documented in Weston's Remedial Action Report dated September 19, 1991. EPA accepted the work on September 25, 1991.

Since the bulk of the remedy identified in the 1989 ROD was never completed and this ROD Amendment for OU1 has been planned since 1993, EPA has not conducted a formal Five-Year Review. However, EPA believes that the analysis in this AROD adequately addresses the scope and conclusions of a Five-Year Review Report. This analysis concludes that the remedy selected in the 1989 ROD is not protective, since the selected technology is not capable of achieving the remedial goals for the Site. Therefore, this AROD identifies and selects an amended remedy which is protective of human health and the environment.

American Creosote Works
Pensacola, Escambia County, Florida

3. RESPONSIVENESS SUMMARY

In accordance with Sections 113 and 117 of CERCLA, as amended, EPA has conducted community involvement activities at the ACW Site to solicit community input and ensure that the public remains informed about Site activities. EPA's Proposed Plan Fact Sheet for the Record or Decision (ROD) amendment was mailed to the public on April 28, 1998, and a copy of the Administrative Record was made available in the information repository at the West Florida Regional Library in downtown Pensacola. A public notice was published in the *Pensacola News Journal* in Pensacola, Florida, on April 30, 1998, advising the public of the availability of the Administrative Record and the date of the upcoming public meeting. EPA held a public meeting on May 14, 1998, at the Sanders Beach Community Center to answer questions and receive comments on the Agency's preferred alternative for addressing soil, sludge, and sediment contamination from the Site. Comments received during the public meeting were recorded in an official transcript of the meeting, a copy of which is included in the Administrative Record. Initially, a public comment period was scheduled from May 1 through June 1, 1998. However, at the request of the Bayou Chico Association, the Technical Assistance Grant (TAG) recipient for the Site, EPA granted a 30-day extension to the comment period through July 1, 1998. EPA published a public notice announcing the comment period extension in the *Pensacola News Journal* on June 6, 1998.

In conjunction with the Remedial Action activities for Operable Unit 2, EPA revised the Community Relations Plan for the Site in July 1998. This effort involved conducting additional community interviews and updating the Site mailing list.

This Responsiveness Summary provides information about the views of the community and other interested parties regarding EPA's proposed action, documents how the Agency has considered public comments during the decision-making process, and provides answers to major comments received during the comment period. It consists of the following sections:

1.0 Overview: This section discusses the recommended action for the Site and the public reaction to this alternative.

2.0 Background on Community Involvement: This section provides a brief history of community interest in the Site and identifies key public issues.

3.0 Summary of Comments Received and EPA's Responses: This section provides EPA's responses to oral and written comments submitted during the pubic comment period.

4.0 RD/RA Concerns: This section discusses community concerns raised during the comment period regarding ongoing remedial action activities at the Site.

1.0 Overview

The Proposed Plan for the ACW Site was released for public comment in April 1998, identifying a combination of Alternatives SS2 and SD4 as the preferred alternative for the amended remedy. Whereas Alternative SD4 called for removal of contaminated sediment from the PYC ditch and installation of culverts to replace the storm water management function of the ditch, Alternative SD2, also presented in the Proposed Plan, called for excavation of contaminated sediment and restoration of the PYC ditch to its original condition. Comments received during the public comment period from the City of Pensacola Office of the Engineer identified long-term maintenance concerns associated with sediment buildup in the culvert outfall in Pensacola Bay. In addition, the City, PYC, the Bayou Chico Association, and the National Oceanic and Atmospheric Administration indicated that backfilling the ditch eliminated an important treatment function of the existing ditch in allowing sediment in storm water to settle out before reaching the Bay. Therefore, EPA , in consultation with FDEP, decided to select Alternative SD2 for addressing the PYC ditch.

Numerous comments were received during the comment period and the public meeting. The primary concerns raised by residents related to the adequacy of the residential soil sampling program and the preferred alternative for the PYC ditch sediment.

2.0 Background on Community Involvement

EPA's earliest community outreach effort was a press release related to the emergency removal activities in 1983. Periodic fact sheets were issued during 1984 and 1985 to update the community concerning studies being conducted at the site. In September 1985, EPA issued fact sheets and press releases announcing a public meeting and comment period related to the proposed plan for addressing source contamination at the site. Similarly, in 1989, EPA issued a fact sheet and held a public meeting to discuss the revised source control remedy. In 1990, EPA prepared an Explanation of Significant Differences (ESD) notifying the public of additional tasks that would be necessary to implement the 1989 ROD. Later, in March 1991, a fact sheet was published to advise the public of the initiation of these site preparation activities which included cap repair, drum characterization, fence repairs, well closure, and building demolition.

EPA conducted a door-to-door survey in September 1993 in the neighborhood surrounding the site to update its mailing list. EPA's Proposed Plan for Operable Unit 2 was sent to the public in November 1993, and the administrative record for the site was made available in the public repository at the West Florida Regional Library. Notices were published in the *Pensacola News Journal* on November 28 and 30, 1993 advising of the availability of the administrative record, announcing the opening of the public comment period, and advertising the date of the upcoming public meeting. A comment period was held from November 12, 1993 to January 11, 1994 to solicit input on EPA's preferred alternative for addressing groundwater contamination at the site. In addition, EPA held a public meeting at the Sanders Beach Community Center on December 2, 1993 to discuss EPA findings and answer residents' questions. Approximately 50 people attended the public meeting during which several residents expressed concern about their health, citing numerous cases of cancer

and other conditions in the community. At least three people requested that a health study of area residents be conducted. Residents also registered complaints about the site being overgrown, thereby providing potential hiding places for criminals. One resident attributed drainage problems and flooding to the site, furnishing EPA with photographs of flooding along Pine and Gimble Streets. At least two citizens suggested that EPA was wasting money in cleaning up this site, but many of the residents expressed support of EPA's Proposed Plan for groundwater remediation. EPA issued the final OU2 ROD on February 4, 1994 with a Responsiveness Summary documenting the Agency's response to significant comments.

EPA has continued to keep the community informed about progress at the site through fact sheets and informational meetings. During the design phase for OU2, EPA issued fact sheets in November 1996 and May 1997. An Open House was held at the Sanders Beach Community Center to discuss EPA's progress on the design of the OU2 remedy and outline the alternatives EPA was considering for soil, sludge and sediment. During the Remedial Action for OU2, EPA published update fact sheets in June 1998 and January 1999. A public informational poster session was held at the Sanders Beach Center on July 16, 1998 to discuss the upcoming OU2 construction work and answer questions from residents. In addition, EPA conducted interviews with local officials and community members in March 1998 in preparation for revising the Community Relations Plan (CRP) for the Site. The revised CRP was published in July 1998.

EPA's Proposed Plan Fact Sheet for the ROD amendment for OU1 was mailed to the public on April 28, 1998, and a copy of the Administrative Record was made available in the information repository at the West Florida Regional Library in downtown Pensacola. A public notice was published in the *Pensacola News Journal* in Pensacola, Florida, on April 30, 1998, advising the public of the availability of the Administrative Record and the date of the upcoming public meeting. EPA held a public meeting on May 14, 1998, at the Sanders Beach Community Center to answer questions and receive comments on the Agency's preferred alternative for addressing soil, sludge, and sediment contamination from the Site. Comments received during the public meeting were recorded in an official transcript of the meeting, a copy of which is included in the Administrative Record. Initially, a public comment period was scheduled from May 1 through June 1, 1998. However, at the request of the Bayou Chico Association, the Technical Assistance Grant (TAG) recipient for the Site, EPA granted a 30-day extension to the comment period through July 1, 1998. EPA published a public notice announcing the comment period extension in the *Pensacola News Journal* on June 6, 1998.

EPA awarded a TAG of $50,000 to the Bayou Chico Association in September 1996 for the site. The Bayou Chico Association hired a local office of Ecology and Environment as their technical expert for reviewing and interpreting EPA information and documents.

3.0 Summary of Comments Received and EPA's Responses

Comment: The drainage ditch commonly referred to as the Pensacola Yacht Club (PYC) ditch appears to fulfill all criteria of wetlands. It has artesian springs active near where the culvert from the city storm water culverts empty into it; it constantly has water in it; it empties into the mouth of

Bayou Chico; and the vegetation is characteristic of wetlands. We request a formal determination if this is a wetland. Does EPA have the right to place a culvert in this wetland and fill it? If so, will mitigation be performed? By whom and in what area?

Response: EPA agrees that available information about the PYC ditch (including the National Wetland Inventory published by the Department of Interior) suggests that portions of the ditch may be a wetland. Accordingly, Section 10.1 of this AROD indicates that a formal wetland delineation and functional assessment will be conducted during the design. Other than the "No Action" alternative (which is not considered to be protective of human health or the environment), each of the alternatives EPA considered for addressing sediment contamination in the PYC ditch will result in some degree of impact to the wetlands associated with the ditch. Clearing, dredging, and backfilling the PYC drainage ditch are activities that may constitute a discharge of dredged and fill material into waters of the United States, which is regulated by Section 404 of the Clean Water Act (CWA), 33 U.S.C. Section 1344. The requirements of CWA Section 404 and the associated Section 404(b)(1) Guidelines at 40 CFR Part 230 are therefore applicable to the implementation of these activities. Nationwide Permit 38 applies to cleanup of hazardous and toxic wastes in wetlands, but does not apply to activities undertaken entirely on a CERCLA site as required by EPA. Accordingly, Nationwide Permit 38 is not applicable here. However, the General Conditions of this nationwide permit are relevant and appropriate requirements, and the remedy must meet the substantive requirements of CWA Section 404 and the Section 404(b)(1) Guidelines. The Guidelines require a hierarchical approach to mitigation measures which includes impact avoidance, impact minimization, and compensatory mitigation. Compliance with this three step process with respect to the selected remedy for the ACW Site is evaluated in Section 10.1 of the AROD. The Northwest District of FDEP has provided a letter indicating that neither a wetland resource permit under Chapter 62-312, Florida Administrative Code nor a stormwater permit under Chapter 62-52, Florida Administrative Code will be required for the project.

Comment: Numerous comments were received from the Bayou Chico Association, recipient of the Technical Assistance Grant (TAG) for the Site, relative to the management of storm water from the ACW Site. Specific concerns or suggestions provided include the following: identify the actions that will be taken to prevent ACW Site-related contamination from entering Bayou Chico; storm water runoff should be routed to a sedimentation pond prior to discharge to Pensacola Bay and Bayou Chico; testing and removal of the accumulated sediment should be done; assurance should be provided that contracts and funding for long term maintenance will be available.

Response: EPA's selected remedy involves a number of elements which are expected to improve the quality of storm water runoff in the vicinity of the ACW Site: contaminated soil from the PYC property and residential areas will be excavated and consolidated on the ACW property; contaminated sediment from the PYC ditch will be excavated and placed on the ACW property; and a surface cap will be constructed over the consolidated material, stabilized sludge, and other contaminated portions of the ACW facility. The cap will isolate Site contamination, thereby preventing storm water from coming into contact with contaminated media. Section 10.1 of the AROD indicates that runoff from the Site will be directed to a retention pond on the east end of the ACW property. Storm water will

then flow from the retention pond through an improved storm sewer to Pensacola Bay. Any sediment which collects in the retention pond is not expected to be contaminated, since all contaminated media will be isolated beneath the cap. EPA will negotiate a State Superfund Contract (SSC) in which FDEP agrees to fund and perform the long term maintenance of the cap and drainage features.

Comment: Commenters expressed concern about the potential for recontamination of the PYC ditch should Alternative SD2, Total Removal, be selected. What measures will be taken to evaluate the potential recontamination of the ditch via the discharge of contaminated groundwater?

Response: Although EPA identified Alternative SD4 as its preferred alternative for addressing PYC ditch contamination, information and comments received during the comment period have persuaded EPA to select Alternative SD2 as the selected remedy for the PYC ditch. The rationale for this decision is documented in Section 12.0 of the AROD. In the long-term, EPA's groundwater remedy selected in the OU2 ROD sets cleanup levels for groundwater which are protective of the PYC ditch and Pensacola Bay. The OU2 ROD already requires that surface water and groundwater monitoring be conducted to evaluate the performance of the groundwater remedy. EPA shares the commenters' concern about the potential for recontamination of the ditch. Therefore, to ensure that an accumulation of contaminants does not occur in the restored ditch prior to achieving applicable cleanup goals in the groundwater, Section 10.1 of the AROD requires that periodic sampling of the sediment in the restored ditch be conducted until cleanup levels in the groundwater have been achieved.

Comment: A number of comments were received with respect to Sediment Alternative SD4 expressing concern that contaminated groundwater might flow around or into the culverts on the PYC property and recontaminate the ditch or release contamination into the Bay and Bayou Chico.

Response: As indicated above, EPA's groundwater remedy is designed to ultimately prevent contamination from reaching the PYC ditch and Pensacola Bay. Based on comments received during the comment period, EPA has dropped Alternative SD4 involving the culverts in favor of Alternative SD2 which involves removal of the contaminated sediment and restoration of the PYC ditch.

Comment: Several commenters said that EPA's sampling program in the residential areas near the ACW facility was inadequate, suggesting that both the depth (3 inches) and the areal extent of the sampling were not sufficient. A commenter questioned why samples were not collected at other intervals and analyzed for PAHs or phenols. In documents previously prepared and in EPA's 1998 Fact Sheet, surface soils are defined as soils from 0 to 3 feet below land surface (BLS). It is possible that land surface today may be slightly different than it was 5, 10, 20 or 50 years ago and that high levels of soil contamination are now covered with several inches or feet of topsoil. The commenter is especially concerned that high levels of soil contamination are present below the upper 3 inches in the area of the former drainage ditch and south. As reported in the Sanders Beach Community Area Study, Sample SA-SB-01 was collected from 2 to 3 feet BLS and had very high levels of PAHs. However, the sample collected nearby (SA-SS-4A) from the 0 to 3-inch interval had very low levels

of PAHs. This suggests that what is found at the surface does not necessarily indicate the worst case scenario.

Response: EPA believes that its residential sampling program for the ACW Site has been thorough and comprehensive. The Sanders Beach Area Study Report dated December 1997 documents that EPA's most recent sampling effort addressed all residential properties from the ACW facility south to Pensacola Bay, one block east to E Street, and one block west to M Street. The first phase of the study involved the collection of composite samples from each city block to evaluate whether Site-related contamination had migrated there. Based on these results, a second round of samples were collected from properties in every city block between the ACW facility and West Cypress Street and in the city blocks where composite samples exceeded EPA's soil remedial goals. The use of a 3 inch surface soil sampling depth offers two important advantages with respect to chemicals of concern at the ACW Site: first, both dioxins and cPAHs are easily adsorbed to soil particles, and their deposition in residential areas through storm water runoff would tend to be very shallow; second, because the residential soil cleanup levels for both dioxins and cPAHs are extremely low, the use of a shallower sampling depth (3" vs. the usual 6") reduced the chance for "missing" potentially problematic concentrations of these chemicals through dilution in the sample. EPA recognizes the potential for newer fill material masking the presence of potential contamination, particularly in the surface drainage area immediately south of the former lagoons. To address this concern, a supplemental sampling effort was conducted by the Corps of Engineers in March 1999 which included the collection of samples from the 1 ft., 2 ft., and 3 ft. depths. EPA will use this information to determine whether additional areas exceed EPA's remedial goals.

Comment: A commenter requested that all of the surface and subsurface soil sampling data collected both onsite and off-site be compiled on a single map.

Response: EPA agrees that the soil data upon which this decision is based is located in numerous reports, which is not very user-friendly. Summary maps showing the sample results for dioxins and cPAHs were included in the Sanders Beach Community Area Report. During design, the Corps of Engineers will likely develop a map of the ACW facility indicating contaminated areas which require capping.

Comment: A commenter expressed concern about the health of the youth who live in the ACW area and use Sanders Beach. There appears to be some significant exposure to toxins for children. What postings will be placed on the beach, at the PYC ditch, and what instruction will be formally given to home owners?

Response: Based on the results of the Sanders Beach Area Study, the Florida Department of Health (FDH), under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), has determined that "the soil in the Sanders Beach Community is not a public health threat." Those property owners whose sampling results exceeded EPA's surface soil remedial goals have been notified of EPA's intention to excavate that contamination in connection with the implementation of the selected remedy documented in this AROD. Other residents whose properties

were sampled have also been provided with their sampling results with an indication that no action is necessary to address contamination on their property. The Dye Dispersion and Sediment Sampling Study (Sept. 1991) documented no Site-related contamination in sediment or surface water samples from Pensacola Bay in the vicinity of Sanders Beach, so EPA does not believe that posting of warning signs on the Beach is necessary. EPA and PYC officials discussed the need for warning signs around the drainage ditch until remediation is undertaken, and EPA has purchased the warning signs, but access issues have not yet been resolved between EPA and PYC.

Comment: A commenter indicated that residents are concerned about the use of existing and newly drilled wells for irrigation purposes. These wells are reportedly bringing up "creosote smelling material." How will the use of these wells be terminated and future utilization prevented?

Response: The OU2 ROD called for the plugging and abandonment of private irrigation wells for which consent was given by the owner. Of the 15 irrigation wells identified in the vicinity of the ACW site, 7 wells were already plugged or destroyed, 7 owners refused to give EPA permission to plug their wells, and 1 well was plugged. In addition, the Northwest Florida Water Management District has placed a ban on the installation of new wells in the area.

Comment: Pine Street is unpaved. After a rain, it has a creosote/oily residue on its surface. Pine Street should be paved and adequate storm water utilization facilities be placed. How will EPA arrange for pavement and what storm water collection facilities will be provided?

Response: A contaminated portion of Pine Street (between J and I Streets) will be removed and backfilled as part of the remediation. As indicated earlier, storm water runoff from the Site will be diverted through perimeter drainage channels to a retention pond on the east end of the ACW property. EPA has no current plans to pave the street unless such improvements are necessary to implement the selected remedy.

Comment: A commenter asked about the details of cap construction, including specifics about the barrier cloth, lines, and depth of clay. How will the cap be maintained, and what will be done to prevent roots from disrupting the cap? The commenter felt that a slurry wall or perimeter barrier must be constructed to prevent superficial ground water from flowing through highly contaminated areas of the Site.

Response: Cap construction details are presented in Section 10.1 of this AROD, and a cross-section showing the layers of the cap is provided in Figure 5. As part of the operation and maintenance (O&M) plan for the Site, the cap and the entire ACW property will be mowed as necessary during the growing season, which should prevent the growth of deep rooted plants. However, periodic inspections of the cap will be conducted following construction to evaluate the condition of the cap and drainage features, and a maintenance program will be implemented to prevent growth of trees or other deep-rooted vegetation from penetrating the barriers and to fill in any erosion that may occur. Future use of the Site will be limited to uses that do not require significant ground penetrations. Holes for poles, borings, trenches and other excavations deeper than 6 inches will not

be allowed without a corresponding increase in the thickness of the cap cover. EPA is responsible for O&M for one year following the determination that the remedy is operational and functional. Thereafter, FDEP will be responsible for O&M pursuant to a Superfund State Contract with EPA. The groundwater remedy for the Site was selected in the February 3, 1994 ROD for OU2. No slurry wall was determined to be necessary to address groundwater migration from the Site because the groundwater remedy calls for extraction and recycling of dense non-aqueous phase liquids (DNAPLs) from the aquifer, followed by in-situ and ex-situ groundwater treatment. The DNAPL recovery phase of the groundwater cleanup has been constructed and is in operation. The groundwater treatment phase is expected to begin in 4 to 5 years.

Comment: A citizen has property which appears to be an isolated area of contamination. This citizen has plans to immediately build on this site. What will EPA do to allow building? What financial compensation will be given if the site is unbuildable currently or in the future? Are residents who have plans for ground intrusive or filling activities supposed to wait until soil remediation is complete before conducting these activities? If not, should they contact EPA prior to conducting these activities? Will sidewalks, driveways, gardens, etc. be impacted?

Response: The property in question is a vacant lot with high levels of cPAHs in excess of EPA's remedial goals for residential surface soil, but there was no immediately plausible migration pathway which linked this contamination to the ACW facility. The owner explained that a house which formally stood on the site had a walkway made of creosote-treated blocks. With this information, EPA resampled the property and isolated the partially buried creosote-treated blocks as the source of the high PAH concentrations. Therefore, EPA has notified the owner that the property has been dropped from EPA's remediation plans for the ACW Site. In the more general case, EPA would appreciate notification by the owner of any property that is slated for remediation who has plans for improvements to the property. EPA does not expect existing driveways, sidewalks, or similar improvements to be impacted by the excavation. However, landscape features, including gardens, would likely be disturbed, but would be restored to their original condition to the extent practicable.

Comment: There are a number of sections of old pipe which seem to carry storm water along through the PYC property and Sanders Beach. What is the nature of these pipes? What is the nature of contaminants in the pipes. How will EPA remove and prevent any further contaminant from flowing through these pipes.

Response: Observations by EPA field personnel collecting samples from the PYC ditch and Pensacola Bay indicate the pipe appears to carry storm water from the PYC ditch when the mouth of the ditch is occluded by sand. Sediment and surface water samples in the vicinity of the pipe outfall revealed no Site-related contamination. EPA has no plans to remove the pipe.

Comment: Each property owner must be contacted by EPA and notified of the amount of contaminant on his property and the specific health risks, if any, on that property. That has not been done. How will EPA accomplish this?

Response: EPA has sent letters to each resident whose property was sampled with a copy of the results and a discussion of what the results mean. These letters have been placed in the Administrative Record for the Site.

Comment: The City of Pensacola has not been represented at any of the meetings. EPA is obligated to include the city and county in plans.

Response: EPA met with representatives of the City Engineering Office, the Pensacola Yacht Club, the Corps of Engineers, and Bayou Chico Association to discuss the proposed remedy. In addition, the City Engineering Office provided EPA with comments on the proposed plan. These comments have been addressed in this Responsiveness Summary and in the AROD.

Comment: Engineering practices appear to make a culvert through the PYC ditch very difficult: a pitch of 1/8 to 1/4 inch per foot would appear to be required, causing the outfall of the culvert into the Bay 3 feet below high tide level. Because of littoral flow of sand in this area, the culverts would quickly become occluded. The Bayou Chico Association requests an engineering study of the feasibility of creating a pond or multiple smaller ponds (if PYC is agreeable) of sufficient size where the culverts enter into the PYC ditch, including the area of the artesian springs. The exit from this pond would be culverts three feet higher than the entrance, thus allowing the amount of slope necessary to bring the culverts out above high tide level. The pond would mitigate the PYC ditch, allowing sampling of the water before it went into the bay and removal of contaminated sediment.

Response: Based upon this comment and others received from the City Engineering Office and Pensacola Yacht Club, EPA has changed the selected remedy for the PYC ditch from Alternative SD4 to Alternative SD2. Alternative SD2 involves excavation of all contaminated sediment exceeding EPA's remedial goal for sediment (to an estimated maximum depth of 3 ft.), consolidation of this material on the ACW facility below the surface cap, and backfilling of the ditch with clean fill. Selection of this alternative will address the technical concerns associated with Alternative SD4 raised by Bayou Chico Association and others. EPA believes its Focused Feasibility Study (FFS) represents an adequate development and evaluation of alternatives for the ditch, and no other engineering or feasibility study will be undertaken by EPA. The Corps of Engineers will address all technical issues associated with implementation of the selected remedy during the design.

Comment: There are many instances of cap failure. There are cases where further mobilization of the contaminant plume migrates and causes more widespread contamination after capping and "sign off" of the Site. What mechanism will be available for further remediation if the capping does not prove effective in containing the contamination?

Response: A groundwater monitoring program will be developed and implemented to provide data on the performance of the remedy. EPA will conduct a review of this data and other information every 5 years to ensure that the remedy is operating as designed and continues to protect public health and the environment. Should this review reveal cap failure or other problems, EPA will evaluate alternatives for addressing the problem and either issue an Explanation of Significant Difference or

an Amended Record of Decision to document the necessary changes to the remedy. If fundamental changes to the remedy are needed, EPA will provide an opportunity for public comment on the alternatives being considered and EPA's preferred alternative.

Comment: The Bayou Chico Association indicates that the residents are concerned that the land might revert to the heirs of American Creosote Works, or that some developer may build upon this Site. Who owns the land currently? Who will own the land when EPA signs off on the project? What deed restrictions will be in place to prevent any future development of this Site?

Response: County records list American Creosote Works, Inc. as the current property owner. American Creosote Works, Inc., filed for bankruptcy in 1981. The U.S. District Court for the Northern District of Florida has entered a Consent Decree between American Creosote Works, Inc., their mortgage company, and EPA in which EPA was granted access to conduct the cleanup of the facility and half the proceeds from any sale or lease of the property. Should a developer or other entity desire to purchase or develop the property, they would have to negotiate a Prospective Purchase Agreement with EPA in which memorialize the restrictions to future use and the maintenance requirements associated with the cap and drainage features.

Comment: During the public hearing, EPA's project manager referred to the PYC ditch as the source of contamination to the Bay. We request the record be corrected to reflect that while the drainage ditch, referred to within the documentation as the "PYC ditch," may have been the conduit of contamination from the ACW Site to Pensacola, Bay, it is not the source of the pollution.

Response: While EPA agrees that the original source which resulted in contamination of the PYC ditch is the ACW facility, the contaminated sediment now present in the ditch represents a potential source of contamination to Pensacola Bay if not addressed by EPA's selected remedy.

Comment: When dioxin was found, what health warnings were issued by EPA to residents and the general public? What warnings should be issued to members of PYC, the employees of PYC, and the guests of PYC? We request that EPA provide PYC with the appropriate wording for such warnings to issue to members, employees, and guests.

Response: EPA's sampling data from the Sanders Beach Community Area Study indicates only one small area along Pine Street between I and J Streets which exceeds EPA dioxin cleanup level for soil in residential areas. The dioxin level present in this area represents a chronic (long-term) health threat. EPA notified the community of this and other areas of contamination in its April 1998 Proposed Plan Fact Sheet, but no warnings were deemed to be necessary. Dioxin levels on the PYC property, in both surface soil and in the PYC ditch, do not exceed EPA's residential cleanup criteria, therefore, no health warnings are necessary. EPA does recommend that PYC members, employees, and guests avoid contact with sediment from the ditch, which is contaminated with high levels of PAHs.

Comment: Since there is considerable scientific controversy over appropriate remedial levels against which contamination is evaluated for removal, we request that Dr. Gilman Veith of EPA (Duluth, Minnesota) or his staff review all analytical data generated to date on this project for accuracy in the selection of the remedial level. We request that the cleanup level be confirmed or corrected, that the appropriate protective health measures be described for the public, the membership, guests, and employees of PYC based on the most stringent standard and proximity to the Site (PYC ditch), and operational measures to be exercised by PYC prior to and during operation of the cleanup activity be identified and forwarded to PYC.

Response: EPA's Proposed Plan and this AROD have undergone an extensive peer review within EPA by toxicological and risk professionals in both Region 4 and Headquarters. The remedy reflects EPA's most current policy and guidance with respect to dioxin cleanup levels. In addition, EPA's decision document reflects the review and input of FDEP program and technical review staff, the U.S. Fish & Wildlife Service, the National Oceanic and Atmospheric Administration, and the Florida Department of Health. Therefore, no additional level of review within EPA is deemed to be necessary. EPA believes the Proposed Plan Fact Sheet, EPA's presentation and question and answer session at the public meeting held on May 14, 1998, the Administrative Record for the Site, and this AROD and Responsiveness Summary have adequately described EPA's basis for the cleanup levels at the Site and the rationale for the selected remedy. EPA will consult with PYC during the design and construction to coordinate our activities with PYC activities and events, making every effort to minimize any adverse impact on normal club operations.

Comment: The feasibility study does not include provision to remove the contamination from the northeast quadrant of PYC property. What are the lateral and vertical limits of this contamination? By what means, and in what time frame, does EPA plan to remove the contamination? Since the extent of contamination has not been defined even after seventeen years as an NPL site, we would like to express our dissatisfaction with the overall assessment of the limits of contamination.

Response: The northeast quadrant of the PYC was identified as an area requiring remediation on the basis of a composite surface soil sample collected during the Sanders Beach Area Study. The area to be excavated is depicted in property tax maps and records as Block 190 of the property referenced as 00-OS-00-9080-006-188. The Corps of Engineers will precisely identify the lateral limits of excavation in engineering drawings developed during the design. The initial depth of excavation will be 1 foot, after which confirmatory sampling will be conducted to verify that no soil remaining at the 1 foot level exceeds EPA's remedial goals. Excavation will likely be done using a backhoe, trackhoe, or similar earth-moving equipment. Based on the current projections, construction would likely begin in the late Spring or early Summer of 2000. EPA believes that the Sanders Beach Area Study represents a very thorough and comprehensive assessment of the extent of contamination in surface soil in areas potentially affected by the ACW Site. EPA identified the areas requiring remediation in Figure 2 of the April 1998 Proposed Plan Fact Sheet. A more precise delineation of the Area of Contamination requiring remediation is presented in Figure 3 of this AROD.

Comment: The PYC indicated that should a jurisdictional wetland be determined to be present, the installation of a culvert could not be performed without mitigation by EPA. PYC specifically denies further use of its property as a mitigation site.

Response: As indicated in EPA's response to a previous comment, EPA has changed its selected remedy for the PYC ditch to Alternative SD2, which involves excavation of contaminated sediment and restoration of the ditch. In this instance, the restoration of the ditch would itself represent a one for one functional replacement of the wetlands destroyed by EPA's remedial action. EPA does not anticipate the use of any additional land area on the PYC to address mitigation requirements other than what is currently occupied by the ditch.

Comment: Does EPA recommend that PYC suspend rental of the private house located at the entrance to our property now or during the construction phases which will take place on PYC property?

Response: EPA believes that neither existing contamination on the PYC property nor the proposed construction activities should adversely impact area residents. As indicated in the response to previous comments, dust suppression will be utilized to minimize the migration of airborne contaminants, and work zone delineation and access controls will be used to isolate contaminated areas during invasive activities. In addition, if necessary, perimeter air monitoring will be conducted to ensure protection of nearby residents.

Comment: Does EPA require curtailment of any of the functions which currently exist at PYC, such as use of the swimming pool, tennis courts, boat slips, or grounds?

Response: EPA does not anticipate any significant disruption of PYC use of the swimming pool, tennis courts, or boat slips. However, during the excavation of the northeast portion of the property and excavation and restoration of the drainage ditch, these areas will be designated as an "Exclusion Zones," and access will be restricted to individuals with proper training and protective clothing. Improvements to the mouth of the ditch may be necessary to address the significant erosion that has occurred in this area. Since these improvements have not yet been designed, the potential disruption in the vicinity of the Marina cannot be determined at this time. However, EPA will coordinate the design and construction of these improvements with the PYC and attempt to minimize any disruption to PYC activities.

Comment: Please correct Figure 2 of the Fact Sheet to eliminate the dotted line street configuration shown on the PYC property. Such a configuration stands for road access in civil engineering criteria which could cause a potential contract bidder to mistakenly think there is an access right-of-way where non exists. What will be the route of access to, or through, PYC property by contractors or EPA personnel?

Response: The street configuration shown on PYC property in the Proposed Plan will not be shown on design documents. Final routes of access cannot be fully determined until the design process is underway, but it is EPA's intent to try to limit access to affected areas and the area east of the ditch.

Comment: Is it potentially possible to clean and regrade the drainage ditch and direct future drainage flows around PYC property by realigning a culvert on the K Street easement?

Response: Because of the large volume capacity of the storm water culverts that drain into the PYC ditch, the cost and technical and administrative feasibility of rerouting storm water to the K Street right-of-way make this option difficult to justify under the Superfund Program.

Comment: What is the legal disposition of the property, specific to PYC, once cleanup of the contaminated soil is concluded? What public entity will maintain the property? What deed restriction will be required? How does the City of Pensacola drainage easement affect these requirements?

Response: With the exception of a small parcel immediately adjacent to the former lagoons, the remedial action will have no effect on property ownership. Based on the remedial goals established for surface soil and sediment at the PYC property, there will be no restrictions on the use of the property from a human health standpoint. With the selection of Alternative SD2, any actions which may adversely affect the newly restored wetlands (if any) would be subject to the regulatory requirements associated with wetlands. No deed restrictions will be necessary for the PYC property either before or after remedy implementation. However, EPA requests that PYC exercise due care in the use of contaminated portions of the property prior to implementation of the remedy. The City of Pensacola will have to be consulted concerning their drainage easement.

Comment: Has any data, transmittals, or information related to the contamination by ACW been withheld from the membership of PYC under a "confidential" classification?

Response: No.

Comment: Does EPA intend to issue an order for PYC to cease operation of its facilities, or any part thereof, during the course of construction?

Response: EPA has no intention of ordering PYC to cease operations during construction.

Comment: PYC requests a formal release to construct around, or above, the culvert should Alternative SD4 prevail.

Response: As indicated in earlier responses, EPA has changed the selected remedy to Alternative SD2, which will leave the ditch in place, but allow for its unrestricted use from a human health standpoint.

Comment: PYC requests that the areas of health hazard concerns be appropriately marked by EPA. Should Alternatives SD2 or SD4 prevail, the most stringent health standard should be used to designate contamination and thereby resultant cleanup. Should the standard become even more restrictive in the future, it would be obligatory to EPA to alleviate the condition to the more stringent standard.

Response: The levels of contamination present on the PYC property generally represent a chronic (long-term) threat to public health, so their delineation a year before construction begins is not necessary. The remedial goals for soil on the PYC property are the same as those for residential areas because of previous indications from PYC that portions of the property might be developed in the future for residential use. The remedial goal for sediment of 0.655 mg/kg (ppm) for carcinogenic PAHs is based on ecological concerns. However, EPA risk calculations derived based on the assumption that a child age 7 to 16 (the most likely target population) would be exposed to the contaminated sediment in the ditch 100 days per year (2 days/week, 50 weeks per year) demonstrate that this level is protective for human health. EPA believes these remedial goals are protective for both current and potential future uses of the PYC property. EPA will conduct a review every 5 years following initiation of construction to ensure that these levels remain protective and to evaluate the performance of the selected remedy.

Comment: PYC challenges the differences in the public notice, which is legally binding, and the fact sheet, which is not legally binding. Specifically, we refer to wording of Alternative SD2 of the legal notice. All documents in the repository reflect the accuracy of this alternative. The State of Florida and NOAA have responded with support for this alternative. However, the Fact Sheet has added the caveat of removal to mean to a 3 foot depth--not total removal as stated in the legal notice. We request the Fact Sheet be corrected to reflect the Legal Notice.

Response: EPA regrets the discrepancy between the Proposed Plan Fact Sheet and the Public Notice. The Proposed Plan is correct in placing a limit on the extent of sediment excavation. In general, EPA does not expect sediment contamination in the ditch to extend as deep as 3 feet. However, because the ditch intersects the underlying aquifer, EPA is concerned that excavation might continue indefinitely once the aquifer material is encountered, since the groundwater is known to be contaminated in this area. EPA notes that the Focused Feasibility Study (FFS) assumed a 3-foot excavation depth (see Table 5-1 of the FFS) in the cost estimate for Alternative SD2.

Comment: The issuance of a Technical Assistance Grant (TAG) to Bayou Chico Association as a pubic information vehicle does not preclude the statutory responsibility of EPA under CERCLA, EPCRA, RCRA, or OSHA 1910 to PYC as an affected party.

Response: EPA agrees. The purpose of the TAG is to provide funds for affected communities to hire independent technical experts to help interpret data and reports and provide input to EPA with respect to a particular Superfund site. The TAG does not affect EPA's other public participation responsibilities under CERCLA Section 117.

Comment: We request that all activity on PYC property be performed expeditiously and with minimal disruption to the trees which line the drainage area and abound on PYC property. Trees, which include multiple species of oaks and pecans, are controlled by the City of Pensacola Tree Ordinance found in the Pensacola Land Development Code. In the engineering design phase it would be appropriate to consider a series of small cascade ponds, instead of a streamlined ditch, through the affected PYC ditch in order to preserve as many of the protected trees as possible. This would provide an additional measure of catchment for rogue contamination.

Response: Because of the invasive nature of the excavation in the ditch, damage or destruction of some trees is expected. However, EPA will take reasonable measures to minimize the disruption or damage to trees on the PYC property to the extent practicable. Once access permission is granted by PYC, the Corps of Engineers plans to conduct a tree survey on the PYC property to identify trees which are protected by the local ordinance and assess any potential for damage or destruction of these trees. EPA will share this information with PYC as it becomes available. EPA would be interested in getting more information about the cascade concept from PYC during the design.

Comment: It would be prudent to consider that a series of cross-check sampling efforts be performed after initial remediation to monitor performance of the overall effort over time. Please provide us with a schedule of such a sampling effort affecting PYC.

Response: EPA will conduct confirmatory sampling at the bottom excavated areas to verify that the applicable remedial goals have been met. In addition, a periodic monitoring program will be implemented to evaluate the sediment and surface water in the PYC ditch for potential impacts associated with contaminated groundwater entering the ditch. Although the monitoring schedule cannot be delineated at this time, EPA will coordinate these sampling events with PYC as the project schedule becomes apparent.

Comment: The City of Pensacola has an existing storm sewer system that discharges into the drainage ditch and our primary concern is that the hydraulic efficiency is not adversely impacted. There presently are three 24" corrugated metal pipes that discharge into the ditch. The length of the drainage ditch is approximately 950 feet before it discharges into Pensacola Bay.

Response: Based on this and other comments, EPA has changed its selected remedy for the ditch to Alternative SD2, which involves removal of contaminated sediment and restoration of the ditch. This alternative should result in a very similar hydraulic efficiency as is currently provided by the ditch.

Comment: In evaluating alternatives SD2 and SD3, it appears that alternative SD2 is preferred over SD3 in that considerably more contaminated material is initially removed and SD2 does not require the regular maintenance associated with the ditch liner proposed for SD3. Furthermore, SD2 would allow the establishment of vegetation along the ditch slopes thereby improving an existing wetland by allowing the sediment from storm water runoff to settle and providing some additional treatment.

Response: EPA agrees and has selected Alternative SD2 as the remedy for the PYC ditch.

Comment: Extending the existing storm sewer as recommended in SD4 would require the construction of a small retention area where the pipe enters Pensacola Bay. The existing bottom profile is extremely flat and it will be necessary to construct a rip rap barrier to prevent the pipe from filling in with sediment due to tidal action. Furthermore, any treatment of storm water would be eliminated with the extension of the storm sewer. Alternative SD4 could only be justified if it is beneficial to the future land use of this area. It will have additional maintenance requirements associated with it and does not provide treatment of storm water runoff as is provided with Alternative SD2. I therefore encourage you to evaluate these facts before a final decision is made.

Response: EPA is persuaded that the problems related to the construction and on-going maintenance of the culverts and the benefits of leaving the channel in place make Alternative SD2 a better choice for addressing sediment contamination in the PYC ditch.

Comment: The extent of subsurface soil contamination has not been defined. This is of particular concern in the neighborhood south of the ACW Site and the PYC ditch. What does EPA propose to do regarding the future delineation of subsurface soil contamination?

Response: Under EPA's direction, the Corps of Engineers collected additional subsurface soil samples from properties south of the ACW facility in the former drainage pathway. Once the analytical results are in from this supplemental sampling, EPA will identify the additional properties which need to be excavated based on EPA's remedial goals for subsurface soil.

Comment: Several residents have complained that storm water runoff in the neighborhood has an oily sheen. They believe that the sheen is associated with the ACW Site. Given the contaminant levels in the area, this is a possibility. E&E recommends that EPA establish baseline contaminant levels for storm water runoff and compare this data to data from other unimpacted areas. If the levels in the neighborhood are higher than normal, as the residents suspect, EPA should monitor the storm water runoff contaminant levels in the neighborhood to see if they decline after the proposed soil remedy is implemented. If the levels do not decline, some additional soil hot spots, associated with the ACW Site, may exist in the neighborhood and will need to be remediated.

Response: EPA believes that any significant migration of contamination from the ACW facility into adjacent residential areas associated with storm water runoff would have likely occurred while the plant was operating and the wastewater lagoons were extant. Any areas which exceed residential soil cleanup levels will be addressed by excavation and consolidation of this material beneath the cap on the ACW facility. Since the results from the Sanders Beach Area Study indicated only a few areas which presented a long-term threat to residents (primarily along drainage pathways from the Site), EPA believes that storm water sampling at this time would provide little additional information concerning the proposed remedy. EPA does plan to collect periodic surface water samples from the retention pond following construction of the surface cap to monitor the effectiveness of the remedy.

Comment: Recently (June 1998) during maintenance dredging permitting efforts by the PYC, FDEP expressed concern about potential dioxin, PAH, and phenol contamination of sediments in Bayou Chico that may have resulted from activities at the ACW Site. Samples from the Bayou and Pensacola Bay have been analyzed for PAHs but not dioxins. Is sediment contamination in the Bayou a problem? If not, why is FDEP concerned?

Response: Sampling results reported in the Dye Dispersion and Sediment Sampling Study did not indicate a problem in Bayou Chico and Pensacola Bay. Sediment contamination appears to be limited to the PYC ditch and its delta. Although no sediment samples from the bayou or the bay were analyzed for dioxins, the Phase IV RI report documents very low dioxin levels in the PYC ditch, ranging from 0.069 to 5.0 ng/kg (parts per trillion). Since these dioxin levels are below levels of concern for human or ecological receptors, EPA does not believe that sampling for dioxin in the bay or bayou is warranted. EPA understands the concern on the part of the FDEP district office about the potential for impacts to Pensacola Bay and Bayou Chico by the ACW Site because of the well documented surface water migration pathway from the former Site lagoons to these bodies of water. However, EPA's available data indicates that no Site-related impacts to the bay or bayou have occurred, and the remedies selected in this AROD and the OU2 ROD for groundwater will prevent any potential future impacts.

Comment: Since limited soil data exists deeper than 3 inches BLS, it is very difficult to assess the risks to residents involved in ground-intrusive activities such as gardening.

Response: The dermal and ingestion exposure pathway evaluated in the 1989 Baseline Risk Assessment considered the potential for exposure to contaminated soil during outdoor activities such as playing or gardening. As indicated in Section 7.1.4 of this AROD, the risks associated with residential areas fell within EPA's cancer risk range.

Comment: The community has been encouraged to consider beneficial ways to utilize the ACW property once it is capped. Prior to designing the cap, EPA should discuss beneficial use options with the community at public hearings.

Response: Future use of the Site will be limited to uses that do not require significant ground penetrations. Holes for poles, borings, trenches and other excavations deeper than 6 inches will not be allowed without a corresponding increase in the thickness of the cap cover. Ground penetration at any depth should cease immediately if the nonwoven geotextile is encountered during excavation. Potential future uses that might not require significant ground penetration include walking, jogging, and bicycle paths, pavement for parking, and light-weight slab-on-grade construction. Installation of lighting or other utilities needed for these uses may not be possible if not designed for and possibly constructed in conjunction with the cap. Precautions possibly including placement of additional fill would be required during construction. The grades required for good drainage will make the Site undesirable for ball or soccer fields. Construction of heavily loaded structures will be impracticable over the cap because of the possibility of settlement and the need for deeper foundations. A public hearing would be of little benefit unless a concrete proposal for use of the property was presented and

underwritten by a sponsoring public or private entity. EPA has received no such proposal for the re-use of the ACW Site.

Comment: Phase I "Capture & Containment" is fine, but we must also be on line for Phase II - "neutralization" - when can we expect Phase II?

Response: Again, this comment appears to relate to the groundwater remedy. EPA estimates that the DNAPL recovery system will operate for 4 to 5 years, at which time the dissolved-phase recovery and treatment system (Phase 2) will begin.

Comment: Do not expose the east end of the property to the contamination of the southwest end by storing toxic materials there; keep the worst materials where they are - on that end.

Response: EPA does not intend to stockpile contaminated material on the east end of the ACW facility property. Rather, this area will be used for a stormwater retention pond to manage runoff from the new surface cap.

Comment: How frequently will EPA monitor our individual neighborhood properties after Phase I is completed?

Response: Other than confirmation samples in properties which are excavated, EPA does not expect to collect additional soil samples in the neighborhood.

Comment: At a meeting on 6/18/98 I voiced my concern over how soil samples were taken and two properties, one of which is slightly more than 100 ft. from me is showing a large amount of toxicity. I would hope maybe some additional test on the affected property might show that property is not as bad as shown (8507 ppb). Is it possible to get some additional testing? I am glad to hear work is to start to reclaim what creosote that can be pumped up from the Site.

Response: The property near you with the high PAH levels was in fact resampled to determine whether the source of the PAHs was really the ACW facility. Based on visual observations and the sampling results, EPA has determined that this property was not contaminated by the ACW Site, but the high PAH levels are reflective of the presence of partially buried creosote-treated blocks used in a walkway on the property.

Comment: As residents of the Sanders Beach area, we are very interested in the cleanup efforts of the EPA. We would like to have as much done as possible, including having the 190 million or so gallons of creosote that is in the ground now pumped out.

Response: The OU2 ROD for groundwater addresses the treatment of contaminated groundwater at the ACW Site. The first phase of this groundwater remedy, DNAPL recovery and recycling, is already underway. Once Phase 2 of the groundwater remedy begins, which involves treatment of

contaminated groundwater, EPA estimates that closer to 150 million gallons of *water* will ultimately require treatment.

Comment: EPA proposes to remediate from midway between G and H Streets back to Barrancas Avenue. This would involve about 1,200 linear feet of 100-foot wide right-of-way (about 3 acres) owned by Burlington Northern Santa Fe. This old right-of-way was at the fringe of the contamination and up gradient and should be safe to develop as non-residential property. We oppose any alternative, such as capping, that would not allow for some use of our property.

Response: EPA's data indicates that surface soil contamination exceeding EPA's industrial remedial goals for the Site exists in the right-of-way in question. Based on EPA's evaluation of the alternatives considered for addressing this and other contaminated areas of the ACW facility, the capping alternative represents the best balance among the nine NCP selection criteria, including cost effectiveness. Some limited use of these portions of the property may be possible, as indicated in the response to an earlier comment.

Comment: Having resided at this address for over 60 years; having raised a family of children and grandchildren to the 4th generation; having had a garden for many, many years and used the produce thereof as well as fruit from trees, berries and pecans, all without harm, we do not agree that the contaminants found at the creosote plant are harmful to humans, animals or vegetation. This area should be left alone. Other residents expressed similar sentiments that they had lived in the area for many years without any negative impact.

Response: EPA's risk assessment and recent sampling data confirm that the majority of the residential areas are safe, and only a few properties in the residential areas present an unacceptable long-term risk to residents. However, the risk assessment also documents that contamination on the ACW facility itself poses an unacceptable threat to potential trespassers. Therefore, the Superfund Law requires that EPA take action to address this unacceptable risk.

Comment: I moved in this area on M Street in December and there are smells like there has been contamination. I'm not referring to the smell from the sewage plant located down near the Judicial Building. I am referring to exactly the area located on the map labeled "Figure 1" Site Map, from right near the Yacht Club down M St., down Barrancas to Main Street all within that area is a horrible stench. I would like you to comment as soon as possible. I want to protect my family's health.

Response: EPA believes the stench you refer to is probably not emanating from the ACW Site for two reasons: First, the type of waste material present at the Site is contaminated soil and debris, which is not likely to produce a significant odor, since the contaminants are bound to the soil; second, the primary contaminants at the ACW Site (PAHs, dioxins, PCP) are semi-volatile compounds, which means they are not likely to evaporate or vaporize from the Site. The source of the stench may be the nearby Reichhold Chemical plant or other industrial operations along Bayou Chico.

Comment: Will this action completely clean up the Site?

Response: The selected remedy presented in this AROD represents the second and final response action EPA plans to take to address contamination related to the ACW Site. The first action, known as Operable Unit 2, is the groundwater remedy presented in the ROD dated February 3, 1994. The second action presented in this AROD addresses the remaining contamination at the Site associated with soil, sediment, and the stabilized sludge from the former lagoons. Once these response actions are completed, the Site will be "completely cleaned up."

Comment: What is the ultimate cost?

Response: The total cost of the selected remedy in this AROD is $1,549,400.

Comment: Why the cheaper route?

Response: EPA's rationale for selection of the capping alternative (Alternative SS2) hinges on more than just cost effectiveness. Alternative SS2 ranks the highest against the other alternatives with respect to short-term effectiveness, implementability, and cost. In addition, since the ACW Site was listed on the NPL in 1983 and this AROD represents the third attempt in selecting a remedy for source control at the Site, EPA believes that community sentiment runs against the selection of an innovative technology (such as thermal desorption) or other type of treatment alternative requiring extensive treatability or performance testing which could slow actual implementation. Finally, EPA believes that the stabilization treatment of the sludge in the former lagoons during EPA's earlier response actions has been effective in addressing the mobility of contaminants associated with these principle threat wastes.

Comment: If incinerated, how much emissions and toxic residue is left.

Response: For incineration actions, EPA sets a goal of reduction of dioxin-contaminated wastes by 99.9999% destruction removal efficiently (DRE) and all other wastes by 99.99% DRE. Emissions are reduced or eliminated through pollution control equipment on the incinerator stack, with the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) serving as the applicable performance standards.

Comment: Why not destroy the toxic waste at this time? It will have to be destroyed someday anyway. Is there currently technology that will destroy all of the toxic waste? If so, are there any emissions? If there were technology which would destroy all of the toxic waste without any emissions, would EPA utilize the technology?

Response: EPA evaluated a number of treatment technologies which are capable of destroying or removing the contaminants at the ACW Site, including thermal desorption, incineration, and in situ vitrification. Each of these technologies are likely to produce emissions, but these emissions could be controlled by currently available air pollution control equipment. Based on its evaluation of these

alternatives and the capping alternative, EPA determined that the capping alternative provided adequate protection of human health and the environment at a much lower cost. EPA believes that the cap can be maintained in order to ensure that it remains protective for a long period of time. EPA will continue to conduct a review every 5 years to evaluate the protectiveness of the remedy. Should EPA determine that the remedy is not longer protective, additional measures will be undertaken to restore the remedy to an adequate level of protection.

Comment: Why start cleanup of the groundwater and leave the overlying surface soil capped?

Response: EPA believes that the earlier stabilization of the sludge in the former lagoons combined with the capping of this material and contaminated soil at the Site will prevent any significant leaching of contaminants from the soil into the groundwater. EPA will conduct periodic groundwater monitoring to evaluate the effectiveness of the remedy.

Comment: EPA should not waste another dime to remediate the ACW Site. Moments after the appearance of any remediation equipment, be prepared to contend with a number of ill residents who will demand that the EPA buy their homes and pay for relocation expenses. Study the Escambia Treating Co. imbroglio. There was no problem until EPA showed up in space suits and starting digging.

Response: EPA's risk assessment documents unacceptable risks associated with the ACW Site which by law require action by EPA. EPA believes the selected remedy in the AROD represents the most appropriate option for addressing the risk posed by the Site. To date, EPA has not received a mass demand for relocation of residents near the ACW Site.

Comment: A commenter contended that EPA's approach to remediating groundwater masks the actual results because samples were rarely taken during and after remediation. The commenter further contends that the extraction of groundwater upsets the equilibrium established over a period of 90 years, resulting in a likely increase of contaminant levels. A number of other issues were raised about the effectiveness of EPA's groundwater remedy by citing EPA reports from another Superfund site in the Pensacola area.

Response: Since this comment relates to EPA's groundwater remedy for the ACW Site, EPA refers the commenter to the responsiveness summary for the OU2 ROD dated February 3, 1994 for a response to these comments.

Comment: A commenter indicated that he thought EPA was going to go down and pump all the material out and burn that material and dispose of it onsite. In particular, the commenter thought the deep contamination down to seventy feet would be addressed this way.

Response: The commenter was referring to the DNAPL recovery operation, which is the first phase of EPA's groundwater remedy for the Site. The DNAPL recovery system was constructed last

summer, and extraction wells are currently withdrawing DNAPL from the subsurface. This material is being sent to a cement kiln in North Carolina for burning as a fuel.

Comment: A resident expressed concern that EPA's proposed cap would destroy the wooded areas on the eastern portion of the ACW property.

Response: EPA's initial response during the public meeting suggested that this area of the ACW property would not be disturbed by the selected remedy. However, further development of the alternative and discussions with the Corps of Engineers and the City of Pensacola indicate that this area will be needed for construction of a retention pond to manage storm water runoff form the surface cap and perimeter drainage ditches. Construction of the retention pond will necessitate the removal of all trees and brush in this area.

Comment: A commenter recommended using the ACW Site for a container storage terminal.

Response: EPA has been and continues to be open to accommodating possible productive uses of the ACW facility following cleanup. However, no such proposals have been sponsored and underwritten by either public or private entities. EPA has no mechanism available to promote or pay for a commercial use of the property. The conceptualization and funding for such a venture would have to come from business or public interests within the community.

Comment: A commenter expressed concern that when the sediment was excavated from the PYC ditch, contaminants would become airborne, causing a problem for local residents.

Response: Since sediment is saturated with water and the contaminants are considered semi-volatile, EPA does not expect an air emissions problem during this particular activity. However, work zone air monitoring will be conducted to ensure protection of the workers, and, if determined to be necessary during design, perimeter air monitoring will be conducted to protect area residents.

Comment: The Site has been here for over 90 years and it seems that some equilibrium has been established regarding the contaminants. It seems that EPA will exacerbate the situation by taking the proposed action. What is your benchmark for determining whether you've improved the situation or made the situation worse?

Response: EPA has established cleanup levels for soil and groundwater which serve as benchmarks for evaluating cleanup level effectiveness. EPA believes that the removal, stabilization, or containment of contamination at the Site will reduce or eliminate risks associated with these contaminants.

Comment: A commenter raised concern that EPA does not monitor groundwater contamination until five years after the cleanup. How often is the groundwater monitored? Another commenter was concerned that if there was a problem, EPA would not know about it for five years.

Response: EPA has already initiated a groundwater monitoring program in conjunction with the DNAPL recovery system which is currently operating. This monitoring program will be augmented to include additional wells once the source control remedy is in place, and additional monitor wells are likely to be added once full scale pumping and treating of the groundwater begins in 4 to 5 years. Groundwater samples are currently being collected every 3 months (quarterly). However, the frequency may drop to every 6 months as time goes on. EPA will conduct an ongoing evaluation of groundwater data (not just every 5 years) to ensure that the groundwater and source control remedy remain protective and to make adjustments in the DNAPL and/or groundwater systems to improve performance.

Comment: A commenter expressed concern that EPA would keep digging in the PYC drainage ditch "to the parking lot".

Response: No. EPA expects the lateral limit
has set a limit of 3 ft. on the excavation depth (in all directions) for the PYC ditch.

Comment: A number of residents expressed concern that they had not received data from EPA's residential sampling efforts.

Response: Following the public meeting, EPA forwarded the data to individuals whose property had been sampled .

Comment: Some residents argued that contaminants in the PYC ditch were not a problem, indicating that EPA has not been able to document any cases of cancer.

Response: EPA's sediment sampling results and risk assessment indicate that sediment contamination in the ditch poses a threat both to human health (particularly children age 7 to 16) and the environment.

Comment: A commenter asked if a health study had been done of residents living immediately around the Site to evaluate if they had cancer.

Response: The Florida Department of Health (FDH) evaluated the soil sampling data from the Sanders Beach Community Area Study an concluded that the soil in the neighborhood is not a health threat, with the exception of the areas slated for excavation. FDH also indicated that nationwide, one out of every three people (33%) will get some kind of cancer, and one out of every four (25%) will die from cancer. Based on this information, FDH determined that a public health study was not warranted for the ACW Site.

Comment: A commenter expressed concern that the Site might be developed for residential property in the future.

Response: The future use of the ACW property will be restricted by EPA. The bankrupt American Creosote Works, Inc. remains the owner of record of the ACW property. However, EPA negotiated a Consent Decree with ACW and their mortgage holder which was entered by the U.S. District Court that grants EPA 50% of the proceeds of the sale of the ACW property. Should any developer attempt to acquire the ACW property, he would have to negotiate a prospective purchaser agreement with EPA.

Comment: A commenter asked who owns the building which used to be the office complex for the ACW company. The commenter expressed frustration that the ACW company or someone associated with it made (or is still making money) and the residents who are left to deal with the Site.

Response: The property in question is owned in part by a former officer of the ACW facility. However, it is not EPA's policy to pursue corporate officers for costs associated with a Superfund cleanup.

Comment: A commenter asked why EPA was relocating residents from as far away as 2 or 3 blocks because of contamination from the Escambia site on Palafox, but residents living right next to the ACW Site were determined not to have contamination. EPA says the condominium property is contaminated, and the PYC ditch is contaminated, but my property, which is in the same line as that ditch, is not contaminated.

Response: The Escambia Treating Company site was selected by EPA as a National Relocation Evaluation Pilot project. The Pilot was designed to evaluate the use of relocation as a possible solution to contamination problems at a Superfund site. Although the types of contamination are similar at the ACW and Escambia sites, the levels of contamination at the Escambia site are generally higher. This is not to say that every property near the ACW Site is lower than every property that is being addressed under the Escambia pilot. However, EPA has concluded that, with the exception of the proposed excavation areas, the risks in residential areas fall within EPA's range of acceptable risks. With respect to the migration of contaminants, historical information indicates that a low area existed where the condominiums are now along which discharges from the ACW lagoons would flow, eventually entering the PYC ditch. When the condominiums were built, clean fill was placed in this area, and recent surface soil samples indicate little or no surface contamination. However, the subsurface soil in this area appears to be heavily contaminated. In order to address the commenter's concern, EPA collected additional subsurface soil samples within the entire city block know as the "Condominium Block" to determine if the drainage area was wider than originally thought. The results of this additional sampling will be used during the design to identify additional properties, if any, which require excavation based on EPA's subsurface soil remedial goals.

Comment: It seems EPA is doing things backwards. After 17 years, EPA has decided to shut the wells off that the residents have used all this time. If the water was contaminated, why didn't you shut the wells down 17 years ago?

Response: First, it is important to understand that the wells in question are irrigation wells, and not drinking water wells. The residents in the area use city water for drinking, cooking, washing, etc. EPA's ROD for OU2 called for the plugging of these private irrigation wells not necessarily because they were already contaminated, but because of the potential for them to become contaminated. In addition, EPA was concerned that the operation of these wells could potentially interfere with EPA's groundwater cleanup plan.

4.0 Remedial Design/Remedial Action (RD/RA) Concerns

Comment: How will the traffic congestion resulting from the work on Barrancas affect EPA's ability to implement the remedy?

Response: As of the writing of this Responsiveness Summary, the road work on Barrancas has been completed, and the resulting traffic congestion along Cypress and L Streets has subsided. Construction at the Site is not scheduled to begin until the Spring or Summer of 2000. EPA expects the majority of the Site construction traffic to enter the Site from Main Street, Barrancas, or Gimble to the north. However, trucks carrying contaminated material from the Yacht Club and residential remediation areas will probably be routed north on L Street. EPA will conduct an informational meeting prior to initiating construction to discuss the traffic plans and other aspects of the construction effort.

Comment: A commenter expressed concern about the management of storm water during construction or other times when soil is disturbed.

Response: As a minimum, a silt fence will be required during construction. Additional measures will be considered prior to start of construction, such as a temporary earthfill barrier surrounding the perimeter of the construction site and/or a swale within the barrier to retain all storm water runoff prior to releasing storm water. A temporary lined retention pond will be part of the design to retain and occasionally test (if needed) storm water prior to releasing it.

Comment: Several commenters asked what measures would be taken to protect residents from exposure to dust, airborne contamination, and water (runoff?) during construction. Should pregnant women be warned to avoid the Site during the construction?

Response: One important advantage of the selected remedy is that minimal disturbance of contaminated material on the ACW facility is anticipated. However, the construction contractor will be required to use some sort of dust suppression (most likely water) as necessary to control dust within the Site. The excavation of contaminated areas in residential areas and the Yacht Club will be undertaken in such a manner as to minimize the generation of dust. To address storm water runoff, a silt fence will be required during construction. Additional measures will be considered prior to start of construction, such as a temporary earthfill barrier surrounding the perimeter of the construction site and/or a swale within the barrier to retain all storm water runoff prior to releasing storm water. A temporary lined retention pond will be part of the design to retain and occasionally

test (if needed) storm water prior to releasing it. If determined to be necessary during design, a perimeter air monitoring program will be instituted during construction. No one, including pregnant women, who is not properly trained should enter the Site. Only workers with the appropriate OSHA training and medical monitoring will be allowed to enter contaminated areas of the Site. Contaminated areas will be clearly delineated as "Exclusion Zones," and access will be restricted through the use of a "Contamination Reduction Corridor." At the PYC and other private properties, similar work zone delineations and access controls will be used to protect private citizens.

Comment: All dirt used in fill operations must be of the type of soil that is in the immediate area. No red dirt or sand should be allowed. How will EPA assure that appropriate fill material is used?

Response: The use of a geosynthetic clay liner in place of the usual clay layer (see Section 10.1 of the AROD) will allow use of fill materials similar to the native soil and minimize the use of clay. Since the use of red dirt or red sand appears to be primarily an aesthetic concern, EPA will instruct the Corps of Engineers to incorporate into the specifications a restriction on the use of such materials to the extent practicable.

Comment: How long will the operation of PYC be impaired by this project? Is it possible to avoid the May to August window of PYC activities?

Response: Other than temporarily impacting the use of the northeast quadrant and the areas east of the ditch, EPA does not expect the construction effort to impair normal operations at the club. Unfortunately, current schedule projections indicate that EPA construction activities at the PYC may occur during the May to August 2000 time frame, since the excavation of the soil and sediment must occur prior to construction of the cap on the ACW facility. It is too early to know exactly how long these activities will take.

Comment: PYC is of the opinion that the contractor for the soil contamination or EPA should be responsible for providing HAZMAT "awareness level" training to the onsite personnel of PYC.

Response: EPA would be happy to provide a pre-construction briefing for PYC members and staff to discuss health hazards, contingency plans, project schedule, etc. As the start of construction approaches, EPA will coordinate such a briefing with PYC. Formal HAZMAT training should not be necessary since properly trained and attired workers will be the only people allowed in the Exclusion Zone.

Comment: PYC requests to know the hours of construction, seven days a week, which will be placed in the notice to bidders, on that portion of the project specific to PYC.

Response: EPA will advise PYC of the construction work hours included in the bid documents. Typically, EPA restricts working hours to Monday through Saturday from 7 AM to 6 PM.

Comment: With the revelation of the contamination of the northeast quadrant, how much of the PYC property will be fenced by the contractor during the cleanup operation?

Response: Although EPA does not anticipate the need to fence any areas within the PYC property, the need for fencing will be determined as the design progresses. The "Exclusion Zones" are typically delineated with caution tape.

Comment: Will there be pump noise, and if so, for how long? Does the pump run at night? Will the water table be decreased?

Response: This comment appears to relate to EPA's ongoing groundwater remedy. The pumps associated with the DNAPL recovery system are low flow pneumatic pumps which operate with little noise. The modest amount of water being withdrawn from the aquifer during the current phase of the project is not sufficient to result in a decrease in the water table other than immediately around the well.