REDACTED

RECORD OF DECISION

AMERICAN CREOSOTE WORKS SUPERFUND SITE

PENSACOLA, ESCAMBIA COUNTY, FLORIDA

CERCLIS ID: FLD008161994

PREPARED BY:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

AUGUST 2017

RECORD OF DECISION

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ACRONYMS AND ABBREVIATIONS

%	percent
ACW	American Creosote Works
AROD	ROD Amendments
ADD	average daily dose
amsl	above mean sea level
AR	Administrative Record
ARAR	Applicable or Relevant and Appropriate Requirement
BaP	benzo(a)pyrene
Black & Veatch	Black & Veatch Special Projects Corp.
bls	below land surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CMZ	Contaminated Media Zone
COC	chemical(s) of concern
CSF	cancer slope factor
CSM	Conceptual Site Model
CTL	Cleanup Target Level
CY	cubic yards
DNAPL	dense non-aqueous phase liquid
DPT	direct push technology
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ERA	Ecological Risk assessment
ESD	Explanation of Significant Difference
ESI	Expanded Site Investigation
ETC	Escambia Wood Treating Company
FDEP	Florida Department of Environmental Protection
FFS	Focused Feasibility Study
FL	Florida
FRI	Focused Remedial Investigation
FS	Feasibility Study
ft	foot or feet
FYR	Five-Year Review
GCTL	Groundwater Cleanup Target Level
HAP	hazardous air pollutants
HH&E	Human health and the environment
HHRA	Human Health risk Assessment
HI	hazard index
HQ	hazard quotient
IC	institutional control(s)

IRIS	Integrated Risk Information System
ISCO	*In Situ* Chemical Oxidation
ISEB	*in situ* enhanced bioremediation
IUR	Inhalation Unit Risk
LADD	lifetime average daily dose
LDA	large diameter auger
LDR	land disposal restrictions
LS	Lower Sand
MCL	Maximum Contaminant Level
µg/kg	micrograms per kilogram
ng/kg	nanograms per kilogram
mg/kg	milligrams per kilogram
mg/kg/day	milligrams per kilogram per day
MPE	multi-phase extraction
NAPL	non-aqueous phase liquid
NCP	National Contingency Plan
NPL	National Priorities List
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
P&T	pump and treat
PAH	polycyclic aromatic hydrocarbon
PCP	pentachlorophenol
pg/kg-day	picograms per kilogram-day
ppt	parts per trillion
PRA	Probability Risk Assessment
PRG	Preliminary Remedial Goal
PTW	Principal Threat Waste
PYC	Pensacola Yacht Club
RA	remedial action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation
ROD	Record of Decision
ROW	right-of-way
SARA	Superfund Amendments and Reauthorization Act of 1986
SCAPS	Site Characterization and Analysis Penetrometer System
SCTL	soil cleanup target levels
SDWA	Safe Drinking Water Act
SE	Southeast
SEAR	surfactant enhanced aquifer remediation
SEE	steam-enhanced extraction

SESD	Science and Ecological Support Division
Site	American Creosote Works Superfund Site
SRC	Syracuse Research Corporation
S/S	solidification/stabilization
SSL	Soil Screening Level
SSM	shallow soil mixing
SVOC	semi-volatile organic compound(s)
TarGOST®	Tar-specific Green Optical Screening Tool
TBC	To Be Considered
TCDD	Tetrachlorodibenzo-p-dioxin
TEQ	toxicity equivalent
T/M/V	toxicity/mobility/volume
T/V	toxicity/volume
USACE	U.S. Army Corps of Engineers
US	Upper Sand
USGS	U.S. Geological Society
VOC	volatile organic compound

PART 1: DECLARATION

1.0 Site Name and Location

This Record of Decision (ROD) is for the site-wide remedial action (RA) at American Creosote Works (ACW) Superfund Site (the Site) located in Pensacola, Escambia County, Florida (FL). The Site's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number is: FLD008161994. The Site was listed on the National Priorities List (NPL) on September 8, 1983.

The ACW Pensacola Site is located in a moderately dense commercial and residential district of Pensacola, Florida. The former ACW facility is approximately 18 acres in size and is located one block south of the intersection between Main Street and Barrancas Avenue, between L and F Street, about 500 yards north of Bayou Chico in Pensacola Bay. Several businesses are located north and west of the former ACW facility, including a lumber company, an auto body shop, and an appliance sales and repair shop. Residential areas included as part of the ACW Site, border the former ACW facility on the east and south, with the nearest residence within 50 feet (ft) of the former facility.

2.0 Statement of Basis and Purpose

This decision document presents the Selected Remedy for the site-wide RA at the Site which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, 42 U.S.C. Section 9601 et seq., and, to the extent practicable, the National Contingency Plan (NCP) 40 Code of Federal Regulations (CFR) Part 300. This decision is based on the Administrative Record (AR) for the Site. This decision represents the final remedy selected for the Site's OU1 and OU3 and following completion of the RA, the Site will be ready for reuse. The remedy selected for OU2 is an interim remedy.

The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), is the support agency. In accordance with 40 CFR Sec 300.430(e)(9)(iii)(H), FDEP has provided input during the remedy selection process including review and comment on the RI/FS and supports the selected remedy.

3.0 Assessment of the Site

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances to the environment; and pollutants or contaminants from this Site which may present an imminent and substantial endangerment to public health or welfare.

4.0 Description of Selected Remedy

Due to the complexity of the Site, it was divided into five separate contaminated media zones (CMZs) in order to aid in the screening, evaluation and selection of remedies. CMZs are generically defined as a medium, volume or area that has common characteristics, which effect the remedial alternative selection. The dimensions and characteristics of a defined CMZ are essential parameters for selecting and comparing remedial alternatives because of their impact on

remedial costs and technology feasibility. For example, the depth of contamination, whether it is within or outside the boundaries of the property, the presence of Dense Non-Aqueous Phase Liquid (DNAPL), the specific lithologic unit, and the concentrations of specific chemicals of concern (COCs [e.g. dioxin]) were the factors used in delineating a CMZ for the ACW Site.

Contaminated Media Zone	Operable Units
CMZ-1 Main Source Area	OU1/2 – DNAPL Source/PTW
CMZ-2A Extended DNAPL Plume - On Facility	OU1/2 – DNAPL Source
CMZ-2B Extended DNAPL Plume – Off Facility	OU1/2 – DNAPL Source
CMZ-3 Secondary Source Zone/Adsorbed Phase Zone – On Facility	OU2 – Groundwater
CMZ-4A On facility Surface Soil Contamination	OU1 – Soil, sludge and sediments
CMZ-4B Off facility Surface Soil Contamination	OU3 – Offsite dioxin soil
CMZ-5 Extended Dissolved Groundwater Plume	OU2 – Groundwater

The NCP establishes an expectation that the U.S. Environmental Protection Agency will use treatment to address the principal threats posed by a site whenever practicable (NCP §300.430(a)(1)(iii)(A)). The NCP defines Principal Threat Waste (PTW) as source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or would present significant risk to human health or the environment should exposure occur. NAPL and DNAPL are considered a principal threat wastes under EPA guidance and there is an expectation in the NCP to treat such wastes wherever practicable unless EPA determines that such wastes can be reliably contained. Highly contaminated soil can also be PTW when considered highly toxic, or would present significant risk to human health should exposure occur, or it acts as reservoir for mobile contaminants. Containment alternatives, such as capping, have been demonstrated to be reliable for this type of contamination commonly found at former wood treater sites. The major components of this Selected Remedy are listed below in the order of their expected implementation during construction; however, it is expected that some of these phases can proceed on simultaneous tracks:

Phase	Action
I	Implementation of groundwater sampling at OU2/CMZ-5 will provide baseline on the marine surface water quality in the Bay and Bayou Chico
II	Excavation of CMZ-4B surficial soil to protect against the direct contact threat to the surrounding community. Soil exceeding residential cleanup would be placed onsite in a lined cell until the soils can be placed in the excavation created by CMZ-4A (over CMZ-2A/3) and covered with a temporary cover.
III	Complete 2-ft soil cover over CMZ-4B soil on ACW property
IV	Construction and implementation of the *In Situ* Chemical Oxidation (ISCO)/ *In situ* enhanced bioremediation (ISEB) barriers in CMZ-3 and OU2/CMZ-5

Phase	Action
V	Construction of barrier wall at CMZ-1 to 110-ft below land surface (bls) using the cutter soil mixer technique to isolate the highest percentage of mass
VI	Excavation of CMZ-4A PTW soil for inclusion in the CMZ-1 containment cell; if not considered PTW then the soil is to be included in vault overlying CMZ-3
VII	Install Cap/Cover at CMZ-1
VIII	Place CMZ-4B excavated soil in the excavation created by CMZ-4A (over to CMZ-2A/3) and cover with a 2-ft protective soil cover. This phase would also include 35,000 CY stockpile that currently exists on the former facility and would remain in the CM-2A/3 area
VIII	Installation and Implementation of steam-enhanced extraction (SEE) on CMZ-2A
IX	Installation and Implementation of SEE on CMZ-2B
X	Performance Monitoring for Remedy Effectiveness in CMZ-2B and OU2/CMZ-5.

The Selected Remedy is compatible with anticipated and existing Site reuse. The Site will have institutional controls (ICs) for industrial/commercial uses only, which also includes recreational. The City of Pensacola has the property zoned conservation and would like to turn it into a park.

5.0 Statutory Determinations

Based on the information currently available, the EPA believes the selected remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. In compliance with CERCLA Section 121(b) and Section 121(d), the Selected Remedy is protective of human health and the environment, complies with Federal and any more stringent State requirements that are applicable or relevant and appropriate to the RAs, is cost effective, and utilizes permanent solutions and treatment technologies to the maximum extent practicable.

The Selected Remedies for CMZ-2A, CMZ-2B, CMZ-3, and CMZ-5 satisfy the statutory preference for remedies that employ treatment to reduce toxicity (T) or volume (V) or mobility as a principal element. For CMZ-1, CMZ-4A, and CMZ-4B treatment alternatives to reduce T/V for the creosote dense non-aqueous phase liquid (DNAPL) and dioxins were evaluated and it was determined to be either cost prohibitive or unproven technologies which would likely fail to meet criteria to reduce T/V. Isolation/containment reduces mobility, but will not reduce toxicity or volume of the PTW/DNAPL or contaminated soil; however, it does eliminate the risk exposure pathways of ingestion or inhalation to humans and animals. The removal and on-facility disposal will reduce mobility.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on the Site above levels that would allow for unlimited use and unrestricted exposure, a CERCLA Section 121(c) statutory review will be conducted every five years after initiation of the RA to ensure that the remedy remains protective of human health and the environment, inclusive of the applicable ICs. If results of the five-year reviews reveal that remedy integrity is compromised and protection of human health is insufficient, then additional remedial actions will be evaluated by the EPA and FDEP. The statutory five-year reviews will be conducted in accordance with EPA policy and guidance.

6.0 Data Certification Checklist

The following information is included in the Decision Summary Section of this ROD. Additional information can be found in the AR file for this Site.

- COCs and their respective cleanup levels (Sections 7 and 8; **Tables 11**)
- Baseline risk represented by the COC (Section 7; **Tables 1** through **10**)
- Cleanup levels established for COC and the basis for these levels (Section 8; **Tables 11**)
- How source materials constituting principal threats are addressed (Section 11)
- Current and reasonably anticipated future land use assumptions (Section 6)
- Potential land use that will be available at the Site as a result of the Selected Remedy (Section 6)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 12; **Table 15**)
- Key factors that led to selecting the remedy (i.e., describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing criteria, highlighting criteria key to the decision) (Sections 12 and 13).

7.0 Authorizing Signature

Franklin E. Hill, Director
Superfund Division

9/7/17
Date

PART 2: THE DECISION SUMMARY

1.0 Site Name, Location, and Brief Description

This Record of Decision (ROD) is for the American Creosote Works (ACW) Superfund Site (Site; U.S. Environmental Protection Agency [EPA] ID: FLD008161994) Pensacola, Escambia County, Florida (FL) is approximately 18 acres in size and is located one block south of the intersection between Main Street and Barrancas Avenue, between L and F Street, about 500 yards north of Bayou Chico in Pensacola Bay (**Figure 1**). The Site is a former wood treatment facility in a moderately dense commercial and residential district (**Figure 2**). Several businesses are located north and west of the former ACW facility, including a lumber company, an auto body shop, and an appliance sales and repair shop. Residential areas included as part of the ACW Site, border the former ACW facility on the east and south, with the nearest residence within 50 feet (ft) of the former facility. Currently, the ACW facility is secured by a perimeter fence. A building that previously housed the non-aqueous phase liquid (NAPL) recovery and groundwater treatment system, an office building and several storage tanks exist on the western portion of the facility. Relict building foundations and previous removal action soil debris piles are located in the central portion of the former facility property. Water from the main and overflow ponds, located adjacent to L Street, was pumped out and treated in 1983. Once the water from the ponds was removed, the sludge was solidified and covered with a clay cap.

The ACW Pensacola Superfund Site operated until 1981 when the company filed for bankruptcy. Major contaminants in the soil, sediments and groundwater released as a consequence of the former wood treating processes are semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), and dioxin.

The Site was divided into three operable units (OUs) to facilitate EPA's response actions in addressing the cleanup of various media contaminated by the former facility wood treating and preserving operations. OU1 addresses the soils, sediments and sludges on the former facility and in associated storm water drainage ditches to the east and south of the property. OU2 encompasses the subsurface NAPL (i.e., creosote product), contiguous soil, and the dissolved groundwater contamination. OU3 is the off-facility site-related residual dioxin and SVOC surface soil contamination. In September 2011, the EPA combined OU1, OU2, and OU3 based on further evaluations of the Site conditions, newer and more innovative remedial alternatives, and the current status of the remedies selected in the previous OU1 and OU2 RODs and ROD Amendments (ARODs). This action was the spur that led to the development, screening, and evaluations of remedial alternatives in the Site-wide Feasibility Study (FS) that recommended a final remedy for the OU1/OU3 action and an interim remedy for OU2.

The EPA is the lead agency for the cleanup of the Site and the Florida Department of Environmental Protection (FDEP) is the support agency. To date, EPA has used the Superfund Trust Fund to finance activities at the Site, including several Removal Response Actions, an Expanded Site Investigation (ESI), the Remedial Investigation (RI)/FS, and several remedial actions (RAs) under previous RODs.

2.0 Site History and Activities

2.1 Site Operational History

Wood-preserving operations were conducted at the ACW facility from 1902 until December 1981. Prior to 1950, creosote was used exclusively to treat wood poles. ACW began pressure-treating the lumber, using PCP and Number 2 fuel oil mixture in 1950. This process increased during the later years of the ACW operations. The dioxin/furan contamination present at the Site resulted from the use of PCP as a wood treating chemical, because dioxins/furans are a common impurity in commercial grade PCP and are released when the PCP is heated.

Four surface impoundments were located in the western portion of the ACW facility (**Figure 2**). The Main and Overflow ponds, located adjacent to L Street, were used for disposal of process wastes. During operations, ACW discharged liquid process wastes into the two unlined surface impoundments. Prior to 1970, waste water in these ponds was allowed to overflow through a spillway, then flow through the streets and storm drains into a ditch on the PYC property and then 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 out on the ground in designated "Spillage Areas" on the facility. Additional discharges occurred during periods of heavy rainfall and flooding when the ponds overflowed the containment dikes.

2.2 Regulatory and Investigation History

In 1980, the City of Pensacola found oily creosote-like material in the groundwater near the intersection of L Street and Cypress Street. The EPA placed the ACW facility on the National Priorities List (NPL) on September 8, 1983.

In 1983, EPA initiated an immediate removal action. Water from the main and overflow ponds was pumped out and treated. Once the water from the ponds was removed, the sludge was solidified and covered with a clay cap.

In 1985, EPA completed a RI and FS that indicated that on-facility and off-facility surface soil, the PYC drainage ditch, and nearby groundwater were contaminated with SVOCs, phenols, and volatile organic compounds (VOCs).

EPA signed a ROD in 1985 which selected a remedy for all contaminated surface soils, sludges, and sediments to be placed in an on-facility containment cell. A groundwater remedy was not included in the 1985 ROD. In 1988, the EPA initiated a Post-ROD RI to provide additional information on the extent of surface soil contamination. Following a supplemental RI/FS, EPA signed a ROD Amendment which selected bioremediation for treatment of surface soils. This remedy required treatability studies to determine the most effective biological treatment. The studies indicated that neither the slurry-phase bio-treatment nor land farming would be effective at destroying the PCP and some PAHs.

From 1990-1993 EPA completed 3 more investigations to address the groundwater, solidified sludge, and subsurface soil. Results indicated elevated concentrations of numerous SVOCs and VOCs, as well as dioxins/furans in the soil, surface water, groundwater, and sediments. EPA

completed a BRA in August 1993 to evaluate potential risks associated with groundwater, solidified sludge, and subsurface soils.

In 1994, EPA signed the OU2 ROD which selected direct pumping of NAPL from wells with subsequent recycling of the NAPL as Phase I of the remedy, followed by biological treatment of contaminated groundwater for Phase II. Construction of the NAPL recovery system was completed in September 1998 and the system operated until EPA terminated its operations in 2011. At the time of the system shut down, approximately 190,000 gallons of creosote NAPL had been recovered from the subsurface at the Site. At the end of the long-term RA period, the pump and treat (P&T) system was not capable of removing the remaining dense non-aqueous phase liquid (DNAPL). Therefore, remedy failure was declared.

In 1999, the EPA signed the OU1 AROD that selected construction of a low-permeability cap over the stabilized surface impoundments and other contaminated areas of the ACW facility. Drainage channels were installed around the perimeter of the cap to manage storm water runoff. Groundwater monitoring, in addition to that required as part of the OU2 groundwater remedy, was incorporated to evaluate whether contaminated soils remaining at the facility were leaching into the groundwater.

In 2006, the EPA established OU3 to further address residual surface soil contamination in the neighboring properties. A previous investigation had been performed by EPA in the neighborhood in 1997 to determine the presence of site-related contamination. The State of Florida promulgated introduced soil cleanup target levels (SCTLs) and some of the concentrations found in the residential area were above these new cleanup numbers.

Date Complete	**Scope**
1978	Spill due to heavy rain fall
1979	Spill due to heavy rain fall
1980	Creosote discovered in groundwater by City of Pensacola
Jul-81	U.S. Geological Society (USGS) installs nine groundwater monitoring wells near the Site
8-Sep-1983	Site placed on the NPL
1983	EPA investigation detects PAHs in soil and groundwater
Late 1983	Emergency clean out, solidification and capping of lagoon sludge
1985	EPA conducted a RI/FS which confirms PAH, phenol, and VOC contamination of soil and groundwater
30-Sep-1985	EPA signs ROD
1986	State of Florida signs letter of non-concurrence of the ROD
1988	EPA conducts Supplemental RI
1989	EPA completes Supplemental FS
28-Sep-1989	EPA signs Amended ROD
Aug-1990	EPA issued Explanation of Significant Difference (ESD) Fact Sheet, addressing site preparation, fence repair, drum sampling, analysis and

Date Complete	Scope
	disposal, demolition of buildings, debris removal, well closure, cap repair, and revegetation
Sep-1990	EPA completed a Phase II Post RI
Feb-1991	Initiated tasks in ESD
May-1991	Completed tasks in ESD, triggered Five-Year Review (FYR) requirement
Aug-1991	Phase III Post RI
Sep-1991	Dye Dispersion and Sediment Sampling Study
19-Sep-1991	Interim RA Report, Roy F. Weston
25-Sep-1991	EPA accepted RA Report by Weston
Nov-1991	Supplemental Site Characterization Sampling and Treatability Study
Aug-1993	Baseline Risk Assessment (BRA)
Nov-1993	Supplemental Risk Assessment and FS
3-Feb-1994	EPA signs OU2 ROD
Feb-1994	Phase IV Post RI (EPA); Focused OU2 Groundwater Investigation
1994	EPA streamlines project by assigning all solid media to OU1 and groundwater to OU2
Sep-1996	Final Design Investigation Report, Bechtel Environmental, Inc.
Nov-1996	Pilot Test Treatability Report, Bechtel Environmental, Inc.
1997	Final Remedial Design (RD) Documents
Dec-1997	Sanders Beach Community Area Surface Soil Study, Black & Veatch Special Projects Corp. (Black & Veatch).
Sep-1998	NAPL Recovery System installed
21-May-1999	EPA signed Amended OU1 ROD
25-Sep-2001	Initial FYR conducted
May-2003	Initiate excavation of off-facility soils, transport excavated soils to facility stockpile
Dec-2003	Completed off-facility soil excavation
Jan-2004	Initiate quarterly Groundwater Monitoring
Sep-2004	Hurricane Ivan destroys the NAPL recovery system
Jan-2005	End quarterly Groundwater Monitoring
Sep-2006	2nd FYR conducted
Dec-2006	EPA established OU3 to address off-facility dioxin and PAH contamination
2007	NAPL recovery system operational; Quarterly groundwater monitoring resumes
Apr-2007	OU3 Focused RI initiated by EPA
Mar-2007	EPA installed 10 Groundwater Monitoring Well clusters; Site Characterization and Analysis Penetrometer System (SCAPS) NAPL assessment (U.S. Army Corps of Engineers; USACE)
Dec-2007	OU3 RI field investigation (off-facility surface soil sampling)

Date Complete	Scope
Jan-2008	Groundwater Monitoring Event (USACE)
Apr-2009	OU3 Focused RI (FRI) submitted
Jun-2009	OU3 FRI approved, Black & Veatch Special Projects Corp.
Sep-2009	EPA initiated Focused Feasibility Study (FFS)
Dec-2009	EPA performed additional soil removal in Southeast (SE) Ditch
Feb-2010	OU3 supplemental off-facility soil investigation
Dec-2010	EPA combined OU1 (on-facility soil and NAPL Main Source Zone) into OU3
Jan-2011	OU3 on-facility soil investigation
Jan-2011	Groundwater Monitoring Event (Science and Ecological Support Division [SESD])
Sep-2011	EPA combined OU1, OU2, and OU3 in order to complete evaluation and selection of a Site-wide Remedy
Sep-2011	EPA terminated operations of the NAPL recovery system
Oct-2011	OU3 NAPL and subsurface soil investigation
Jan-2012	Groundwater Monitoring Event (SESD)
Jan-2012	PYC Ditch Stormwater Rerouted (City of Pensacola)
Mar-2013	Completed Groundwater Transport Model (OU2)
Jan-2014	Groundwater Monitoring Event (SESD)
Mar-2014	Supplemental Human Health Risk Assessment (HHRA) Addendum completed
Mar-2014	Draft Site-wide FS and National Remedy Review Board Briefing
Jan-2015	Groundwater Monitoring Event (SESD)
Feb-2016	Groundwater Monitoring Event (SESD)
July-2016	EPA excavated and backfilled the PYC ditch
Dec-2016	Final Site-wide FS Submitted; Black & Veatch Special Projects Corp.

3.0 Community Participation

Site documents including the RI, FS Reports and Proposed Plan for the ACW Site were made available to the public on April 22, 2017 in the Administrative Record (AR) repositories. The AR repositories are located at the EPA Region 4 Superfund Records Center (61 Forsyth Street, Atlanta, GA 30303) and the EPA local repository located at the West Florida Genealogy Branch located at 5740 N 9th Avenue, Pensacola, Florida. A Notice of Availability was published in the Pensacola News Journal on April 23 and 24, 2017. A public comment period on the Proposed Plan was held from April 22 to May 22, 2017.

On April 26, 2017, the EPA hosted a Proposed Plan meeting at the Sanders Beach-Corinne Jones Resource Center. During the meeting the EPA presented a description of the Proposed Plan and schedule for remedy implementation and allowed nearby residents and interested parties to comment and ask questions of EPA officials. Approximately 45 people attended the meeting; a transcript of the meeting is included as **Appendix B.**

There were a number of comments and questions raised during the public meeting and representatives of EPA responded to them during the meeting. EPA responses to written comments received during this comment period are included in the Responsiveness Summary, Part 3, of this ROD.

4.0 Scope and Role of the Response Action

Several off-facility soil removal actions have been performed since 1999, with the excavated soil currently stockpiled on the ACW facility (approximately 35,000 cubic yards [CY]). These former actions, in conjunction with the Selected Remedy in this ROD, will achieve the overall Site goal of eliminating human and ecological exposure to contaminants in soil, sediment, and groundwater and protecting surface water in Pensacola Bay/Bayou Chico and its associated tributaries. The Selected Remedy is compatible with the planned and existing use of the Site.

This ROD presents the final CERCLA action for OU1 and OU3 at the ACW Site. CERCLA action for OU2 groundwater is an interim remedy. The actions in this ROD include:

- Implementation of groundwater sampling at OU2/Contaminated Media Zone (CMZ)-5 will provide baseline data on the marine surface water quality in the Bay and Bayou Chico
- Construction and implementation of the *In Situ* Chemical Oxidation (ISCO)/ *In Situ* enhanced bioremediation (ISEB) barriers in CMZ-3 and OU2/CMZ-5 to prevent any future impact to Pensacola Bay.
- Construction of a barrier wall at CMZ-1 to 110-ft bls using the cutter soil mixer technique to isolate the highest percentage of contaminated soil mass and prevent any future contamination of the aquifer from this zone.
- Excavation of CMZ-4A and 4B Principal Threat Waste (PTW) soil for inclusion in the CMZ-1 containment cell or placement within an encapsulated cell within CMZ-3
- Install Cap/Cover at CMZ-1
- Excavation of CMZ-4B residential surficial soil to protect against the direct contact threat to the surrounding community. Soil exceeding residential cleanup RGOs would be placed in the excavation created by CMZ-4A (over CMZ-2A/3) and covered with a 2-ft protective soil cover. The 35,000 CY soil stockpile that currently exists on the former facility would also be placed over CMZ-2A/3.
- Complete 2-ft soil cover over the CMZ-4B soil on the ACW property
- Installation and implementation of steam-enhanced extraction (SEE) on CMZ-2A to remove all DNAPL and creosote stained soils.
- Installation and implementation of SEE on CMZ-2B to remove all DNAPL and creosote stained soils.
- Performance monitoring for effectiveness in OU2/CMZ-5/5-Yr Review.

5.0 Site Characteristics

5.1 Conceptual Site Model

The Conceptual Site Model (CSM) incorporates information on the potential chemical sources, affected media, release mechanisms, routes of migration, and known or potential human and ecological receptors. In this way, it illustrates the physical, chemical, and biological relationships between contaminant sources and affected resources. Two CSMs were developed for the HHRA and Ecological Risk Assessment (ERA) and serve as the basis for interpretations of contaminant fate and transport and assessments of risk to human and ecological receptors. The HHRA CSM presented as **Figure 3** illustrates that the primary release mechanisms were spills/leaks and discharge of waste from former storage and treatment operations. Secondary release mechanisms include surface runoff and infiltration. Surface runoff resulted in spreading of contaminants to surface soil beyond the confines of the process area. Percolation of rainwater through contaminant source areas and other contaminated subsurface soils resulted in contaminants that leached into the subsurface soil. **Figure 4** illustrates the ERA CSM for potential terrestrial and aquatic receptor exposure scenarios associated with direct contact and/or ingestion of site-related contaminants due to stormwater runoff/erosion and overland flow/transport from the contaminated source to the former PYC Ditch and subsequent discharge to Pensacola Bay. In addition, contaminants that leach into shallow groundwater may discharge to Pensacola Bay.

The Site's CSMs show two major mechanisms for transportation of contamination from the Site to soil on off-facility properties; vehicular traffic and overland flow. The Site had two open creosote dipping ponds on the far western side of the facility. During large rainfall events, these dipping ponds would overflow south to Pensacola Bay. The water would eventually enter the former PYC ditch, leaving contamination on the surface soil between the former facility dipping ponds and the former PYC ditch. Figure 5 depicts the exposure area where overland flow from the facility contributed to off-site migration of dioxin and PAH contamination to surface soil in the adjacent properties.

Trucks leaving the facility would be loaded with creosote treated wood poles. These trucks would leave via the main entrance of South J Street driving down Pine Street or down J Street to get to Cypress Street with dirt and dust from the facility on them. Distribution of dioxin-contaminated soil is consistent with the route of vehicular traffic. Figure 6 shows the exposure area where vehicular and foot traffic on and off the former facility resulted in dioxin and PAH contamination transport into the neighboring community's surface soil (0-2 ft).

EPA had a congener evaluation performed by two different experts who were provided the dioxin data with no maps. The two experts agreed on all 40 data points that were site related except one. The pattern of dioxin concentrations that were Site related was a major factor in how the exposure units were formed.

All off-facility soil contamination has been divided into two exposure units based on how the contamination was transported off facility. EPA's hazard index (HI) of 1 for dioxin is 50 parts per trillion (ppt). Action is triggered in each exposure unit based on residential use and EPA's HI of 1. RA is triggered in each exposure unit. When that RA is triggered, the contaminated soil

is removed to attain a cleanup level for direct exposure based upon Florida's residential SCTLs are applicable within each exposure unit. The cleanup number for each exposure unit will be Florida's residential SCTL, which is 7 ppt for dioxin.

5.2 Overview of the Site

The ACW Superfund Site is an inactive wood-treating facility that operated facility from 1902 until 1981 when the company filed for bankruptcy. The facility covers approximately 18 acres of land located approximately ¼-mile north of the confluence of Bayou Chico and Pensacola Bay (**Figure 2**). The facility is located in a moderately dense commercial and residential district.

5.2.1 Geologic, Hydrogeologic, and Topographic Information

Topography: The area surrounding the ACW facility is generally flat, with elevations ranging between 12 and 14 ft above mean sea level (amsl). The land slopes southward at about 25 ft per mile toward Pensacola Bay.

Geology/Hydrogeology: The groundwater in the vicinity of the Site contains three major aquifers: a shallow aquifer which is locally both confined and unconfined (the Sand-and-Gravel aquifer), and two deep confined aquifers (the upper and lower limestone of the Floridan aquifer). The Sand-and-Gravel aquifer a nd upper limestone of the Floridan aquifer are separated by a thick section of relatively impermeable clay called the Pensacola Clay. The Sand-and-Gravel aquifer is the only freshwater aquifer in central and southern Escambia County and is the public water supply source for the area, including the City of Pensacola.

The Sand-and-Gravel aquifer underlying the ACW facility is composed primarily of sand with many interbedded layers and lenses of clay and sandy clay. These clay layers and lenses range from less than one inch to approximately 38 ft in thickness. Based on characteristics of the sands in these areas, the water-bearing zones have been divided into two distinct strata; the Upper and Lower Sand (US and LS) units. The water-bearing US unit extends to a depth of approximately 25 ft below land surface (bls) and varies in grain size from fine to coarse.

The water-bearing LS unit (greater than 25 ft bls to a depth of about 200 ft) is predominantly a very dense sand, usually fine to medium grained, with variable amounts of silt. Discontinuous clay and sandy clay nodules and lenses occur throughout the deep sand. Clay lenses can form local confining beds; however, since the clay lenses at the Site are not continuous they do not prevent vertical migration of contamination.

Two principle clay formations exist in the water-bearing zone at the Site. One clay layer is directly under the former ACW waste ponds at a depth of about 100 ft bls. This clay has been shown to be continuous under this area, although it does pinch out south of the ACW facility. South of the ACW facility, a second extensive clay layer approximately 38 ft thick underlies the PYC property at a depth of about 20 ft bls and extends south to the Pensacola Bay. This second clay pinches out to the north before reaching the ACW facility.

The direction of groundwater flow is to the south and discharges to Pensacola Bay. The aquifer is recharged by local rainfall, with relatively high infiltration rates because of the sandy nature of

the aquifer and overlying soils. Annual recharge to the aquifer is up to 10 inches per year. Prior to 2011, portions of the shallow groundwater along with area storm water discharged into a drainage ditch on the PYC property which led to the mouth of the Bayou Chico and Pensacola Bay. Stormwater was rerouted by the City in 2011. Contaminated sediment in the PYC ditch was excavated and the ditch backfilled to ground surface in 2016.

5.2.2 Surface and Subsurface Features

During operations, four surface impoundments were located on the western portion of the ACW facility (**Figure 2**). The Main and Overflow ponds, located adjacent to L Street, were used for disposal of process wastes. During operations, ACW discharged liquid process wastes into the two unlined surface impoundments. Prior to 1970, waste water in these ponds was allowed to overflow through a spillway, flow through the streets and storm drains into a ditch on the PYC property 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 out on the ground in designated "Spillage Areas" on the facility. Additional discharges occurred during periods of heavy rainfall and flooding when the ponds overflowed the containment dikes.

Several off-facility soil removal actions have been performed since 1999, with the excavated soil currently stockpiled on the ACW facility (approximately 35,000 CY). Most recently, approximately 4,000 CY of soil/sediments in the PYC ditch (to a maximum depth of 3 ft) were excavated in July 2016 and stockpiled at the ACW facility.

Currently, the ACW facility is secured by a perimeter fence. A building that previously housed the NAPL recovery and groundwater treatment system, an office building and several storage tanks exist on the western portion of the facility. Relict building foundations and previous removal action soil debris piles are located in the central portion of the former facility property.

5.3 Sampling Strategy

Multi-media sampling was guided by the CSMs that were refined as understanding of the Site increased over time. Samples were collected and evaluated to determine the nature and extent of soil, sediment, surface water and groundwater contamination, support assessment of risks, improve hydrogeologic understanding, and evaluate potential remedy alternatives and treatment options.

Surface and subsurface soil samples were collected in February 2010, January 2011, and October 2011 as part of three supplemental FS investigations. Samples were collected from the ACW facility, the PYC Ditch, and the Southeast Ditch and were analyzed for SVOCs, phenols, and dioxin/furans. Groundwater samples have been collected annually by EPA Region 4 SESD. The additional investigations also included visual screening for DNAPL using direct push technology (DPT) and completion of a Tar-specific Green Optical Screening Tool (TarGOST®) investigation.

5.4 Known or Suspected Sources of Contamination

The observed contamination at the Site is attributable to one or more of the following known or suspected sources:

- On-facility DAPL in the subsurface as a result of the waste lagoons and dipping ponds over many years of operation.
- Off-facility creosote in the subsurface as a result of the overflow through a drainage course into Bayou Chico and Pensacola Bay.
- On-facility soil contamination across the Site as a result of preserved wood storage prior to shipment off the Site by rail.
- On and off facility soil contamination as a result of previous discharges to, and overflow of the lagoons and ponds on the former ACW facility.
- On-facility dissolved groundwater contamination as a result of the NAPL in the subsurface.
- Off-facility dissolved groundwater contamination as a result off-facility NAPL in the subsurface soil due to overflow through a drainage course into Bayou Chico and Pensacola Bay.
- On an off facility dissolved groundwater contamination as a result of previous discharges to, and overflow of the lagoons and ponds on the former ACW facility.
- Off-facility dioxin soil contamination not related to previous operations at the ACW facility, such as: another wood treater point source (i.e., Pensacola Wood Treating Company); backyard burning of wood and/or trash; vehicle exhaust emissions; rail transport of treated wood along the former right-of-ways (ROWs) from the ACW facility and other facilities; house fires; and fireplaces.

The present and historical site-specific potential migration pathways and release mechanisms at the Site include:

- treated lumber storage on the former facility,
- holding and dipping ponds used in the wood treatment process,
- storm water drainage and runoff,
- rail transportation of treated lumber, and
- vehicular and foot traffic out of the facility.

5.5 Nature and Extent of Contamination

The Site was divided into CMZs in order to aid in the screening, evaluation and selection of the remedies. Remedial alternatives were developed for each CMZ that would be successful at meeting the RAOs and that meet the requirements of CERCLA and the National Contingency Plan (NCP). CMZs are generically defined as a medium, volume or area that has common characteristics which effect the remedial alternative selection. The dimensions and characteristics of a defined CMZ are essential parameters for selecting and comparing remedial alternatives because of their impact on remedial costs and technology feasibility. For example,

the depth of contamination, whether it is on or off the boundaries of the property, the presence of NAPL, the specific lithologic unit, and concentrations of specific chemicals of concern (COCs; e.g. dioxin) were the factors used in delineating the CMZs for the ACW Site. Five CMZs have been developed for the ACW Site. **Figure 7** illustrates the location of these zones.

CMZ-1 – Main Source Zone
This zone incorporates the western portion of the ACW facility property that is inclusive of the former impoundments and main process facilities. CMZ-1 was defined based on three characteristics:

1. Located entirely on the facility property;
2. High mass of contaminants as represented by a large volume of DNAPL and residual creosote, creosote-stained soil, and heavy creosote odors; and
3. Presence of a competent clay confining layer beneath the zone to a depth of 100 ft bls.

This CMZ was configured to represent the largest mass of significantly contaminated soil that could be practically isolated and confined. This zone has been well documented as the primary source area for the Site and has high volumes of NAPL. No surface obstructions are currently present in this zone. The lithology for this zone is predominantly sand, silty sand, some clay lenses and is underlain by approximately 10-ft of homogenous, low permeability clay at approximately 110 ft bls. CMZ-1 has creosote-impacted soil from 3 to 100 ft bls with an estimated volume of approximately 325,001 CY. This total volume includes 231,111 CY of DNAPL-saturated soil and 93,890 CY of creosote-stained soil.

CMZ-2A - Extended NAPL Contamination – On-facility
This CMZ lies immediately south and southeast of CMZ-1 and was defined based on four characteristics:

1. Located almost entirely on the ACW property;
2. High mass of contaminants as represented by a large volume of DNAPL and residual creosote, creosote-stained soil, and heavy creosote odors;
3. Deepest zone of NAPL contamination (e.g. 136 ft bls); and
4. The absence of a competent clay confining layer beneath the zone.

This CMZ was configured to represent the remaining DNAPL source area that is not underlain by a practical lithologic confining unit. CMZ-2A has also been well documented as a source area for the Site and has high volumes of NAPL. No surface obstructions are currently present in this zone. The lithology for CMZ-2A is similar to CMZ-1, but lacks the deeper clay confining unit found in CMZ-1. A lower permeability layer at approximately 25 ft bls was encountered in just the western portion of CMZ-2A. CMZ-2A has an estimated creosote-impacted soil volume of 158,791 CY. This total volume includes 130,347 CY of DNAPL-saturated soil and 28,444 CY of creosote-stained soil.

CMZ-2B Extended NAPL Plume – Off-facility
This CMZ represents the remaining areas of free-phase liquid and residual NAPL located entirely off-facility. The zone is based on three characteristics:

1. Located entirely off the former facility directly to the south;
2. High mass of contaminants as represented by a large volume of free-phase NAPL and residual creosote, creosote-stained soil, and heavy creosote odors located above the shallow clay layer (approximately 20 ft bls). This lithologic unit (shallow clay) is considered the vertical limit of contamination for CMZ-2B.
3. The locations of DNAPL are typically represented more as stringers than fully saturated lithologic layers.

This CMZ was configured to represent all off-facility source areas and is generally a shallow zone. Some deeper NAPL stringers were documented. These stringers may represent lateral movement under the lower permeability layer extending south from the CMZ-1 and CMZ-2A source areas. The bulk of NAPL impacts in CMZ-2B are attributed to the movement of contamination by storm water drainage along the former PYC drainage ditch. This zone represents the third greatest mass of contamination. A critical aspect of this CMZ is the presence of overlying buildings, roads, and utilities, along with its close proximity to Bayou Chico. CMZ 2B has a creosote-impacted soil volume of approximately 133,239 CY. This total volume includes an estimated 73,766 CY DNAPL-saturated soil and 59,473 CY creosote-stained soil from 3 to 60 ft bls.

CMZ-3 Secondary Source Zone/Adsorbed Phase Zone – On-facility/OU2
This CMZ represents on-facility contamination with lower levels of creosote impacted soil; e.g., NAPL stained soil or soil with moderate odors. The present CSM predicts that the soil contamination extends from less than 10 - 20 ft bls on the eastern portion of the former facility to approximately 60 ft bls in the central portion. CMZ-3 has NAPL stained soil as well as leachable soil concentrations of SVOCs, PCP, and dioxins. Additional PCP characterization will be performed in the RD on the western side of the PCP plume. No buildings or utilities exist in this zone. This zone represents the fourth greatest mass of contamination, predominantly in the adsorbed soil. CMZ-3 has a calculated volume of soil contamination of 262,224 CY. A 4-ft tall 35,000 CY stockpile of dioxin- and SVOC- contaminated soil and debris generated from previous off-facility excavations is present and encompasses a large portion of this zone.

CMZ-4A/4B On-facility/Off-facility Surface Soil Contamination
This CMZ represents the surface soil contamination on-facility (CMZ-4A) and off-facility residential (CMZ-4B). The primary COCs in these zones are dioxin and SVOCs (PAHs) in the soil from 0-3 ft on-facility and 0-2 ft off-facility.

Significant dioxin soil contamination is present on the former ACW property from 0 to 3 ft bls, with an estimated total volume of 86,429 CY. CMZ-4A comprises approximately 61,794 CY of the total volume of contaminated surficial soil on the former ACW property (excluding CMZ-1). The majority of surficial soils (minus the debris and stockpiles) have significant concentrations of dioxins and other SVOCs are considered PTW.

The total volume of off-facility residential contaminated surficial soil in CMZ-4B is approximately 53,617 CY (0-2 ft bls). In addition, there is off-facility surface soil in the Pine

Street and Gimble Street ROWs. This volume has been estimated at 9,208 CY and will be considered as PTW, because it exceeds the LDR.

OU2/CMZ-5 Extended Dissolved Groundwater Plume

CMZ-5 is analogous to OU2, the groundwater dissolved plume that extends beneath the Source Zones (CMZ-1, 2A, 2B), along the southern perimeter and downgradient of the Source Zones. While there are dissolved contaminate concentrations in groundwater in this zone; no NAPL stained soils or appreciable odors have been observed. The dissolved plume extends off-facility from the western portion of the former ACW property south towards Pensacola Bay and consists mostly of naphthalene, PCP, and lower levels of additional SVOCs (including methylnaphthalene, acenaphthene, methylphenol) and benzene. CMZ-5 extends to over 180 ft deep and encompasses a total of approximately 35 acres. Several buildings, roads, and utilities exist in this zone. The PCP plume is principally located on the eastern portion of the Site between the facility and the Bay. This PCP plume will be further investigated and delineated during the Remedial Design phase.

5.5.1 DNAPL/Creosote Contamination

Two zones of DNAPL have been identified under the former waste ponds, in the US unit at approximately 30 ft bls and also in the LS unit at 75 to 100 ft bls (**Figures 8 and 9**). Prior Site investigations indicated that DNAPL beneath the former facility waste ponds was limited to depths of 20 to 100 ft bls; however, in October 2011, DNAPL was observed at a depth of 136 ft bls as a thin stringer of creosote in an area immediately east of the former waste ponds. This is the deepest recorded observation of DNAPL at the Site. The lateral extent of observed DNAPL in the LS Unit is limited to within the facility boundaries (CMZ-1 and CMZ-2A). DNAPL in the US unit extends south along the pathway of the former PYC Ditch (CMZ-2B) to a depth of 49 ft bls **(Figure 8)**. DNAPL and DNAPL saturated soils are considered to be PTW. **Figures 8 and 9** identify the extent and vertical range of the DNAPL in the subsurface. The DNAPL extent was determined using a combination of TarGOST® data and soil boring logs.

5.5.2 Soil Contamination

CMZ-4 represents the surface soil contamination on-facility (CMZ-4A) and off-facility (CMZ-4B). The primary COCs in these zones are dioxin and SVOCs (PAHs) in the soil from 0-3 ft on-facility and 0-2 ft off-facility. Soil contamination does exist below 3 ft, the water table is encountered between 3- 5 ft bls, and impacted soils below the water table are considered an ongoing source for the dissolved contamination. SVOCs are measured using a benzo(a)pyrene (BaP) total equivalent (TEQ). Likewise, the numerous congeners of dioxin are measured using a dioxin total equivalent (dioxin TEQ). The most likely transport mechanisms for the soil contamination are: historical facility processes, overland flow, stormwater runoff, vehicular and foot traffic. Soil that exceeds LDRs are considered to be PTW.

5.5.3 Groundwater Contamination

Elevated levels of SVOCs (including naphthalene and carbazole), benzene, and PCP have been detected across the ACW Site. The deepest documented extent of naphthalene and PCP were detected in the 167-177 ft interval at monitoring well CW9 and in the 182-192 ft interval at monitoring well MW4. CW9 is located 900 ft south of the southern ACW facility boundary and

MW4 is located just southwest of the former waste ponds. The most likely transport mechanisms for the groundwater contamination are a result of the NAPL in the subsurface; overland flow, stormwater runoff, and historical facility processes.

6.0 Current and Potential Future Land and Water Uses

6.1 Land Uses

The former ACW facility is currently abandoned, and all structures associated with the past operations have been demolished. The Site has been fenced to prevent unauthorized access. The Site is located in a moderately densely populated commercial and residential district of Pensacola, Escambia County, Florida. As presented in **Figure 2,** the Site is primarily surrounded by residential areas to the south and west with commercial/industrial entities to the north and east.

Reasonably anticipated future land use of the Site is recreational. The City of Pensacola is planning to turn the property into a park. The properties surrounding the Site are expected to remain residential to the south and west with commercial/industrial entities to the north and east.

6.2 Ground and Surface Water Uses

The groundwater beneath the Site and surrounding area is classified as a potential drinking water aquifer (Class G-II) by the State of Florida. Therefore, the future final groundwater ROD will identify the selected remedy for OU2 and include the appropriate remedial action objectives and groundwater cleanup standards. Drinking water for the surrounding area is provided by the City of Pensacola and is drawn from the Sand-and-Gravel aquifer.

A potable well survey performed in 2011 identified no wells within the area of the Site plume. A well is known to exist at the Ice House, located a couple blocks upgradient to the north, but is not in use.

Most surface water drainage in the area is by overland sheet flow through the streets and storm drains south of the ACW facility into Bayou Chico/Pensacola Bay. Pensacola Bay is separated from the Gulf of Mexico by a long narrow island that forms a natural breakwater for the harbor (**Figure 1**).

7.0 Summary of Site Risks

The response action selected in this ROD is necessary to protect public health and the environment from actual or threatened releases of hazardous substances, contamination and pollutants into the environment. Baseline risks to human health and ecological receptors exposed to contaminants at the Site have been evaluated separately for OU1 (EBASCO, 1989), OU2 (Black & Veatch, 1993) and OU3 (Black & Veatch, 2009). In addition, an updated site wide HHRA (Black & Veatch, 2014) was prepared to support the site-wide FS and this ROD. All human health and ecological risk posed by PYC ditch was eliminated by the removal and backfilling of the ditch as documented in the Remedial Action Report dated September 14, 2016.

7.1 Summary of the Human Health Risk Assessment

Human health risks associated with the ACW Site have been evaluated in the following reports:

1. The OU1 1989 HHRA (EBASCO, 1989) evaluated the risks associated with surface soil at the ACW facility, in residential areas and in the PYC Ditch sediments.
2. The 1993 OU2 HHRA (Black & Veatch, 1993) evaluated risks associated with groundwater.
3. The 2009 OU3 HHRA (Black & Veatch, 2009) evaluated potential risks to human health due to exposure to dioxins and furans in off-site residential/industrial areas adjacent to the former ACW facility.
4. The Site Wide HHRA Addendum (Black & Veatch, 2014) updated the risks associated with the Site using the analytical data for soil, sediment and groundwater collected at the Site in 2007 through 2013 for all on- and off-facility affected areas.

A summary of the Site Wide HHRA Addendum is provided in the following subsections.

7.1.1 Identification of Chemicals of Concern

The Site Wide HHRA Addendum evaluated exposure to soil and groundwater based on data collected in 2007 through 2013. Data from previous investigations were not deemed acceptable for inclusion in the HHRA. In addition, sample data from media locations that no longer exist due to various removal actions were not included.

Positively identified chemicals were screened to identify COCs that are important in terms of potential human health effects. The screening was conducted in accordance with EPA Region 4 Human Health Risk Assessment Supplemental Guidance. The COCs identified in soil and groundwater at the Site are listed in **Table 1** and **Table 2**, respectively. The COCs include 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) TEQ, VOCs such as benzene, ethylbenzene and xylene, and SVOCs such as BaP TEQ, other PAHs, and PCP.

7.1.2 Exposure Assessment

Based on an understanding of the fate and transport properties of the contaminants, and the potential for human contact to soil/dry sediment and groundwater, the receptors evaluated included residents, industrial/commercial workers, and recreational users. **Figure 3** presents the CSM for the HHRA.

Potentially complete exposure pathways examined for the site were:

- Incidental ingestion of soil/dry sediment, inhalation of dust released from soil, and dermal contact with soil/dry sediment.
- Routes of exposure with groundwater included ingestion, dermal contact, and inhalation of vapors

Note that only the highest risks and hazards for exposures to soil and groundwater are presented in this summary as they justify implementation of the selected remedy. The risks and hazards associated with the other current and future receptors/media combinations can be found in the

HHRA. The soil and groundwater exposure point concentrations (EPCs) for the COCs were calculated in accordance with EPA Region 4 Human Health Risk Assessment Supplemental Guidance and are shown in **Tables 1 and 2**, respectively.

Human intakes were calculated for each COC and receptor using the EPCs. Estimates of human intake, expressed in terms of mass of chemical per unit body weight per time (milligrams per kilogram per day [mg/kg/day]), were calculated differently depending on whether the COC is a non-carcinogen or a carcinogen. For non-carcinogens, intake was averaged over the duration of exposure and is referred to as the average daily dose (ADD). For carcinogens, intake was averaged over the average lifespan of a person (70 years) and is referred to as the lifetime average daily dose (LADD). The Human Health Risk Assessment considered the contaminants of concern that act via a mutagenic mode of action and that cancer risks were estimated using age-dependent adjustment factors, that are consistent with cancer guidelines and supplemental guidance.

7.1.3 Toxicity Assessment

EPA toxicity assessments and the resultant toxicity criteria were used in the ACW HHRA Addendum to determine both carcinogenic and non-carcinogenic risks associated with each COC and route of exposure. EPA toxicity values that were used in the 2014 HHRA Addendum were:

- Chronic Reference Dose (RfD) and Reference Concentration (RfC) values for non-carcinogenic effects, and
- Oral Cancer Slope Factors (CSFs) and Inhalation Unit Risk (IUR) values for carcinogenic effects.

On Feb. 17, 2012, the EPA released the final non-cancer dioxin reassessment, and established a non-cancer toxicity value, or RfD, for dioxin in EPA's Integrated Risk Information System (IRIS) toxicological database. The dioxin RfD is used at Superfund sites to ensure protection of human health. The action level calculated using the new RfD of 0.7 picograms per kilogram-day (pg/kg-day) is 50 ppt dioxin TEQ for residential soil and 720 ppt dioxin TEQ for commercial / industrial soil. These dioxin levels are the risk-based acceptable levels for exposure to soil based on a hazard quotient (HQ) of 1 and are within EPA's acceptable cancer risk range of between one in 10,000 (1E-04) and one in a million (1E-06).

7.1.4 Risk Characterization

Risk characterization integrates the results of the exposure and toxicity assessments to estimate potential non-cancer hazards and cancer risks. To characterize the overall potential for non-carcinogenic effects associated with exposure to multiple chemicals, the EPA uses a HI approach. This approach assumes that simultaneous sub-threshold chronic exposures to multiple chemicals that affect the same target organ are additive and could result in an adverse health effect. The HI is calculated as follows:

$$HI = ADD1 / RfD1 + ADD2 / RfD2 + ... ADDi / RfDi$$

where:

ADDi = Average Daily Dose for the ith toxicant
RfDi = RfD for the ith toxicant

The term ADDi/RfDi is referred to as the hazard quotient.

Calculation of an HI in excess of unity indicates the potential for adverse health effects. Indices greater than one are generated when intake for any of the COCs exceeds its RfD or RfC. However, given a sufficient number of chemicals under consideration, it is also possible to generate an HI greater than one even if none of the individual chemical intakes exceeds its respective RfD or RfC.

Carcinogenic risk is expressed as a probability of developing cancer as a result of lifetime exposure. For a given chemical and route of exposure, excess lifetime cancer risk is calculated as follows:

$$Risk = LADD \times CSF$$

These risks are probabilities that are generally expressed in scientific notation (e.g., 1E-06). An excess lifetime cancer risk (ELCR) of 1E-06 indicates that, as a plausible upper-bound, an individual has a one-in-one-million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at the Site. For exposures to multiple carcinogens, the EPA assumes that the risk associated with multiple exposures is equivalent to the sum of their individual risks. Increased cancer risks less than 1E-06 indicate no action is required. Cancer risks between 1E-06 and 1E-04 generally do not warrant cleanup unless dictated by site-specific circumstances or other considerations. Increased cancer risks greater than 1E-04 indicate some type of action needs to be considered.

The results of the HHRA for soil and groundwater at the ACW Site indicate that residential, industrial/ commercial worker, and recreational exposures result in unacceptable cancer risks and non-cancer hazards (see **Tables 3 through 10**).

As presented in **Table 3**, excess cancer risks exceeding 1E-04 were calculated for current/future residents exposed to the COCs in surface soil/sediment at the off-site residential area at SS114 (2.0E-04) and the ROW (1.2E-03). Excess cancer risks exceeding 1E-04 were also calculated for current/future industrial/commercial workers (**Table 5**) exposed to on site surface soil (2.7E-04); and current/future recreational users (**Table 7**) exposed to on site surface soil (2.7E-04).

As presented in **Table 4**, non-cancer hazard indices greater than one were calculated for the current/future child resident exposed to the COCs in surface soil/sediment at the off-site residential areas at SS119, SS121, SS145 (HIs ranging from 1 to 3), the PYC Area (HI=3), the ROW (HI=85), the Industrial Area West (HI=3), and the Industrial Area North (HI=3). Non-cancer hazard indices greater than one were also calculated for current/future industrial/commercial workers (**Table 6**) and recreational users (**Table 8**) exposed to on site surface soil (HIs of 6 and 13, respectively). The critical target organ of concern associated with all hazard threshold exceedances is the reproductive system.

As presented in **Table 9**, excess cancer risks exceeding 1E-04 were calculated for future residents exposed to the COCs in shallow groundwater (4.1E-02), intermediate groundwater (3.8E-02), and deep groundwater (1.7E-02). As presented in **Table 10**, non-cancer hazard indices greater than one were calculated for future residents exposed to the COCs in shallow groundwater (982), intermediate groundwater (958), and deep groundwater (430). The critical target organs of concern include effects on the liver, blood, kidney, body weight, motor coordination, growth and body fat, lethargy and prostration, as well as effects of the reproductive, respiratory and central nervous systems.

The results of the HHRA for soil/sediment and groundwater at the ACW Site indicate that residential, industrial/commercial, and recreational exposures result in unacceptable cancer risks and non-cancer hazards. Therefore, action under CERCLA is warranted. The COCs and a range of cleanup goals for soil/sediment and groundwater at the ACW Site are listed in **Tables 11 and 12.**

7.1.5 Uncertainties

The calculations presented in the HHRA are meant to assist the EPA remedial project manager with information on which to base risk management decisions. A combination of site-specific exposure information, standard default assumptions, and professional judgment were used to select exposure units and develop exposure assumptions for the various receptors evaluated in the HHRA. For each of these exposure assumptions (or exposure parameters) a single numerical value (or point estimate) is selected from the range of possible values for a given parameter. For example, an exposure frequency of 350 days per year was used to represent the number of days spent at home each year for the residential scenario evaluated in the HHRA. As shown in this example, all the point estimate values are chosen so as not to underestimate potential exposures. When these point estimates are combined in a risk equation, the result is conservative and is likely to overestimate hazards and risks.

An uncertainty evaluation was conducted using a Probabilistic Risk Assessment (PRA) that evaluated residential exposures to TCDD in soil at the ACW Site to characterize the variability and uncertainty in the HHRA risk estimates and to assist with the development of a technically defensible and health-protective target concentration. A PRA is a mathematical technique that incorporates information on the full range and likelihood of possible values for one or more exposure parameter (e.g., body weight) in a risk equation, rather than a single value. For example, exposure parameters in a PRA are mathematically defined by a "probability distribution" that is based on a central tendency value (e.g., mean or median) and at least one other value that provides information on the spread of the values in the distribution (e.g., standard deviation or upper percentile). In a PRA, the risk equation is "solved" thousands of times, each time a new value is selected for each parameter based on its underlying probability distribution. The output of a PRA is a probability distribution of risks experienced by the receptors.

The PRA-based uncertainty evaluation resulted in a TCDD concentration of 37 nanograms per kilogram (ng/kg) in residential soil, which represents an ELCR of 1E-06 at the 90^{th} percentile of the final exposure/risk distribution. This PRA-based TCDD soil target concentration can be

compared to EPA's default risk-based RGO of 50 ng/kg (which corresponds to a non-cancer Hazard Quotient of 1 and an ELCR of approximately 1E-05), and to FDEP's default SCTL of 7 ng/kg (which corresponds to an ELCR of 1E-06). FDEP also performed a site-specific bioavailability study on ACW's dioxin. The result of this site-specific dioxin study showed the relative bioavailability of dioxin in soil was 59 percent (%). FDEP replaced its standard SCTL assumption on bioavailability in its deterministic formula to calculate a SCTL with this site-specific bioavailability value. This resulted in a site-specific residential soil FDEP cleanup number of 15 ng/kg. The reason for including these numbers in the uncertainty section is only for information purposes to demonstrate that other suggested cleanup values can be calculated using additional site specific information that, like the default SCTLs, also achieve a 10-6 risk level. This number along with EPA's probabilistic value discussed in the section indicate a broader range of cleanup values beyond 7 ppt that are still protective for residents.

It is important to note that several conservative assumptions were retained in the development of probability distributions to maintain a high level of confidence that the selected SCTL cleanup goal is protective of human health, including sensitive subpopulations. A recent literature review and data analysis conducted on behalf of the EPA indicates that the relative bioavailability of dioxin may be considerably less than 100% (Syracuse Research Corporation [SRC], 2010). If bioavailability was incorporated into this analysis, it would likely result in an incremental increase in the PRA-based soil target concentration developed for TCDD. All EPA calculations used 100% relative bioavailability.

7.2 Summary of the Ecological Risk Assessment

The potential impact of ACW related contaminants on ecological receptors has been evaluated in three separate ERAs. Environmental impacts associated with the transport of contaminants from the Site (erosion of site soil and movement of contaminants via overland flow and groundwater into Pensacola Bay) were evaluated as part of the risk assessment for OU1 in 1989. An evaluation of the potential risks to terrestrial and aquatic receptors associated with contaminated soil and groundwater was included in the risk assessment for OU2 in 1993. In addition, an ERA was conducted for OU3 in 2009, and included an evaluation of the potential risk to ecological receptors associated with exposure to dioxins and furans in the offsite commercial/residential areas at the Site.

7.2.1 Problem Formulation

The CSM developed for the ERA is presented in **Figure 4**. The chemicals of potential ecological concern include PAHs and dioxins/furans in soils and sediments. The chemicals of potential ecological concern in groundwater include dioxins/furans, VOCs, and SVOCs. The primary contaminant transport mechanisms at the site are: 1) erosion and runoff from source areas to Pensacola Bay; and 2) leaching of contaminants into shallow groundwater that may discharge to Pensacola Bay.

The ACW Site and offsite area consist of two major types of ecosystems (terrestrial and aquatic). There are two terrestrial habitats at the Site. The first habitat consists of grasslands or field areas over the majority of the center of the Site. To the east and south of the Site the second habitat consists of a wooded or forested area. Aquatic habitat does not exist on the ACW site; however,

offsite aquatic habitats located in Pensacola Bay may be impacted by the movement of contaminants from the Site. Exposure routes to ecological receptors in these habitats are direct contact with contaminated soil, sediments and surface water, and bioaccumulation through the food web. Because several PAHs and dioxins/furans are readily transferred through the food web, the evaluation considered potential effects to upper-trophic level mammals and birds that ingest contaminated prey from the Site.

The assessment endpoints (ecological resources to be protected) selected for the ACW site are:

- Protection of soil organisms and terrestrial wildlife.
- Protection of aquatic life in the Pensacola Bay

Site data and/or measurement endpoints needed to evaluate ecological risks to the above assessment endpoints included:

- Use of existing soil screening levels and/or benchmarks to assess exposure and risks to terrestrial wildlife.
- Use of existing water quality standards and/or benchmarks and sediment quality values to assess exposure and risks to aquatic life.

7.2.2 Risks to Terrestrial Receptors

The Site is located in an urban residential and light industrial/commercial setting adjacent to Pensacola Bay. There are no unique terrestrial habitats or open-space lands of suitable size within or near the area. The Site is approximately 3 miles from several state and national preserve areas. Seventeen wildlife species which are either state or national endangered or threatened species are found in the ACW area; however, none of these species have been documented on-site. Ecological receptors in this area consist primarily of urban-tolerant song birds, a few gulls, and small rodents such as mice. Neighborhood dogs and cats are common.

There are no site-specific terrestrial toxicity test data available for this Site. The residual dioxin concentrations that exist across most of the Site are quite low and would not constitute an adverse risk to local wildlife. Based on EPA's Soil Screening Level (SSL) for PAHs, there are a few isolated locations where BaP TEQ concentrations exceed the Eco SSL for high molecular weight PAHs. However, the residual concentrations of PAHs across most of the Site are less than the SSL and would not constitute an adverse risk to local wildlife.

7.2.3 Risks to Aquatic Receptors

Aquatic receptors are not present on the ACW Site. There currently is no pathway from the Site to nearby Pensacola Bay, which does support a variety of reptiles, fish, mammals, crustaceans, mollusks, insects, and plants.

For the Bay, an ecological risk evaluation was performed by the EPA Science Ecosystem Support Division (SESD) in February 2010 that evaluated the sediment, pore water and surface water samples at the site. That study reviewed 13 different sampling locations in Bayou Chico, Pensacola Bay and PYC Ditch and found there is minimal risk from dioxin/furans to mammals

and birds in this area, which were considered to be the most sensitive receptors to the dioxins. The low dioxin concentrations and the small level of exceedences over the mammalian screening value as reported for Bayou Chico and Pensacola Bay samples is not likely to cause significant adverse effects to mammalian (or avian or aquatic) receptors, especially because it has been stated that the sediments in the shoreline areas are "mucky". This implies a fairly high organic matter content, which would serve to make the residual dioxins in the sediment less bioavailable. Given that the risk assessment performed for the Bay found no unacceptable risk to ecological receptors for the aquatic areas, and the remedial actions planned for the terrestrial areas, the Region believes ecological risk has been adequately addressed for this site.

Contaminated shallow groundwater flows south toward Pensacola Bay. There are no site-specific aquatic toxicity test data available for this Site. Information on the effects of several chemicals detected in the groundwater to various aquatic receptors was unavailable. TCDD is reported to cause mortality in fish at 2.3 ppm. Benzene, carbon disulfide, styrene, trichlorobenzene, and xylene are known to be highly toxic to aquatic life.

Maximum concentrations of chemicals detected in the shallow groundwater exceed Florida Marine surface water quality criteria for Class 3 Marine Surface Water (Fish Consumption, Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife). However, the impact of the shallow aquifer on aquatic life in Pensacola Bay is likely to be minimal because of the low flow volumes to the Bay, tidal mixing, continued infiltration of precipitation, and the current low level of contamination of the shallow aquifer south of the Site near the point of discharge to the Bay.

7.2.4 Summary

The potential for ecological risk associated with the ACW Site was evaluated for both terrestrial and aquatic receptors. The residual concentrations of dioxins and PAHs in soil across most of the ACW Site and offsite area are not expected to result in an adverse risk to terrestrial wildlife. Concentrations of chemicals detected in the shallow groundwater may discharge to Pensacola Bay. The impact of the shallow aquifer on aquatic life in the bay is likely to be minimal mainly due to low water volumes and extensive tidal mixing.

8.0 Remedial Action Objectives

To satisfy requirements of CERCLA and based on previous Site investigations, Remedial Action Objectives (RAOs) have been developed for the Site. The RAOs were developed to protect human health and the environment. The objectives specify the contaminants and media of concern, the exposure route(s) and receptor(s), and the acceptable contaminant levels or range of levels for each exposure route. The following Site-specific RAOs were developed for the ACW Site:

- Prevent human (adult and child resident) exposure (ingestion, inhalation, dermal) to site-related contaminated soil at concentrations above regulatory direct exposure contaminant levels.
- Prevent ingestion of groundwater that contains concentrations of compounds representing a total excess cancer risk greater than 10-6, a non-carcinogenic HI greater than 1, or

concentrations which exceed Federal and State Applicable or Relevant and Appropriate Requirements (ARARs).

- Reduce or eliminate the long-term leachability of soil COCs into the groundwater.
- Provide protection of marine surface waters from migration of contaminated groundwater into Pensacola Bay/Bayou Chico.
- Reduce residual and free-phase NAPL materials to the maximum extent practicable.

8.1 Cleanup Levels

EPA has adopted the remedial goals (PRGs) identified in the Proposed Plan as the final cleanup levels. PRGs are the concentrations for individual COCs in the distinct media above, which must be achieved in order for the remedy to achieve RAOs. The PRGs for the ACW Site were developed during the FS and are based on specific chemical-based ARARs and risk evaluations. The cleanup levels for the COCs at the Site are provided in **Tables 11**.

Soil cleanup levels were determined for the soil COCs in consideration of Florida's CTLs for residential and commercial/industrial exposure scenarios.

Groundwater PRGs are provided in **Table 12**. Groundwater cleanup levels will be determined once a final remedy is selected for the ACW site.

9.0 Description of Alternatives

9.1 Description of the Main Source Zone (CMZ-1) Remedy Alternatives

The five remedial alternatives developed for CMZ-1 are:

9.1.1 CMZ-1 Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual Operation and Maintenance (O&M) Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

Section 300.430(e)(6) of the NCP directs that a "No Action Alternative" be evaluated to provide a baseline scenario to compare all other alternatives against. The No Action Alternative can typically only include compliance monitoring. In general, the alternative is applicable when there is no current or potential threat to human health and the environment or when CERCLA exclusions preclude taking an action. Under No Action Alternatives, no funds are expended for control or remediation of the contaminated media. Funds are required for the statutory FYRs of the Site for Site visits, minimal compliance sampling and analyses of select contaminated media, review of regulatory changes, and report preparation.

This CMZ would remain in its present condition. Minimal periodic sampling and analysis of COCs in surface water, sediments, or soil would be used to track contaminant concentrations

over the course of a 30-year monitoring period. This information will facilitate evaluation of the conditions at the CMZ for the FYR.

9.1.2 CMZ-1 Alternative 2: Barrier Wall Containment and Cap

Estimated Capital Costs: $4,822,503
Estimated Annual O&M Costs: $12,000
Estimated Present Worth Costs: $5,067,800
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

Alternative CMZ-1 #2 consists of constructing a barrier wall to completely surround the CMZ-1 zone, extending from the ground surface down to and keyed into the underlying continuous clay layer approximately 100 ft bls. At the surface, the entire area will be covered with a geosynthetic clay layer (GCL), low density polyethylene (LDPE) or high density polyethylene (HDPE) liner, or a combination of these to contain the PTW and with a 2-foot clean layer of fill on top that is vegetated cover to prevent rainwater from infiltrating into the containment system. The alternative would contain the primary source of contamination at the site including DNAPL, residual DNAPL and creosote contaminated statured soils.

9.1.3 CMZ-1 Alternative 3: Surfactant Enhanced Aquifer Remediation with multi-phase extraction (MPE); ISCO/ISEB

Estimated Capital Costs: $36,254,769
Estimated Annual O&M Costs: $343,900
Estimated Present Worth Costs: $38,143,500
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 years

Alternative CMZ-1 #3 includes surfactant enhanced aquifer remediation (SEAR) with a NAPL recovery system to remove creosote directly from the saturated soil. The NAPL would be separated from the extracted NAPL/groundwater for subsequent recycling. This remedy combination also includes ISCO/ISEB treatment as a polishing component.

9.1.4 CMZ-1 Alternative 4: SEE; ISCO/ISEB

Estimated Capital Costs: $23,296,431
Estimated Annual O&M Costs: $343,900
Estimated Present Worth Costs: $25,185,200
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 years

Alternative CMZ-1 #4 includes the combination of thermal-enhanced NAPL recovery using steam stripping with an overlapping multiphase extraction (MPE) capture zone. This remedy combination also includes ISCO/ISEB treatment as a polishing component.

9.1.5 CMZ-1 Alternative 5: Solidification/Stabilization (S/S) with Large Diameter Augers (LDA); SEE (Deep); ISCO/ISEB

Estimated Capital Costs: $27,562,410
Estimated Annual O&M Costs: $343,900
Estimated Present Worth Costs: $29,451,100
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 years

Alternative CMZ-1 #5 consists of an in situ treatment scenario using LDAs for soil mixing and stabilization with a cement slurry followed by the application of SEE for deeper soil that cannot be cost effectively stabilized with the LDA method. This remedy combination also includes ISCO/ISEB treatment as a polishing component.

9.2 Description of the Extended NAPL Plume – On-facility (CMZ-2A) Remedy Alternatives

The four remedial alternatives developed for CMZ-2A are:

9.2.1 CMZ-2A Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

This remedy is analogous to the No Action Alternative CMZ-1.

9.2.2 CMZ-2A Alternative 2: SEAR with MPE

Estimated Capital Costs: $18,270,358
Estimated Annual O&M Costs: $214,600
Estimated Present Worth Costs: $18,555,800
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 7 years

Alternative CMZ-2A #2 consists of an application of SEAR for NAPL recovery, equivalent to the approach outlined for CMZ-1, Alternative #3. SEAR would be applied to the DNAPL-impacted soil.

9.2.3 CMZ-2A Alternative 3: SEE

Estimated Capital Costs: $10,993,334
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $10,993,300
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 1 year

Alternative CMZ-2A #3 includes thermal-enhanced NAPL recovery using SEE steam stripping with an overlapping MPE capture zone. SEE would be applied to the DNAPL and creosote-impacted soil.

9.2.4 CMZ-2A Alternative 4: S/S with LDA; SEE (Deep)

Estimated Capital Costs: $13,307,320
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $13,307,300
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 months

Alternative CMZ-2A #4 is an in situ treatment scenario which includes soil mixing and stabilization with a cement slurry followed by the application of SEE for deeper soil that cannot be cost effectively stabilized by the LDA method.

9.3 Description of the Extended NAPL Plume – Off-facility (CMZ-2B) Remedy Alternatives

The four remedial alternatives developed for CMZ-2B are:

9.3.1 CMZ-2B Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-2B No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.3.2 CMZ-2B Alternative 2: SEAR with MPE

Estimated Capital Costs: $6,551,780
Estimated Annual O&M Costs: $214,600
Estimated Present Worth Costs: $7,329,000
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 4 years

Alternative CMZ-2B #2 consists of the application of SEAR for NAPL recovery equivalent to the approach outlined for CMZ-1, Alternative #3. SEAR would be applied to the shallow creosote impacted soil. The recovered DNAPL will be contained and shipped off for total destruction at concrete kiln. The groundwater will be treated onsite and discharged to an onsite infiltration gallery.

9.3.3 CMZ-2B Alternative 3: SEE

Estimated Capital Costs: $5,002,200

Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $5,002,200
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 1 year

Alternative CMZ-2B #3 includes thermal-enhanced NAPL recovery using SEE steam stripping with an overlapping multiphase extraction capture zone. SEE would be applied to the DNAPL and creosote-impacted soil. The recovered DNAPL will be contained and shipped off for total destruction at concrete kiln. The groundwater will be treated onsite and discharged to an onsite infiltration gallery.

9.3.4 CMZ-2B Alternative 4: S/S with LDA; ISCO

Estimated Capital Costs: $3,718,915
Estimated Annual O&M Costs: $214,600
Estimated Present Worth Costs: $4,469,200
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 2 years

Alternative CMZ-2B #4 includes an in situ treatment scenario, which includes S/S for shallow soil impacts. S/S would be applied to the creosote-impacted soil to a depth of 20-ft. Areas not accessible by LDA (roads, buildings, and utilities) would be addressed with ISCO.

9.4 Description of the Secondary Source Zone/Adsorbed Phase Zone – On-facility (CMZ-3) Remedy Alternatives

The four remedial alternatives developed for CMZ-3 are:

9.4.1 CMZ-3 Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-3 No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.4.2 CMZ-3 Alternative 2: ISCO/ISEB Barriers

Capital Costs: $2,731,942
Estimated Annual O&M Costs: $125,000
Estimated Present Worth Costs: $3,182,200
Estimated Construction Timeframe: 6 months
Estimated Time to Achieve RAOs/Cleanup Levels: 6 years

This alternative includes an upgradient ISEB treatment zone to be installed along the northern CMZ-3 boundary and combined ISCO/ISEB treatment barrier along the southern edge of

CMZ-3.

9.4.3 CMZ-3 Alternative 3: S/S with Shallow Soil Mixing (SSM); ISCO/ISEB

Capital Costs: $8,891,262
Estimated Annual O&M Costs: $125,000
Estimated Present Worth Costs: $9,341,500
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 6 years

This alternative includes an in situ treatment which includes S/S for shallow soil impacts. This remedy combination also includes ISCO/ISEB treatment as a polishing component.

9.4.4 CMZ-3 Alternative 4: ISEB

Capital Costs: $2,076,531
Estimated Annual O&M Costs: $85,000
Estimated Present Worth Costs: $2,566,000
Estimated Construction Timeframe: 6 months
Estimated Time to Achieve RAOs/Cleanup Levels: 6 years

This alternative includes an upgradient ISEB treatment zone that would be installed along the northern CMZ-3 boundary along with a second barrier to be deployed across the center of the CMZ-3 area.

9.5 Description of the On-facility Surface Soil Contamination (CMZ-4A) Remedy Alternatives

The five remedial alternatives developed for CMZ-4A are:

9.5.1 CMZ-4A Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-4A No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.5.2 CMZ-4A Alternative 2: Excavation, Encapsulate On-Facility in Barrier Wall (CMZ-1)

Capital Costs: $2,005,471
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $2,005,500
Estimated Construction Timeframe: 8 months
Estimated Time to Achieve RAOs/Cleanup Levels: 8 months

This alternative includes excavation of all unsaturated contaminated surficial soil on the former facility in CMZ-2A and CMZ-3 from 0 to 3-ft bls. These CMZ-4A soils with the exception of soils that currently overlay CMZ-3 would be placed inside the CMZ-1 Alternative #2 barrier wall and capped for long-term isolation. The CMZ-4A soils overlying CMZ-3 will be placed within an encapsulated cell within CMZ-3. At the surface, the entire on-facility area (excluding CMZ-1) will be covered with a multi-component cover consisting of 18 inches of clean fill, 6 inches of enriched soil and then hydro seeding.

9.5.3 CMZ-4A Alternative 3: Excavation with Off-facility Incineration

Capital Costs: $44,431,853
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $44,431,900
Estimated Construction Timeframe: 8 months
Estimated Time to Achieve RAOs/Cleanup Levels: 8 months

This alternative includes excavation of all the soil on the ACW property from 0-3 ft bls, from CMZs-1, 2A, and 3 with transport and treatment by incineration at a Texas-based facility. Excavated areas would be used as capacity for depositing the CMZ-4B residential soil and/or be graded to land surface with clean fill, enriched soil, and hydro seeded.

9.5.4 CMZ-4A Alternative 4: Excavation, *Ex situ* S/S, Place On-facility

Capital Costs: $8,155,458
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $8,155,500
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 months

Excavated soil from CMZ-1, -2A, and -3 would be solidified in an aboveground pug mill. Soil processing would include excavation, screening, cement reagent addition and transport by dump truck to various locations on the property for emplacement by a bulldozer. The treated soil would be covered with a nominal 2-ft soil/sod cover.

9.5.5 CMZ-4A Alternative 5: *In situ* S/S

Capital Costs: $6,602,394
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $6,602,400
Estimated Construction Timeframe: 12 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12 months

This remedy is an in situ treatment scenario using Shallow Soil Mixing (SSM) to stabilize the contaminated surface soil from 0-3 ft bls in CMZ-1, 2A, and 3. A 2-ft clean fill cover, followed by hydro seeding would be placed over the soil to protect the stabilized soil and to prevent direct contact exposure with the soil.

9.6 Description of the Off-facility Surface Soil Contamination (CMZ-4B) Remedy Alternatives

The five remedial alternatives developed for CMZ-4B are:

9.6.1 CMZ-4B Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-4B No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.6.2 CMZ-4B Alternative 2: Encapsulate On-facility in Barrier Wall (CMZ-1)

Capital Costs: $4,949,989
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $4,950,000
Estimated Construction Timeframe: 12-18 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12-18 months

This alternative includes excavation of all unsaturated contaminated residential surficial soil from off-facility at depths ranging from 6 inches to a maximum depth of 3-ft bls (top of the average water table), plus excavation of the 35,000 CY stockpile. The excavated soil would be placed inside the CMZ-1 Alternative #2 barrier wall and capped for long-term isolation. At the surface, the entire area would be covered with a multi-component cover consisting of 18 inches of clean fill, 6 inches of enriched soil and then hydro seeding.

9.6.3 CMZ-4B Alternative 3a: Excavation, Off-facility Disposal to Subtitle D Landfill

Capital Costs: $10,507,439
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $10,507,400
Estimated Construction Timeframe: 12-18 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12-18 months

This alternative consists of excavation of the surficial soil from the neighborhood, plus the 35,000 CY stockpile with subsequent transportation and disposal to a local Subtitle D landfill.

9.6.4 CMZ-4B Alternative 3b: Excavation, Off-facility Disposal at Escambia Wood Treating Company (ETC) Superfund Site

Capital Costs: $4,975,193
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $4,975,200
Estimated Construction Timeframe: 12-18 months

Estimated Time to Achieve RAOs/Cleanup Levels: 12-18 months

This alternative consists of excavation of the same volume of surficial soil as in Alternative #3a with subsequent transportation and disposal of the soil in an engineered vault at the ETC Superfund Site, 5-miles north of ACW in Pensacola, FL.

9.6.5 CMZ-4B Alternative 4: Excavation/Disposal On-facility Over CMZ-2A/3 Areas

Capital Costs: $5,426,436
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $5,426,400
Estimated Construction Timeframe: 12-18 months
Estimated Time to Achieve RAOs/Cleanup Levels: 12-18 months

This alternative is identical to CMZ-4B Alternative #2, except that the off-facility soil along with the 35,000 CY stockpile would be placed over the CMZ-2A and CMZ-3 areas for long term isolation. PTW soils on Pine and Gimble Street would be brought onsite and placed within the CMZ-1 containment unit. At the surface, the entire CMZ-2A and CMZ-3 areas will be covered with a protective soil cover.

9.7 Description of the Extended Dissolved Groundwater Plume (CMZ-5) Remedy Alternatives

The three remedial alternatives developed for CMZ-5 are:

9.7.1 CMZ-5 Alternative 1: No Action

Estimated Capital Costs: $0
Estimated Annual O&M Costs: $0
Estimated Present Worth Costs: $0
Estimated Construction Timeframe: 0 months
Estimated Time to Achieve RAOs/Cleanup Levels: greater than 30 years

The CMZ-5 No Action Alternative is equivalent to the CMZ-1 and CMZ-2A, No Action alternatives.

9.7.2 CMZ-5 Alternative 2: Hydraulic Containment

Capital Costs: $266,459
Estimated Annual O&M Costs: $194,560
Estimated Annual Groundwater Sampling Costs: $141,500
Estimated Present Worth Costs: $3,289,300
Estimated Construction Timeframe: 8 months

Estimated Time to Achieve RAOs/Cleanup Levels: 15 years*
* Because this is an interim remedy, the timeframe is estimated.

This alternative would rely upon the use of a series of groundwater recovery wells to intercept the downgradient dissolved SVOC and PCP contaminant plumes. Recovered groundwater would be conveyed to the facility for treatment and subsequent discharge to on-facility infiltration galleries.

9.7.3 CMZ-5 Alternative 3: ISCO/ISEB Treatment Barrier

Capital Costs: $926,521
Estimated Annual O&M Costs: $150,300
Estimated Annual Groundwater Sampling Costs: $141,500
Estimated Present Worth Costs: $3,409,300
Estimated Construction Timeframe: 8 months
Estimated Time to Achieve RAOs/Cleanup Levels: 10 years*
* Because this is an interim remedy, the timeframe is estimated.

This alternative is an extension of CMZ-3 Alternative #2 (ISCO/ISEB Barriers). An additional ISCO/ISEB treatment barrier would be installed along the Pensacola Bay shoreline to protect the Bay.

9.8 Common Elements of Each Alternative

With the exception of Alternative 1: No Action, all of the individual alternatives evaluated would include; (1) institutional controls (ICs) to restrict access and land use to prohibit intrusive activities below 2-ft, and (2) periodic monitoring of the Site to document the effectiveness and continued protectiveness of the remedy. Since these components are common elements of all alternatives, they are described at this point in the document to prevent repetition, and are not included under each remedial alternative description in the following section. The costs of these common elements are included in the remedy cost estimates.

9.8.1 Institutional Controls

ICs will be required for all the alternatives since waste will remain in place. The following generally describes those ICs to be considered for implementation at the Site to achieve the performance objectives:

- Prohibit intrusive activities in the area of the barrier wall and cap to be installed as stated for the Selected Remedy
- Property record notices could be implemented to inform anyone performing a search of property records to important information about contamination and response actions on the Site.
- Restrictive covenants could be executed by the property owners that outline the prohibition of any residential, industrial, or recreational reuse of the property unless prior written approval is obtained from EPA and FDEP. The covenant could also prohibit interference with the integrity of any existing or future monitoring or remediation system without prior EPA and FDEP approval. Notice of the application of ICs to the Site via the restrictive covenant would be provided to the local regulatory agencies.
- Regulatory restrictions including Chapter 62-524, F.A.C., "Delineated Areas rule."

Should any IC fail, EPA and FDEP will ensure that appropriate actions are taken to reestablish the remedy's protectiveness.

9.9 Distinguishing Features of Each Alternative

The following chart lists the advantages and disadvantages of each of the alternatives.

Criteria	Analysis	
Alternative: No Action for all Alternatives		**All**
Advantages	• Low cost, no site disruption	
Disadvantages	• Site would remain in current condition, no additive protection of human health and the environment • The potential for ingestion or direct contact with deeper contaminated soil would remain	
CMZ-1 Alternative #2: Barrier Wall Containment with Cap		**CMZ-1**
Advantages	• Common construction practice on CERCLA sites • Eliminates direct contact hazard • Cap prevents flushing and recharged leaching • Implementation in less than one year	
Disadvantages	• Containment and isolation only, no reduction of toxicity and volume through treatment • Potential for slow leaching of dissolved COCs through wall via diffusion • Potential for transport or leaching through inconsistencies in basal clay • French drain may be required to redirect aquifer flow around barrier • Hydraulic control system may be required within barrier w/ long term intermittent operation	
CMZ-1 Alternative #3: SEAR w/MPE; ISCO/ISEB		**CMZ-1**
Advantages	• SEAR greatly accelerates NAPL removal rates and quantity • Implementation in less than one year • Can use existing NAPL recovery wells (with additional wells) • MPE provides strong hydraulic controls • Combination of ISCO and ISEB are amenable to COCs (except dioxin) • Offers a high degree of operational flexibility to optimize treatment • Both ISCO/ISEB will be effective in predominantly sandy lithology • Well proven technologies for wood treating sites • ISCO/ISEB Particularly compatible with *in situ* thermal enhancement	
Disadvantages	• High volume of surfactant chemical required in CMZ-1 • Potential for COC dissolved mobilization, even vertically • Complex chemistry highly dependent upon bench and pilot scale testing • Treatment of extracted groundwater is complex and costly • Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants • Appreciable residual NAPL would consume large volumes of oxidant • Potentially longer timeframe for ISEB treatment • ISEB is less certain with PCP contamination	
CMZ-1 Alternative #4: SEE; ISCO/ISEB		**CMZ-1**

Criteria		Analysis	
Advantages		◦ Greatly accelerates NAPL removal rates and quantity ◦ High mass reduction efficiency rates (typically greater than 90-95 percent). ◦ Implementation in less than one year ◦ Can use existing NAPL recovery wells (with additions) ◦ SEE reduces leachability of residual COCs ◦ SEE enhances aerobic bioremediation on periphery ◦ SEE complimentary with ISCO/ISEB approaches ◦ Combination of ISCO and ISEB are amenable to COCs (except dioxin) ◦ Offers a high degree of operational flexibility to optimize treatment ◦ Both ISCO/ISEB will be effective in predominantly sandy lithology ◦ Well proven technologies for wood treating sites ◦ ISCO/ISEB particularly compatible with *in situ* thermal enhancement	
Disadvantages		◦ Potential for creosote mobilization at creosote front (mitigation through MPE) ◦ Treatment of extracted groundwater and vapors is extensive and costly ◦ Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants ◦ Appreciable residual NAPL would consume large volumes of oxidant ◦ ISCO/ISEB application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested ◦ Potentially longer timeframe for ISEB treatment ◦ ISEB is less certain with PCP contamination	
CMZ-1 Alternative #5: S/S with LDA and SEE (Deep); ISCO/ISEB			**CMZ-1**
Advantages	S/S	◦ S/S should effectively bind NAPL and prevent significant leachate. ◦ Successfully applied at other sites ◦ Lower vapor phase emissions to be treated ◦ No chance of increased mobilization; not lithology dependent ◦ Can easily bind residual dioxin levels ◦ Good soil bearing capacity for future land development ◦ Rapid application (less than a year)	
	SEE	◦ Greatly accelerates NAPL removal rates and quantity ◦ High mass reduction efficiency rates (typically greater than 90-95 percent) ◦ Implementation in less than one year ◦ Can use existing NAPL recovery wells (with additions) ◦ Reduces leachability of residual COCs ◦ Enhances aerobic bioremediation on periphery ◦ Complimentary with ISCO and ISEB approaches	
	ISCO/ ISEB	◦ Combination of ISCO and ISEB are amenable to COCs (except dioxin) ◦ Offers a high degree of operational flexibility to optimize treatment ◦ Both ISCO/ISEB will be effective in predominantly sandy lithology ◦ Well proven technologies for wood treating sites ◦ Particularly compatible with *in situ* thermal enhancement. ◦ No contaminated vapors to treat and minimal equipment	
Disadvantages	S/S	◦ No destruction of COCs ◦ Long term care of cap; inspections/maintenance required ◦ Potential for large volumes and pore space percentages of NAPL to be too rich for satisfactory stabilization	
	SEE	◦ Potential for creosote mobilization at creosote front (mitigation through MPE) ◦ Treatment of extracted groundwater and vapors is costly	
	ISCO/ ISEB	◦ Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants	

Criteria		Analysis
		• Appreciable residual NAPL would consume large volumes of oxidant • Application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested • Potentially longer timeframe for ISEB treatment • ISEB is less certain with PCP contamination
CMZ-2A Alternative #2: SEAR w/MPE		**CMZ-2A**
Advantages		• Greatly accelerates NAPL removal rates and quantity • Implementation in less than one year • Can use existing NAPL recovery wells (with additional wells) • MPE provides strong hydraulic controls
Disadvantages		• Potential for COC dissolved mobilization, even vertically • Complex chemistry highly dependent upon bench and pilot scale testing • High volume of surfactant chemical required in CMZ-2A • Treatment of extracted groundwater is complex and costly • More difficult to extract multi-phase fluids with depth. • Robust approach relative to RAO for protection of Bay
CMZ-2A Alternative #3: SEE		**CMZ-2A**
Advantages		• Greatly accelerates NAPL removal rates and quantity • Technology can be applied effectively in deeper soil • High mass reduction efficiency rates (typically greater than 90-95 percent) • Implementation in less than one year • Suitable lithology • Can use two existing NAPL recovery wells (with additions) • Reduces leachability of residual COCs • Enhances aerobic bioremediation on periphery • Wellheads, manifolds, and equipment can be remobilized to treat other CMZs (e.g. CMZ-2B) or for potential use on other CERCLA wood-treating sites
Disadvantages		• Potential for creosote mobilization at creosote front (mitigation through MPE) • Treatment of extracted groundwater and vapors is extensive and costly • Robust approach relative to RAO for protection of Bay
CMZ-2A Alternative #4: S/S with LDA and SEE (Deep)		**CMZ-2A**
Advantages	S/S	• S/S should effectively bind NAPL and prevent significant leachate. • Successfully applied at other sites • Lower vapor phase emissions to be treated • No chance of increased mobilization; not lithology dependent • Can easily bound residual dioxin levels • Good soil bearing capacity for future land development • Rapid application (less than a year)
	SEE	• SEE treatment is focused on smaller areal extent • Greatly accelerates NAPL removal rates and quantity • High mass reduction efficiency rates (typically greater than 90-95 percent). • Implementation in less than one year • Can use two existing NAPL recovery wells (with additions) • Reduces leachability of residual COCs. • Enhances aerobic bioremediation on periphery
Disadvantages	S/S	• No destruction of COCs • Long term care of cap; inspections/maintenance required • Potential for large volumes and pore space percentages of NAPL to be too rich for satisfactory stabilization • Robust approach relative to RAO for protection of the Bay

Criteria		Analysis
	SEE	◦ Potential for creosote mobilization at creosote front (mitigation through MPE) ◦ Treatment of extracted groundwater and vapors is costly • Applying secondary major technology within same CMZ
CMZ-2B Alternative #2: SEAR w/MPE		**CMZ-2B**
Advantages		◦ Greatly accelerates NAPL removal rates and quantity • Implementation in less than one year ◦ MPE provides strong hydraulic controls ◦ More NAPL stringers and less saturated NAPL will require less surfactant than source areas ◦ Can be applied under existing roads and buildings
Disadvantages		◦ Potential for COC dissolved mobilization, even vertically, particularly significant close to the Bay ◦ Complex chemistry highly dependent upon bench and pilot scale testing ◦ Treatment of extracted groundwater is complex and costly
CMZ-2B Alternative #3: SEE		**CMZ-2B**
Advantages		◦ Greatly accelerates NAPL removal rates and quantity ◦ High mass reduction efficiency rates (typically greater than 90-95 percent) • Implementation in less than one year ◦ Suitable lithology ◦ Reduces leachability of residual COCs ◦ Enhances aerobic bioremediation on periphery
Disadvantages		◦ Potential for creosote mobilization at creosote front (mitigation through MPE) ◦ Cannot be easily used around roads and buildings ◦ Potentially greater community concerns with technology and treatment equipment off-facility • Treatment of extracted groundwater and vapors is extensive and costly
CMZ-2B Alternative #4: S/S with LDA; ISCO		**CMZ-2B**
Advantages		• S/S should effectively bind NAPL and prevent significant leachate ◦ Successfully applied at other sites ◦ Lower vapor phase emissions to be treated ◦ No chance of increased mobilization; not lithology dependent • S/S can easily bind residual dioxin levels ◦ S/S good soil bearing capacity for future land development ◦ Rapid application (less than a year) ◦ ISCO can effectively treat under obstructions • Offers a high degree of operational flexibility to optimize treatment • ISCO will be effective in predominantly sandy lithology ◦ Proven technologies for wood treating sites ◦ No contaminated vapors to treat and minimal equipment
Disadvantages		◦ No destruction of COCs with S/S ◦ Long term care of cap and inspections/maintenance required ◦ Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants ◦ Appreciable residual NAPL would consume large volumes of oxidant ◦ ISCO Application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested
CMZ-3 Alternative #2: ISCO/ISEB Barriers		**CMZ-3**
Advantages		• Combination of ISCO and ISEB are amenable to COCs (except dioxin) • Offers a high degree of operational flexibility to optimize treatment

Criteria	Analysis
	• Both technologies will be effective in predominantly sandy lithology • ISEB is the most cost effective approach • Well proven technologies for wood treating sites • No contaminated vapors to treat and minimal equipment • Eliminates over 90 percent of off-facility PCP flux • Relies on sustainable solar power for slow release ISCO treatment well mixing
Disadvantages	• Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants • Application contingent upon successful bench scale testing; Unknown effect of natural oxidant demand until tested • Potentially longer timeframe for ISEB treatment • Slow release oxidant wells is an emerging technology application • No direct oxidation of PCP source area or high concentrations of SVOCs on the soil • Appreciable residual NAPL would consume large volumes of oxidant • ISEB is less certain with PCP contamination
CMZ-3 Alternative #3: S/S with SSM; ISCO/ISEB	**CMZ-3**
Advantages	• S/S should effectively bind COCs in surficial soil; ISCO and ISEB capable of mass destruction of deeper COCs • Successfully applied at other sites • No chance of increased mobilization; not lithology dependent • Can easily bind dioxin • Good soil bearing capacity for future land development • Rapid application • Combination of ISCO and ISEB are amenable to COCs (except dioxin) • Offers a high degree of operational flexibility to optimize treatment • Well proven technologies for wood treating sites • Applies both technologies to remediation of presumed PCP source area • No contaminated vapors to treat and minimal equipment • Both ISCO/ISEB will be effective in predominantly sandy lithology
Disadvantages	• No destruction of COCs with S/S • S/S and cap will be partially disrupted by repeat ISCO treatments • Long term care of cap and inspections/maintenance required • Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants • Appreciable residual NAPL would consume large volumes of oxidant • Application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested • Potentially longer timeframe for ISEB treatment • ISEB is less certain with PCP contamination
CMZ-3 Alternative #4: ISEB	**CMZ-3**
Advantages	• ISEB can be configured to treat SVOCs and PCP (but not dioxin) • Offers a high degree of operational flexibility to optimize treatment • Effective in predominantly sandy lithology on-facility • Well proven technology for wood treating sites; less proven with PCP component • No contaminated vapors to treat and minimal equipment
Disadvantages	• Application contingent upon successful bench scale testing

Criteria	Analysis	
	◦ ISEB not optimum technology if creosote stringers are present (appreciable residual NAPL would consume large volumes of oxidant) ◦ Potentially long timeframe for treatment ◦ May require bioaugmentation with no commercially available strains currently present ◦ No direct oxidation of PCP source area or high concentrations of SVOCs on the soil ◦ Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies. Will typically have some rebound of contaminants ◦ ISEB is less certain with PCP contamination	
CMZ-4A Alternative #2: Excavation/Encapsulate On-facility in Barrier Wall (CMZ-1)		**CMZ-4A**
Advantages	◦ Soils with highest level of dioxin contamination are isolated	
Disadvantages	• Soils are not treated ◦ Resultant addition to mound height at CMZ-1	
CMZ-4A Alternative #3: Excavation with Off-facility Incineration		**CMZ-4A**
Advantages	◦ All dioxin contamination soil on-facility are treated to regulatory acceptable standards. Incinerator must meet 99.99 percent destruction efficiency ◦ No addition to height of soil on property ◦ Treatment process is approved by the EPA	
Disadvantages	◦ Disruption for Site and community due to off-site transport ◦ Very high treatment costs	
CMZ-4A Alternative #4: Excavation, *Ex situ* S/S, Replace On-facility		**CMZ-4A**
Advantages	◦ S/S should effectively bind COCs in surficial soil ◦ Suitable lithology present ◦ Can easily bind dioxin ◦ Good soil bearing capacity for future land development • Rapid application ◦ *Ex situ* application should have improved QA/QC and mixture consistency	
Disadvantages	◦ No destruction of COCs ◦ Long term care of cap and inspections/maintenance required ◦ Needs further regulatory clarification but acceptable precedents exist for S/S	
CMZ-4A Alternative #5: *In situ* S/S On-facility		**CMZ-4A**
Advantages	◦ S/S should effectively bind COCs in surficial soil • Suitable lithology present, easily mixed for shallow depth • Can easily bind dioxin • Good soil bearing capacity for future land development ◦ Rapid application ◦ Less soil handling and associated Site disruptions and short-term impacts	
Disadvantages	◦ No destruction of COCs ◦ Long term care of cap and inspections/maintenance required ◦ Needs further regulatory clarification but acceptable precedents do exist for S/S	
CMZ-4B Alternative #2: Excavation/Encapsulate On-facility in Barrier Wall (CMZ-1)		**CMZ-4B**
Advantages	◦ Soils with highest level of off-facility dioxin contamination are securely isolated ◦ No long-term soil liability with off-facility landfill disposal	
Disadvantages	• Soils are not treated ◦ Resultant addition to height of grade on-facility	

Criteria	Analysis	
	• All CMZ-4B alternatives will have high direct impacts on surrounding properties due to construction activity	
CMZ-4B Alternatives #3a and3b: Excavation, Off-facility Disposal to Subtitle D Landfill (3a) or Off-facility Disposal to ETC Superfund Site (3b)		**CMZ-4B**
Advantages	• Soils with highest level of off-facility dioxin contamination are removed from the Site. No increase in surface elevation on the facility	
Disadvantages	• Soils are not treated • All CMZ-4B alternatives will have high direct impacts on surrounding properties. • Some long-term liability with off-site landfill disposal • Would require coordination between the ETC and ACW RA implementations	
CMZ-4B Alternative #4: Excavation/Disposal On-facility over CMZ-2A/3 Areas		**CMZ-4B**
Advantages	• Soils with highest level of off-facility dioxin contamination are securely isolated • No long-term soil liability with off-facility landfill disposal	
Disadvantages	• Soils are not treated • Resultant addition to height of soil on-facility (minimal) • All CMZ-4B alternatives will have high direct impacts on surrounding properties due to construction activity	
OU2/CMZ-5 Alternative #2: Hydraulic Containment		**CMZ-5**
Advantages	• This remedy is proven and reliable • Complete capture of the facility dissolved COCs along with additional sentry protection of the Bay • COCs are readily treated *ex situ* • No adverse impacts on the Bay • Sufficient room for well installation	
Disadvantages	• Off-facility treatment system required • Does not address higher mass of contamination on adsorbed phase • Will require long-term O&M, in particular for submersible pumps • Permission to obtain effluent discharge to POTW may be difficult	
OU2/CMZ-5 Alternative #3: ISCO/ISEB Treatment Barriers		**CMZ-5**
Advantages	• Flexible and robust approach for groundwater treatment • ISCO is proven technology for PCP destruction • No adverse impacts on the Bay • Sufficient room for well installation • Combination of ISCO and ISEB are amenable to COCs (except dioxin) • Both ISCO/ISEB will be effective in predominantly sandy lithology • No contaminated vapors to treat and minimal equipment	
Disadvantages	• Oxidant technologies require contact with the COCs to be effective; therefore, distribution is critical to the success of these technologies • Rebound can occur from back-diffusion of COCs • More complex system; may require additional O&M • Bench scale testing needed to finalize approach and to demonstrate the efficacy of ISEB for PCP • Appreciable residual NAPL would consume large volumes of oxidant • Application contingent upon successful bench scale testing; unknown effect of natural oxidant demand until tested • Potentially longer timeframe for ISEB treatment	

10.0 Comparative Analysis of Alternatives

The NCP establishes a framework of nine criteria for evaluating remedial alternatives. These nine criteria were used to evaluate the remedial alternatives individually and against each other to identify the Selected Remedy. If an alternative does not meet the first two threshold criteria; Overall Protection of Human Health and the Environment and Compliance with ARARs, EPA does not consider the alternative for further evaluation.

10.1 Overall Protection of Human Health and the Environment (HH&E)

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through exposure pathway are eliminated, reduced or controlled, through treatment, engineering controls and/or ICs.

All of the CMZ alternatives, except the No Action alternatives, are protective of human health and the environment by eliminating, reducing, or controlling risks posed by Site COCs through treatment/isolation of the contaminants, removal, engineering controls, and/or ICs.

CMZ-1 Alternative #4 (SEE with ISCO/ISEB) is expected to provide the highest level of protection for HH&E as it provides the most complete level of treatment for the COCs. Alternative #2 (Barrier Wall Containment with Cap) provides complete isolation and containment of the large mass of NAPL and stained soil. This alternative also provides a repository for additional high level dioxin contaminated soil.

CMZ-2A Alternative #3 (SEE) is expected to provide the highest level of protection for HH&E as it provides the most aggressive and complete level of treatment for the COCs.

CMZ-2B All of the alternatives, with exception to Alternative #1 (No Action), are considered equivalent for protection of HH&E. The shallow depth and significantly lower estimated volume of NAPL improves the viability of these remedies. SEE will be very protective due to its aggressiveness and COC treatment. S/S should be more effective in the NAPL stringers but still provides only isolation of COCs. SEAR should be considered marginally less protective due to the potential for leaving larger zones of residual soil contamination that has to be treated with ISCO and ISEB.

CMZ-3 Alternative #3 (S/S with SSM; ISCO/ISEB) is expected to provide the highest level of protection for HH&E as it provides the most aggressive remedial option, providing isolation and treatment.

CMZ-4A Alternative #3 (Excavation with Off-site Incineration) is expected to provide the highest level of protection for HH&E as it provides complete treatment for the COCs.

CMZ-4B All of the alternatives scored equal for protection of HH&E, largely through complete isolation or removal of COCs. Alternative #2 (Excavate/Encapsulate On-Facility in Barrier Wall) will be highly protective and consolidate the contaminant mass on a smaller portion of the Site. Off-site disposal for Alternative #3A and #3B is very protective of the local community

and environment but leaves a long-term liability. In particular, transport of wastes to the ETC Superfund Site merely relocates the COCs to an equivalent setting. None of the alternatives provides treatment of COCs.

CMZ-5 Alternatives #2 (Hydraulic Containment) and #3 (ISCO/ISEB Treatment Barrier) provide the highest level of protection for HH&E as can reliably be expected to safeguard the Bay and meet GCTLs and/or MCTLs.

10.2 Compliance with ARARs

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that RAs at CERCLA sites attain legally applicable or relevant and appropriate federal and more stringent state requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4). Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, RA, location, or other circumstance found at a CERCLA site. Relevant and appropriate requirements, are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, RA, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site.

ARARs do not include occupational safety or worker protection requirements. Compliance with Occupational Safety and Health Administration (OSHA) standards is separately required by 40 Code of Federal Regulation (CFR) §300.150.

Under CERCLA Section 121(e)(1), federal, state, or local permits are not required for the portion of any removal or RA conducted entirely 'on-site' as defined in 40 CFR §300.5. See also 40 CFR §300.400(e)(1) & (2). Also, CERCLA response actions must only comply with the "substantive requirements," not the administrative requirements of a regulation or law. Administrative requirements include permit applications, reporting, record keeping, inspections, and consultation with administrative bodies. Although consultation with state and federal agencies responsible for issuing permits is not required, it is often recommended for determining compliance with certain requirements such as those typically identified as location-specific ARARs. See EPA, Office of Solid Waste and Emergency Response (OSWER) Directives No. 9234.1-01 and 9234.1-02, CERCLA Compliance with Other Laws Manual: Parts 1 and Part II.

In addition to ARARs, the lead and support agencies may, as appropriate, identify other advisories, criteria, or guidance to be considered for a particular release that may be useful in developing Superfund remedies. See 40 CFR §300.400(g)(3). The "to-be-considered" (TBC) category consists of advisories, criteria, or guidance that were developed by EPA, other federal agencies, or states that may assist in determining, for example health-based levels for a particular contaminant for which there are no ARARs or the appropriate method for conducting an action. TBCs are not considered legally enforceable and, therefore, are not considered to be applicable for a site but typically are evaluated along with Chemical-specific ARARs as part of the risk

assessment to determine protective cleanup levels. See EPA, OSWER Directives No. 9234.1-01 and 9234.1-02, CERCLA Compliance with Other Laws Manual: Parts 1 and Part II, Section 1.4.

For purposes of ease of identification, the EPA has created three categories of ARARs: Chemical-, Location- and Action-Specific. Under 40 CFR §300.400(g)(5), the lead and support agencies shall identify their specific ARARs for a particular site and notify each other in a timely manner as described in 40 CFR §300.515(d).

Chemical-Specific ARARs/TBC Guidance
Chemical-specific ARARs are usually health or risk-based numerical values limiting the amount or concentration of a chemical that may be found in, or discharged to, the environment. The chemical-specific ARARs for the Selected Remedy are identified in **Table 13.**

Location-Specific ARARs/TBC Guidance
Location-specific requirements establish restrictions on permissible concentrations of hazardous substances or establish requirements for how activities will be conducted because they are in special locations (e.g., wetlands, floodplains, critical habitats, streams). There are no location-specific ARARs for the COCs at the ACW Site.

Action-Specific ARARs/TBC Guidance
Action-specific ARARs are usually technology-based or activity-based requirements or limitations that control actions taken at hazardous waste sites. Action-specific requirements often include performance, design and controls, or restrictions on particular kinds of activities related to management of hazardous substances. Action-specific ARARs are triggered by the types of remedial activities and types of wastes that are generated, stored, treated, disposed, emitted, discharged, or otherwise managed. Potential action-specific ARARs include federal and state requirements for discharge of treated wastewater from an on-facility treatment plant; general construction management requirements, and RCRA waste characterization, treatment, storage and disposal requirements. The action-specific ARARs for the Selected Remedy are identified in **Table 14.**

Compliance with Identified ARARs
In accordance with 40 CFR §300.400(g), EPA and FDEP have identified the potential ARARs and TBCs for the evaluated alternatives.

CMZ-1 Alternative #4 (SEE with ISCO/ISEB) is the most aggressive treatment alternative and is expected to have the most comprehensive success at reducing the mass and concentration of contaminants, and should do so in a short timeframe. Alternative #3 (SEAR with MPE; ISCO/ISEB) is also an aggressive treatment alternative, but there is a risk of the plume spreading. Containment and S/S remedies (Alternatives #2 and #5, respectively) do not achieve chemical-specific ARARs in the short term in the contaminated media. Alternative #3 and Alternative #4 will comply with ARARs.

CMZ-2A All of the alternatives, except the No Action alternative, meet the ARARs.

CMZ-2B All of the alternatives, except the No Action alternative, meet the ARARs.

CMZ-3 All of the alternatives, except the No Action alternative, meet the ARARs. Alternative #3 (S/S with SSM; ISCO/ISEB) was considered the most reliable approach in addition to being complimentary with CMZ-4A Alternative #5 (In Situ S/S On-Facility). Alternative #2 (ISCO/ISEB Barriers) should be effective at meeting RAOs both on the facility and downgradient.

CMZ-4A All of the alternatives, except the No Action alternative, meet the ARARs. Alternative #3 (Excavate with off-Site Incineration) may be harder to obtain a permit for the off-facility incineration of the hazardous soil and it will be difficult to gain public acceptance of this alternative.

CMZ-4B All of the alternatives, except the No Action alternative, meet the ARARs. Alternative #2 was ranked the highest because it does not involve ARARs for transportation and off-facility disposal. Disposal at the ETC Superfund Site transfers the long-term liability for isolation to the ETC site.

CMZ-5 Alternatives #2 (Hydraulic Containment) and #3 (ISCO/ISEB Treatment Barrier) meet the ARARs. Alternative #1 (No Action) lacks treatment.

10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to the expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

All of the alternatives, except the No Action alternatives, provide some degree of long-term protection. Reviews at least every five years, as required, would be necessary to evaluate the effectiveness of all of the alternatives.

CMZ-1 The thermal remedial approach (Alternative #4) is expected to provide uniform contact and be a robust option that will provide long-term effectiveness by a short-term mass reduction. Containment-based remedial alternatives (Alternatives #2 and #5) will meet this criterion if the engineered remedy is stable and complete. Alternative #5 is considered less effective due to potential gaps including uncertainty of S/S to fully immobilize the high NAPL percentage. The surfactant enhanced remediation (Alternative #3) is considered the least effective active remedy due to the potential for the injected surfactants/polymers to be non-uniformly distributed due to the variability in soil permeability. This could result in not achieving necessary contact to facilitate desorption and effective enhanced recovery in ongoing desorption of contaminants.

CMZ-2A Alternative #3 (SEE) will provide the best long-term effectiveness because it is expected to reduce the mass of leachable COCs the most. Alternative #4 (S/S with LDA and SEE) is considered less effective because of the uncertainty of S/S to fully immobilize the NAPL mass. The surfactant enhanced remediation (Alternative #2) is considered potentially less effective than SEE due to the possibility of not achieving necessary contact resulting in

continued desorption and subsequent uncontrolled migration of contaminants. The No Action alternative is considered the least effective due to the magnitude of risk.

CMZ-2B The best long-term effectiveness will be offered by the SEE thermal remedial approach (Alternative #3) which is expected to reduce the mass of leachable COCs the most. Alternative #4 (SS with LDA; ISCO) is considered as effective as Alternative #3, but does have some uncertainty relative to the inability to assure treatment beneath and adjacent to roads and buildings. The surfactant-enhanced remediation (Alternative #2) is considered the least effective due to the potential for not achieving adequate distribution of the injected amendments in the heterogeneous soils.

CMZ-3 The best long-term effectiveness will be offered by the remedial approach combining S/S with ISCO/ISEB (Alternative #3). This alternative is expected to bind the majority of leachable mass of COCs in the upper 8 ft bls to the soil-cement matrix. The ISCO/ISEB component of this alternative would be used to provide oxidation of deeper contamination hot spots or areas under roads and buildings followed by long-term in situ bioremediation to any remaining contaminants with ISCO/ISEB. Alternatives #2 (ISCO/ISEB Barriers) is a less aggressive approach. Alternative #4 (ISEB) could be less effective due to the uncertainty of complete treatment for all SVOCs and because ISEB is not an optimal approach if residual NAPL is present.

CMZ-4A The best long-term effectiveness is Alternative #3 (Excavate with off-facility Incineration) because the material will be treated/disposed of off-site effectively eliminating post-remedial risks. Alternatives #4 (Excavation, Ex Situ S/S, Replace On-Facility) and #5 (In Situ S/S On-Facility) are considered less effective than Alternative #3 because the treated contaminated soil will remain on the facility. Alternative #2 was considered as the least effective active remedy because the contaminated soil will be encapsulated on-facility, but will not be treated.

CMZ-4B The best long-term effectiveness will be achieved under Alternatives #3a (Excavate/Disposal Off-facility at Subtitle D Landfill) and #3b (Excavate/Disposal Off-facility at ETC Superfund Site) because these alternatives will excavate and dispose of all contaminated soil off-facility thereby effectively risks at the Site. Alternatives #2 and #4 include relocation of the contaminated soil onto the ACW property.

CMZ-5 The long-term effectiveness of Alternative #3 (ISCO/ISEB Treatment Barrier) and Alternative #2 (Hydraulic Containment) were considered nearly equivalent. Alternative #3 was deemed slightly more advantageous because it provides contaminate reduction.

10.4 Reduce Toxicity, Mobility or Volume through Treatment

Reduction of toxicity, mobility or volume (T/M/V) through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

CMZ-1 Alternative #4 (SEE with ISCO/ISEB) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants, and does so in a short timeframe (less than one year). Alternative #5 (S/S with LDA and SEE [Deep]; ISCO/ISEB) is

expected to have good T/M/V reduction. Alternative #3 (SEAR with MPE; ISCO/ISEB) was considered equivalent to Alternative #4 (SEE with ISCO/ISEB), however; due to concerns for the effect of the increased plume mobility on the overall volume, it scored lower despite the mass reduction potential for the technology. The containment alternative (Alternative #2) is considered less effective because it does not include an active treatment component, but it does totally hydraulically isolate CMZ-1.

CMZ-2A With the exception of Alternative #1 (No Action), all of the remedial alternatives evaluated for CMZ-2A involve active treatment. The SEE thermal remedial approach (Alternative #3) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants; this alternative is also more practical for the deeper soil contamination. Alternatives #2 (SEAR with MPE) and #4 (S/S with LDA and SEE [Deep]) are also expected to have good T/M/V reduction. The SEAR application has a higher potential for increased contaminant mobility. Alternative #4 does not provide toxicity or volume reduction using the S/S treatment component.

CMZ-2B With the exception of Alternative #1 (No Action), all of the remedial alternatives evaluated for CMZ-2B involve active treatment. The SEE thermal remedial approach (Alternative #3) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants. Alternatives #2 (SEAR with MPE) and #4 (S/S with LDA and SEE [Deep]; ISCO) are also expected to have good T/M/V reduction. The SEAR application has a higher potential for increased contaminant mobility. Alternative #4 does not provide toxicity or volume reduction using the S/S treatment component.

CMZ-3 With the exception of Alternative #1 (No Action), all of the remedial alternatives evaluated for CMZ-3 involve active treatment. The combined S/S with ISCO/ISEB remedial approach (Alternative #3) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants. Alternatives 2 (ISCO/ISEB) and 4 (ISEB) are also expected to have good T/M/V reduction.

CMZ-4A Alternative #3 (Excavate with off-site Incineration) is expected to have the most comprehensive success at reducing the mass, volume, and concentration of contaminants. The remaining alternatives are expected to effectively reduce mobility through stabilization or encapsulation.

CMZ-4B None of the remedial alternatives evaluated for CMZ-4B involve active treatment; however, the mobility of the contaminants will be greatly reduced through containment and isolation. Except for Alternative #1 (No Action), all of the alternatives are considered equal for reduction of T/M/V with little differentiation between them.

CMZ-5 Alternative #3 (ISCO/ISEB treatment) offers a better combination of T/M/V reduction than Alternative #2 (Hydraulic Containment). Neither alternative will significantly impact the volume of COCs across the Site in the short term. The No Action alternative offers no T/M/V reduction.

10.5 Short-Term Effectiveness

Short-term effective addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

CMZ-1 Alternatives #4 (SEE; ISCO/ISEB) and #5 (S/S with LDA and SEE; ISCO/ISEB) are considered the most effective because they are thought to have the smallest impact on the community and construction workers. Alternative #3 (SEAR with MPE; ISCO/ISEB) is considered the least effective of active remedies because of the potential of mobilizing the contaminants to surface water if leachate is not contained Alternative #2 (Barrier Wall) is protective of the community and environment in the short term but has an undesignated timeframe to meet RAOs for contaminant reduction.

CMZ-2A Alternatives #3 (SEE) and #4 (S/S with LDA and SEE) are considered the most effective because they are thought to have the smallest impact on the community and construction workers. Alternative #2 (SEAR with MPE) is considered the least effective active remedy because of the potential of mobilizing the contaminants to surface water if leachate is not contained.

CMZ-2B Alternatives #3 (SEE) and #4 (S/S with LDA and SEE) are considered the most effective because they should have the smallest impact on the community and construction workers. Alternative #2 (SEAR with MPE) is considered the least effective active remedy because of the potential of mobilizing the contaminants to surface water if leachate is not contained.

CMZ-3 Alternatives #2 (ISCO/ISEB Barriers) and #4 (ISEB) have a slight edge over Alternative #3 (S/S with SSM; ISCO/ISEB) due to remedy duration because they should have the smallest impact on the community and construction workers. Alternative #3 ranks lower also due to the noise, visibility, and monitoring of dust emissions from soil stabilization, although these can be minimized with adequate engineering controls.

CMZ-4A All alternatives, with the exception of the No Action Alternative are considered equivalent for short-term effectiveness; however, there are differences. Alternative #5 (In Situ S/S On-facility) is an in situ remedy that should have the smallest impact on the community and construction workers. Alternatives #2, #3, and #4 includes the contaminated material being transported off-site over public roads.

CMZ-4B Except for Alternative #1 (No Action), all of the alternatives are considered effective with little differentiation between them. All of the alternatives involve excavating contaminated soil from off-facility areas.

CMZ-5 Alternative #2 (Hydraulic Containment) and #3 (ISCO/ISEB Treatment Barrier) will have a distinguishable difference in community impacts or worker protection. Alternative #3 is more intrusive to the community and requires more worker protection. Both options are protective of the Bay and have equivalent uncertainties regarding the overall remedial timeframe.

Once the CMZ-1 and CMZ-2 remedies have been implemented the CMZ-5 groundwater plume definition will be obtained through monitoring.

10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

CMZ-1 Of the active remedies, Alternative #4 (SEE; ISCO/ISEB) can be installed and operated in a short time frame, with minor site disruption, and with limited potential technical difficulties due to the Site layout or lithology. Alternative #2 is a commonly used containment alternative and implementable, with appropriate assessment to confirm the presence of the clay upon which to anchor the slurry wall. Alternative #3 (SEAR with MPE; ISCO/ISEB) also is more susceptible to technology reliability issues given the large volume of NAPL and more innovative/complex attributes of the remedy. Alternative #5 is considered the least implementable based on the uncertainty of the effectiveness of the S/S to treat the high percentage of NAPL in this zone.

CMZ-2A All of the alternatives evaluated for CMZ-2A are implementable with only minor issues and there is little differentiation. The technology reliability of SEAR (Alternative #2) is more uncertain given the volume and extended depth of NAPL in CMZ-2A. Lack of adequate control of the surfactant/polymer could result in an expansion of dissolved SVOC contamination at depth.

CMZ-2B All of the alternatives evaluated for CMZ-2B are generally implementable. Alternative #4, shallow S/S with LDA, was considered easy to implement due to its small relative footprint and its effectiveness at a shallow depth. Alternative #3 (SEE) has implementation concerns due to the off-facility surface obstructions and utilities. The technology reliability and ability to monitor and control contaminant mobility using SEAR (Alternative #2) close to Pensacola Bay and Bayou Chico was considered a potential liability as the surfactants/polymer could contaminate the Bay if groundwater extraction controls were inadequate or not maintained long enough.

CMZ-3 All of the alternatives evaluated for CMZ-3 are implementable with little difference between them. The open area and shallow depth is favorable for using Alternative #3 (S/S with SSM; ISCO/ISEB).

CMZ-4A All of the alternatives evaluated for CMZ-4A are implementable. Alternative #3 (Excavation with Off-site Incineration) ranked the lowest because there are a limited number of hazardous waste incinerators in the southeast United States.

CMZ-4B All of the alternatives evaluated for CMZ-4B are implementable essentially all being variations on soil excavation and disposal. Travel distance was less of a concern with relocation of the soils to the ACW facility property.

CMZ-5 All of the alternatives evaluated for CMZ-5 are implementable and equivalent in comparison. The Hydraulic Containment alternative will require connection and permitting of treated effluent to the POTW or off-site access for an infiltration gallery. The ISCO/ISEB alternative is likely to have higher operational complexity, but a marginally shorter implementation period.

10.7 Cost

Cost estimates, including capital costs and long-term operating costs, were prepared for each alternative. There are no capital costs associated with the No Action Alternatives; present worth costs for this alternative to conduct FYRs, monitor ICs, and maintain the Site property are estimated at $241,600 for an estimated 30 years of monitoring. The No Action Alternative would not be protective of human health and the environment.

The CMZ-1 alternatives range from $5M to $38M, with Alternative #3; SEAR with MPE; ISCO/ISEB as the most costly alternative. The CMZ-2A alternatives are all comparable in costs ranging from $11M to $19M. The CMZ-2B alternatives range from $4M to $7M. The CMZ-3 costs range from $3M to $9M. The CMZ-4A costs range from $1M to $44M, with Alternative #3; Excavation with Off-site Incineration as the most costly alternative. The CMZ-4B costs range from $5M to $11M. The CMZ-5 costs are both approximately $3M. Detailed cost estimates of each alternative are included in the FS Report, Revision 3.

10.8 State Acceptance

The State of Florida has been involved actively in the process of determining and evaluating the ACW cleanup alternatives. The state has expressed support of a combination of Alternatives:

- CMZ-1 Alternative #2 - Barrier Wall Containment with Cap
- CMZ-2A Alternative #3 (SEE)
- CMZ-2B Alternative #3 (SEE)
- CMZ-3 Alternative #2 (ISCO/ISEB Barriers)
- CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility in Barrier Wall [CMZ-1])
- CMZ-4B Alternative #4 (Excavation/ Disposal On-facility Over CMZ-2A/3 Areas)
- OU2/CMZ-5 Interim Alternative #3 (ISCO/ISEB Treatment Barriers)
- Site-wide activities including long-term groundwater monitoring, FYRs, placement of ICs on the Site to provide increased public awareness of the Site's hazards and to minimize the potential for exposure to contaminated groundwater.

State correspondence is included in **Appendix D**.

10.9 Community Acceptance

During the public comment period, the community did not express opposition to the remedial strategy selected which was the combination of CMZ-1 #2, CMZ-2A #3, CMZ-2B #3, CMZ-3 #2, CMZ-4A #2, CMZ-4B #4, and interim remedy CMZ-5 #3.

11.0 Principal Threat Waste (PTW)

The NCP establishes an expectation that the EPA will address the principal threats posed by a site through treatment or to the maximum extent practicable (NCP§121(b)(1), NCP §300.430(a)(1)(iii)(A)). PTW is defined on a site-specific basis for source material with toxicity and mobility characteristics that combine to pose a potential risk several orders of magnitude greater than the risk level that is acceptable for the current or reasonably anticipated future land use, given realistic exposure scenarios. In general, the priority for treatment for PTW is placed on source materials considered to be liquid, highly toxic or highly mobile, which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. If the selected remedy does not comply with this preference, the EPA must publish an explanation as to why a treatment remedy was not selected. The soil containing visual evidence of NAPL and the high soil concentrations of dioxin (e.g., exceeding levels that require further treatment prior to land disposal) would be considered PTW at the ACW site.

As stated in the preamble to the NCP (55 FR at 8703, March 8, 1990) and in Superfund Publication 9380.3-06FS, "A Guide to Principal Threat and Low Level Threat Wastes", there may be situations where wastes identified as constituting PTW may be effectively and reliably contained rather than treated due to inherent difficulties in treating the wastes. Specific situations that may limit the use of treatment include:

- Treatment technologies are not technically feasible or are not available within a reasonable time frame;
- The extraordinary volume of materials or complexity of the Site make implementation of treatment technologies impracticable;
- Implementation of a treatment-based remedy would result in greater overall risk to human health and the environment due to risks posed to workers or the surrounding community during implementation; or
- Severe effects across environmental media resulting from implementation would occur.

Conversely, there may be situations where the same treatment remedy will be selected for both PTWs and low level threat wastes. For example, once a decision has been made to treat some wastes (e.g., in an on-facility incinerator) economies of scale may make it cost effective to treat all materials including low level threat wastes to alleviate or minimize the need for engineering controls or ICs.

Where EPA determines that it is impracticable to use treatment to address PTW, the material may be transported off-site, consistent with the Off-Site Rule, 40 CFR 300.440, or managed safely on-site consistent with all ARARs. Engineering controls, such as containment and consolidation in a cell that has a secure liner system, may be used for such wastes that pose a relatively low long-term threat or where treatment is deemed impracticable. In demonstrating impracticability, EPA considers factors such as the media involved, the volume and concentration of contamination, the size and depth of the area impacted, whether containment is even possible, whether groundwater is or is likely to be impacted, the accessibility to the waste material, the on-site containment costs, the availability of effective ICs and engineering controls

and the likely threat of exposure over time. Applying these considerations to the portions of the ACW Site that contain PTW, the EPA believes it can prevent exposure over the long-term through the selected remedy.

As discussed in Section 12, PTW materials at this Site will be addressed effectively through containment and capping (CMZ-1) and isolated in the on-site barrier wall and capped (CMZ-4B). Containment is one of the presumptive remedies for wood treaters with NAPL.

12.0 Selected Remedy

12.1 Summary of the Rationale for the Selected Remedy

Using the above information/assumptions, the Preferred Alternative for the ACW Pensacola Site is a combination of the following alternatives:

- CMZ-1 Alternative #2 - Barrier Wall Containment with Cap
- CMZ-2A Alternative #3 (SEE)
- CMZ-2B Alternative #3 (SEE)
- CMZ-3 Alternative #2 (ISCO/ISEB Barriers)
- CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility in Barrier Wall [CMZ-1])
- CMZ-4B Alternative #4 (Excavation/ Disposal On-facility Over CMZ-2A/3 Areas)
- OU2/CMZ-5 Interim Alternative #3 (ISCO/ISEB Treatment Barriers)
- Site-wide activities including long-term groundwater monitoring, five-year reviews, placement of ICs on the Site to provide increased public awareness of the Site's hazards and to minimize the potential for exposure to contaminated groundwater.

These alternatives were chosen based on the comparative analysis of all of the alternatives. The Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to balancing and modifying criteria.

Based on the information available at this time, EPA and FDEP believe that the Selected Remedy combination satisfies the following statutory requirements of CERCLA Section 121(b) and Section 121(d): 1) protects human health and the environment; 2) complies with ARARs; 3) is cost effective; 4) utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and 5) satisfies the preference for treatment as a principal element. The listed alternatives in combination and conjunction with the previous several off-facility soil removal actions performed since 1999, will achieve substantial risk reduction to all potential exposures routes in a reasonable time frame.

12.2 Description of the Selected Remedy

12.2.1 CMZ-1 Alternative #2 - Barrier Wall Containment with Cap

Alternative #2 for CMZ-1 consists of a barrier wall constructed using a cutter soil mixer technology completely surrounding the zone and a low permeability cap and cover. This alternative would provide physical isolation and hydraulic containment of the top, base, and side boundaries of the zone. The cutter soil mixer wall would be installed to a depth of approximately 110 ft below the nominal ground surface. The isolation cell created offers an additional advantage to this remedy, as it will provide isolation of additional deeper soil that may have lower but appreciable levels of contamination. The cutter soil mixer method would result in a wall thickness of approximately 3-ft. The entire area will be covered with a GCL, LDPE or HDPE liner, or a combination of these to contain the PTW and with a 2-foot clean layer of fill on top that is vegetated cover to prevent rainwater from infiltrating into the containment system. The composite cap will also eliminate human exposure pathways, prevent infiltration of surface water and subsequent leaching of the COCs.

12.2.2 CMZ-2A Alternative #3 (SEE)

CMZ-2A Alternative #3 includes thermal-enhanced DNAPL recovery using SEE steam stripping. SEE would be applied through injection wells to the DNAPL creosote-impacted soil. Assuming an effective steam influence and an overlapping MPE capture zone of 25-ft (42-ft spacing) from each well cluster, approximately 45 steam injection well cluster locations and a total of (120) 20-ft injection intervals would be needed to implement this approach.

An additional goal of using SEE in CMZ-2A will be to reduce the groundwater contaminants to a subsurface level that will be able to detect leakage/failure of the containment remedy of CMZ-1. This level will be determined in the remedial design phase.

12.2.3 CMZ-2B Alternative #3 (SEE)

CMZ-2B Alternative #3 includes thermal-enhanced NAPL recovery using SEE steam stripping. Assuming an effective steam influence and an overlapping MPE capture zone of 25-ft (42-ft spacing) from each well cluster, approximately 62 steam injection well locations and a 15-ft injection interval would be needed to implement this approach.

Groundwater monitoring below the shallow clay (approximately 20 ft bls) is recommended to assess the effectiveness of the remedy in this zone.

12.2.4 CMZ-3 Alternative #2 (ISCO/ISEB Barriers)

CMZ-3 Alternative #2 entails the use of an upgradient ISEB treatment zone along the northern CMZ-3 facility boundary and a combined ISCO/ISEB treatment barrier along the southern edge of the CMZ. The upgradient ISEB barrier will be created though injection points and will provide a flush of infused oxygen to sweep the CMZ, providing enhanced aerobic bioremediation of PAHs and PCP. The ISCO/ISEB barrier will provide immediate relief from this contamination, effectively isolating the onsite secondary source from the downgradient plume and potential impacts on Pensacola Bay.

The CMZ-3 north ISEB treatment zone would consist of 24 two-depth cluster wells for oxygen infusion. These cluster wells would be screened from 5 to 40 ft bls and 45 to 80 ft bls, respectively. The treatment line will extend laterally along CMZ-3 for approximately 700 ft with ISEB clusters spaced by 30-ft. Two ISEB equipment trailers are anticipated; each delivering 90 percent infused oxygen gas to a network of buried manifolds and headers. The CMZ-3 southwest ISEB barrier will be constructed in a similar fashion, with 10 cluster wells along a 300-foot lateral treatment length. A programmable logic controller is used to operate and monitor the treatment process.

The south ISCO barrier is configured as an application of a slow release (SR) oxidant through groundwater wells to provide long-term treatment. This barrier is primarily designed to address the dissolved PCP contamination near OW-9. PCP in particular is amenable to treatment with oxidation, although the treatment wall will also reduce any PAHs in the groundwater mass discharge heading downgradient towards the Bay. The slow release ISCO treatment line is envisioned as potassium permanganate 'candles' which are porous wax cylinders manufactured by Carus Corporation. These candles are stacked in groundwater wells across the treatment interval. They are designed to release the permanganate slowly into the aquifer and will be designed to correspond with the mass flux of PCP contamination predicted for CMZ-3. The SR oxidation wells will be placed in two parallel rows that extend laterally for approximately 575-ft along the southern CMZ-3 boundary. An estimated 114 wells will be required with a spacing of 10-ft on each row. The rows will alternate spacing, effectively creating a 5-ft net spacing of the SR oxidant wells. The barrier is conceptually configured to extend from 20 to 80–ft bls. Prior to placement of the candles, a one-time injection of approximately 208,000 pounds of potassium permanganate was assumed to reduce the overall soil oxidant demand in the vicinity of the SR oxidant barrier. Supplemental mixing may be employed using several solar-powered compressors to enhance mixing and distribution at each SR oxidant well.

The optimal application of this remedy will be contingent upon successful bench scale or pilot scale testing. The current uncertainty and need for additional assessment data also factored into this recommendation. It is assumed that the remedy will be reduced in scope following additional Site investigation to be performed as part of the RD.

In addition, the removal of the upper 3 feet of soil as part of the CMZ-4A remedy will remove a significant quantity of the leachable source soil.

12.2.5 CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility in Barrier Wall [CMZ-1])

CMZ-4A Alternative #2 (Excavation, Encapsulate On-facility in Barrier Wall [CMZ-1]) includes excavation of all unsaturated contaminated surficial soil on the former facility and surficial soils in CMZ-2A from 0 to 3-ft bls. All of this soil would be placed inside the CMZ-1 Alternative #2 barrier wall and capped for long-term isolation. A total of 61,794 cy of soil is estimated for this alternative, plus the 9,208 cy of soil that exceeds the LDR criteria from Pine and Gimble Streets. The resulting cap would be sloped at a 2:1 horizontal/vertical angle and completed as described in CMZ-1 with a multi-component cap consisting of 18 inches of clean fill, 6 inches of enriched soil and then hydro seeding. Excavation and placement would include all appropriate engineering controls for dust control and monitoring.

All CMZ-4A soils with the exception of soils that currently overlays CMZ-3 would be placed inside the CMZ-1 Alternative #2 Barrier Wall and capped for long-term isolation. The soil currently overlying CMZ-3 will be placed within a new encapsulated cell within CMZ-3.

12.2.6 CMZ-4B Alternative #4 (Excavation/ Disposal On-facility Over CMZ-2A/3 Areas)

CMZ-4B Alternative #4 (Excavation/Disposal On-facility Over CMZ-2A/3 Areas) was chosen as the recommended remedy for this zone. This Alternative includes excavation of all unsaturated contaminated surficial soil located off-facility at depths ranging from 6 inches to a maximum depth of 3-ft bls (top of the average water table). The soil would be spread over the CMZ-2A and CMZ-3 areas for long-term isolation. The resulting cap would be sloped at a 2:1 horizontal/vertical angle and completed with a 2-ft multi-component cap and soil cover and then hydro seeded. Excavation and placement would include all appropriate engineering controls for dust control and monitoring. The 35,000 CY soil stockpile that currently exists on the former ACW facility would also be spread over the CMZ-2A/3 areas. The encapsulation of the CMZ-2A/3 areas to provide further protection of the groundwater and will level out the heights of these two capped areas.

12.2.7 OU2/CMZ-5 Interim Alternative #3 (ISCO/ISEB Treatment Barriers)

The Interim Remedy recommended for OU2/CMZ-5 is the ISCO/ISEB Treatment Barriers remedy (Alternative #3) for addressing the dissolved PCP groundwater plume on the eastern part of the Site. This alternative is an extension of the ISCO/ISEB biobarrier concept that was selected for CMZ-3 (Alternative #2). PCP is amenable to treatment with various oxidants and can be aerobically or anaerobically biodegraded. Aerobic biodegradation is likely to be more successful, especially given the current aquifer geochemistry. The ISCO/ISEB barrier cluster wells would be installed along the Pensacola Bay shoreline. This location will intercept any existing or future dissolved PCP contamination before it can impact the Bay.

Injection wells would be used for the addition of either a liquid or gaseous oxidant or oxygen for both areas. The wells would be screened from 30 to 70 ft bls to correspond with the existing layer of dissolved phase contamination and the hydraulic profile of the Bay. Alternately, horizontally drilled wells could be used to accomplish the same function. Approximately 21 ISCO/ISEB wells would be installed along a 800-ft lateral treatment barrier. Wells would be spaced at 40-ft (typical) intervals. Bench scale or pilot scale testing will be required to validate these assumptions.

The treatment barrier will also be successful for treatment of advected PAHs, most notably naphthalene. The use of injected oxygen for bioremediation of naphthalene has been successfully pilot tested at the nearby ETC Site using a horizontally screened well and the infusion of 90 percent oxygen.

Groundwater monitoring will be conducted to assess the effectiveness of the DNAPL source treatment in reducing the naphthalene/SVOC plume on the west side of the Site. This recommendation reflects a consideration that active treatment at the foot of the Bay should not be necessary if source and contaminant flux reduction on-facility abates the dissolved

naphthalene plume sufficiently in a 5-year timeframe following implementation of CMZ-1, 2A and 2B remedies.

The future selection of this alternative as the final remedy is highly contingent upon a thorough review of the initial post CMZ-1, -2A and -3 RA response actions. The needs for any additional groundwater actions will be accessed during the first Five Year Reviews of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will be evaluated. If significant decreasing trends are present at the first Five Year Review a final groundwater ROD could be written at that time. Should groundwater monitoring not show progress towards meeting the CTLs in OU2/CMZ-5, a remedy screening and evaluation of other possible remedies will be completed at that time so a final remedy can eventually be selected and documented in a final ROD for OU2/CMZ-5.

Figure 11 illustrates the Selected Remedy major components and the volumes of soil to be handled and contained or removed from the Site.

12.3 Cost Estimate for the Selected Remedy

The estimated total net present worth cost for the Selected Remedy is $35.3 million. The cost estimate for the Selected Remedy is included in **Table 14.** Detailed cost breakdown sheets of the components for each alternative are included in **Appendix C**. The cost estimate is based on the available information regarding the anticipated scope of the remedial action. Changes in the cost elements are likely to occur as a result of new information and data collected during the remedial design phase. Major changes may be documented in the form of a memorandum to the AR file, an ESD, or a ROD Amendment. The projected cost is based on an order-of-magnitude engineering cost estimate that is expected to be within +50 or -30 percent of the actual project cost. Costs are based on the conservative estimate of a 30-year timeframe until all cleanup levels are met.

12.4 Estimated Outcomes of the Selected Remedy

The Selected Remedy will provide protection of human health and the environment by eliminating, reducing, or controlling risks at the Site through excavation and consolidation of contamination by isolation/containment, physical removal of waste from areas of access by receptors, monitoring of engineering controls, and implementation of the ICs. The ICs will include restrictive covenants for soil and groundwater to protect the remedy and prevent any future exposure routes. Future land use of the Site property is anticipated to continue to be industrial/commercial with the containment area to remain as undeveloped land (or a park). Future land use at the Site property is anticipated to be industrial /commercial. The Site property may also be used for recreation (park) with appropriate ICs and engineering controls consisting of the cap over the entire area which would prevent exposure to underlying contaminated soils.

Implementation of the Selected Remedy and achievement of the final cleanup levels will achieve the final RAOs for the Site. The final cleanup levels determined for this remedy are the same as those determined during the FS, and are shown in **Tables 4** and **5**.

13.0 Statutory Determination

Based on the information currently available, EPA believes the chosen Selected Remedy for each of the CMZs meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying Criteria. EPA expects the Selected Remedy will satisfy the following statutory requirements of CERCLA Section 121(b):

- Be protective of human health and the environment.
- Comply with ARARs;
- Be cost effective; and
- Use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

13.1 Protection of Human Health and the Environment (HH&E)

Protection of human health and the environment will be achieved by the containment and thermal treatment of the residual and free-phase DNAPL and creosote impacted soil, containment of contaminated surface soil, and in situ treatment of the dissolved groundwater plume that will prevent future migration of hazardous substances into Chico Bayou/Pensacola Bay. Encapsulating and treating the NAPL and contaminated surface soil will eliminate the potential risk to HH&E from these COCs.

13.2 Compliance with ARARs

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate federal and more stringent state requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4). The Selected Remedy will comply with all ARARs and To Be Considered guidance presented in **Tables 13 and 14**.

Removal of impacted surface soil removes a source of contamination and attains ARARs. Compliance with ARARs will be achieved through containment and encapsulation of PTW high level dioxin soil and isolation and treatment of NAPL.

13.3 Cost Effectiveness

EPA has determined that the Selected Remedy is cost-effective and that the overall protectiveness of the remedy is proportional to the overall cost. As specified 40 CFR §300.430(f)(1)(ii)(D), the cost-effectiveness of the Selected Remedy was assessed by comparing the protectiveness of human-health and the environment in relation to three balancing criteria (i.e., long-term effectiveness and permanence; reduction in T/M/V; and short-term effectiveness) with the other alternatives considered.

The basis for EPA's determination of cost-effectiveness is summarized in **Table 15**. While more than one remedial alternative can be considered cost-effective, CERCLA does not mandate that the most cost-effective or least expensive remedy be selected. The estimated total cost (i.e., capital plus present worth of O&M costs) of the Selected Remedy is $35.3M at a five percent

discount rate. A table with five percent and seven percent discount rates can be found in Table 15.

13.4 Use 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 practicable manner at 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 tradeoffs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element, bias against off-site treatment and disposal, and considering State and community acceptance.

EPA recommends development of at least one alternative that would eliminate the need for long-term management at the Site. Thermal treatment is a proven treatment method to remediate creosote NAPL. No other feasible permanent remedial alternatives were identified due to the prohibitive cost to handle the large volume of contaminated soil remaining at the Site. Additionally, treatment options for dioxin contaminated soil are limited and costly. On-facility encapsulation is the best balanced option to remediate this COC and protect potential receptors.

Long term effectiveness and permanence will be attained by long term containment/isolation, encapsulation and treatment of NAPL and contaminated soil. The barrier wall and geosynthetic clay layer (GCL), low density polyethylene (LDPE) or high density polyethylene (HDPE) liners are proven remedial treatment methods for this type of waste and have long life cycles. Implementability is easily achieved for these alternatives. There are physical obstructions to the thermal and off-facility removal remedies such as buildings, roads, utilities, etc. A competent clay layer will serve as the bottom of the isolation/containment cell in CMZ-1. While, reduction in toxicity, mobility, or volume is achievable with these alternatives, isolation via containment reduces mobility and effectively eliminates the risk of a completed exposure pathway.

13.5 Preference for Treatment as a Principal Element

The NCP at 40 CFR §300.430(a)(I)(iii)(A) establishes an expectation that treatment will be used to address PTW posed by a site wherever practicable. In general, the priority for treatment for PTW is placed on source materials considered to be liquid, highly toxic or highly mobile, which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur.

As stated in the preamble to the NCP (55 FR at 8703, March 8, 1990) and in Superfund Publication 9380.3-06FS, "A Guide to Principal Threat and Low Level Threat Wastes"), there may be situations where wastes identified as constituting a PTW may be effectively contained (e.g. isolated) rather than treated due to inherent difficulties in treating the wastes. Thus, this allows for situations where the same treatment remedy will be selected for both PTWs and low level threat wastes.

The Selected Remedies for CMZ-2A, CMZ-2B, CMZ-3, and CMZ-5 satisfy the statutory preference for remedies that employ treatment to reduce toxicity or volume as a principal element. For CMZ-1, CMZ-4A, and CMZ-4B, treatment alternatives to reduce toxicity or volume for the creosote DNAPL and dioxins were evaluated and determined to be either cost prohibitive or involve unproven technologies which would likely fail to meet criteria to reduce toxicity or volume.

13.6 Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the RA to ensure that the Selected Remedy is, or will be, protective of human health and the environment. EPA will conduct a FYR until levels that allow for unlimited use and unrestricted exposures are achieved.

13.7 Documentation of Significant Changes

Pursuant to CERCLA 117(b) and NCP §300.430(f)(3)(ii), the ROD must document any significant changes made to the Preferred Alternative discussed in the Proposed Plan. The Proposed Plan, which was released for public comment in April 2017, identified the following Alternatives in combination and conjunction with the Removal Response Actions that have been conducted, as the site-wide Preferred Remedy for the ACW site.

CMZ	Alternative #	Description
1	Alt. #2	Barrier Wall Containment with Cap
2A	Alt. #3	SEE
2B	Alt. #3	SEE
3	Alt. #2	ISCO/ISEB Barriers
4A	Alt. #2	Excavation/Encapsulate On-facility in Barrier Wall (CMZ-1)
4B	Alt. #4	Excavation/Disposal On-facility over CMZ-2A/3 Areas
5/OU2	Alt. #3	ISCO/ISEB Treatment Barriers

ICs to restrict land use and prevent disturbance of on-site engineering controls (e.g., capped area) are included in the Selected Remedy. The ICs may also include restrictive covenants, property deed notices, and governmental controls such as local ordinances or zoning restrictions.

EPA reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

14.0 References

Black & Veatch, 1993. Black & Veatch Special Projects Corp. B*aseline Risk Assessment Report for the American Creosote Works Site*, Pensacola, Florida. Prepared by B&V Waste Science and Technology Corp. for EPA Region 4. August, 1993.

Black & Veatch, 2009. Black & Veatch Special Projects Corp. *Focused Remedial Investigation Report, Revision 0 American Creosote Works Superfund Site OU3, Pensacola, Escambia County, Florida, Revision 0.* April, 2009.

Black & Veatch, 2010. Black & Veatch Special Projects Corp. *Focused Feasibility Study Report, Revision 0, for the American Creosote Works Site OU3, Pensacola, Escambia County, Florida.* July, 2010.

Black & Veatch, 2011. Black & Veatch Special Projects Corp. *Focused Feasibility Study Report, Revision 1, American Creosote Works Superfund Site OU3, Pensacola, Escambia County, Florida.* April 2011.

Black & Veatch, 2014. Black & Veatch Special Projects Corp. *Human Health Risk Assessment Addendum for American Creosote Works Superfund Site, Pensacola, Escambia County, Florida.* Prepared by Black & Veatch Special Projects Corp. for EPA Region 4. March, 2014.

EBASCO, 1989. *Risk Assessment for American Creosote Works Site, Escambia County, Florida.* Prepared by EBASCO Services Incorporated for EPA Region 4. June, 1989.

EPA, 1985. U.S. Environmental Protection Agency. *Record of Decision, American Creosote Works, Inc., Pensacola, Florida.* 1985.

EPA, 1994. U.S. Environmental Protection Agency. *Record of Decision OU2, American Creosote Works, Inc., Pensacola, Florida.* February 3, 1994.

EPA, 2000. U.S. Environmental Protection Agency. *EPA Region 4 Human Health Risk Assessment Bulletins – Supplement to RAGS.*

EPA, 2001. U.S. Environmental Protection Agency. *Risk Assessment Guidance for Superfund: Volume III - Part A, Process for Conducting Probabilistic Risk Assessment.* Office of Emergency and Remedial Response, OSWER Directive 9285.7-45 EPA 540-R-02-002. December, 2001.

EPA, 2017. U.S. Environmental Protection Agency, *Proposed Plan Fact Sheet, American Creosote Works Superfund Site, Pensacola, Escambia County, FL.* April 2017

FDEP, 2011. Florida Department of Environmental Protection. *Final Order Establishing Bayou Chico Basin Management Action Plan.* October, 2011.

FDEP, 2012. Florida Department of Environmental Protection. *F.A.C. Chapter 62-302.530 Table: Surface Water Quality Criteria.* July, 2012.

FDEP, 2014. Florida Department of Environmental Protection. *Florida Administrative Code, Chapter 62-777, Contaminant Cleanup Target Levels.* April, 2014.

NUS, 1985. NUS Corporation. *Remedial Investigation Report, Volume 1, American Creosote Works, Inc. Site, Pensacola, Florida.* January, 1985.

SRC; 2010. Syracuse Research Corporation, *Final Report: Bioavailability of Dioxins and Dioxin-Like Compounds in Soil*. Prepared for: Office of Superfund Remediation and Technology Innovation, Environmental Response Team – West. December 2010.

PART 3: RESPONSIVENESS SUMMARY

The Responsiveness Summary for the Site has been prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Contingency Plan (NCP), 40 CFR §300.430(0- EPA's responses to comments received on the Proposed Plan during the public comment period are included in **Appendix A**.

The Proposed Plan for the Site was issued on April 22, 2017. On April 26, 2017, the EPA hosted a Proposed Plan meeting at the Sanders Beach-Corinne Jones Resource Center. Site documents including the RI, FS Reports and Proposed Plan for the American Creosote Works Site were made available to the public on April 22, 2017 in the Administrative Record (AR) repositories. The AR repositories are located at the EPA Region 4 Superfund Records Center (61 Forsyth Street, Atlanta, GA 30303) and the EPA local repository located at the West Florida Genealogy Branch located at 5740 N 9th Avenue, Pensacola, Florida. A Notice of Availability was published in the Pensacola News Journal on April 23 and 24, 2017. A public comment period on the Proposed Plan was held from April 22 to May 22, 2017. The comment period ended on May 22, 2017. EPA's responses to comments are included in Appendix A. Several questions were asked during the public meeting by the attendees after the presentation. EPA's responses to these questions are documented in the meeting transcript, which is included in **Appendix B**.

TABLES

Table 1: Occurrence, Distribution, and Selection of Chemicals of Concern in Soil (2014 HHRA Addendum)

Chemical of Concern	Exposure Unit	Min Conc.[1] (µg/kg)	Max Conc.[1] (µg/kg)	Mean Conc. (µg/kg)	95% UCL of Mean (µg/kg)	Exposure Point Conc. (µg/kg)	Background Conc. (µg/kg)	Screening Toxicity Value (µg/kg)
BaP TEQ	On Site	148.3	14,882	5,031	NC	14,882	ND	15
	Off Site at SS114	3,844.7	3,844.7	3,844.7	NC	3,844.7		
	Right-of-Way	198.3	3,353.3	1,331	NC	3,353.3		
Pentachlorophenol	Right-of-Way	58	960	367.2	NC	960	ND	890
2-Methylnaphthalene	On Site	6.8	77,000	10,159	NC	77,000	ND	23000
2,3,7,8- TCDD Dioxin TEQ	On Site	0.0022	12	1.718	4.201	4.201	ND	0.0045
	Off Site at SS119	0.019	0.14	0.08	NC	0.14		
	Off Site at SS121	0.062	0.092	0.077	NC	0.092		
	Off Site at SS126	0.013	0.061	0.037	NC	0.061		
	Off Site at SS128	0.015	0.060	0.0375	NC	0.060		
	Off Site at SS145	0.023	0.086	0.0593	NC	0.086		
	PYC Area	0.0033	0.16	0.033	NC	0.16		
	Right-of-Way	0.049	4.1	0.9898	NC	4.1		
	Industrial Area West	0.0064	0.130	0.035	NC	0.130		
	Industrial Area North	0.011	0.130	0.047	NC	0.130		

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
[1] Minimum/maximum detected concentration in soil
NA = None available
UCL = Upper Confidence Limit
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
µg/kg = micrograms per kilogram
NC = Not calculated due to small sample size
ND = Not Detected

Table 2: Occurrence, Distribution, and Selection of Chemicals of Concern in Groundwater (2014 HHRA Addendum)

Chemical of Concern	Exposure Area	Min Conc.[1] (µg/L)	Max Conc.[1] (µg/L)	Mean Conc. (µg/L)	95% UCL of Mean (µg/L)	Exposure Point Conc. (µg/L)	Background Conc. (µg/L)	Screening Toxicity Value (µg/L)
2378-TCDD TEQ	Shallow	0.0000032	0.000026	0.000011	NA	0.000011	ND	0.00000052
	Intermediate	0.00000049	0.0037	0.000236	NA	0.000236		
	Deep	0.00000091	0.000013	0.00000561	NA	0.00000561		
Benzene	Shallow	3.4	170	60.97	NA	60.97	ND	0.39
	Intermediate	3.4	190	82.87	NA	82.87		
	Deep	1.6	51	16.86	NA	16.86		
Ethylbenzene	Shallow	1.2	66	33.11	NA	33.11	ND	1.3
	Intermediate	1.2	74	45.08	NA	45.08		
	Deep	6.1	47	19.54	NA	19.54		
Xylenes	Shallow	3.4	213	102	NA	102	ND	190
	Intermediate	3.4	222	119.4	NA	119.4		
	Deep	11	111	37.16	NA	37.16		
Acenaphthene	Shallow	6.2	870	291.5	NA	291.5	ND	400
	Intermediate	6.2	520	185.4	NA	185.4		
	Deep	1.9	320	135.8	NA	135.8		
Benzo(a) Anthracene	Shallow	1.1	120	14.7	NA	14.7	ND	0.029
	Intermediate	1.1	12	1.879	NA	1.879		
Benzo(a)Pyrene	Shallow	42	45	42.19	NA	42.19	ND	0.0029
Benzo(b) Fluoranthene	Shallow	2.1	52	6.805	NA	6.805	ND	0.029
	Intermediate	2.1	2.1	2.1	NA	2.1		
Benzo(k) Fluoranthene	Shallow	48	50	48.1	NA	48.1	ND	0.29
Carbazole	Shallow	8.7	740	303	NA	303	ND	NA
	Intermediate	8.7	740	264.6	NA	264.6		
	Deep	130	300	201.4	NA	201.4		
Chrysene	Shallow	1.2	100	11.2	NA	11.2	ND	2.9
Dibenzofuran	Shallow	3.1	530	161.1	NA	161.1	ND	5.8
	Intermediate	3.4	310	97.46	NA	97.46		
	Deep	48	150	80.5	NA	80.5		
Fluoranthene	Shallow	22.7	690	67.9	NA	67.9	ND	630
Fluorene	Shallow	4.1	690	165.4	NA	165.4	ND	220
	Intermediate	4.1	280	91.37	NA	91.37		
	Deep	43	120	70.93	NA	70.93		

Table 2: Occurrence, Distribution, and Selection of Chemicals of Concern in Groundwater (2014 HHRA Addendum)

Chemical of Concern	Exposure Area	Min Conc.[1] (µg/L)	Max Conc.[1] (µg/L)	Mean Conc. (µg/L)	95% UCL of Mean (µg/L)	Exposure Point Conc. (µg/L)	Background Conc. (µg/L)	Screening Toxicity Value (µg/L)
Naphthalene	Shallow	1.3	11000	5180	NA	5180	ND	0.14
	Intermediate	300	15000	5100	NA	5100		
	Deep	1300	4800	2400	NA	2400		
2-Methyl Naphthalene	Shallow	11	1100	511.5	NA	511.5	ND	27
	Intermediate	11	830	366.2	NA	366.2		
	Deep	45	250	134.2	NA	134.2		
Phenanthrene	Shallow	5.9	1700	211.1	NA	211.1	ND	87
	Intermediate	5.9	280	65.08	NA	65.08		
	Deep	25	69	45.67	NA	45.67		
Pyrene	Shallow	1.8	3900	180.8	NA	180.8	ND	87
1,1-Biphenyl	Shallow	1.5	260	74.03	NA	74.03	ND	0.83
	Intermediate	1.5	120	47.79	NA	47.79		
	Deep	14	38	24.58	NA	24.58		
1,2,4-Trichloro Benzene	Intermediate	50	50	50	NA	50	ND	0.99
2,4,6-Trichloro Phenol	Shallow	10	12	10.43	NA	10.43	ND	3.5
2,4-Dimethyl Phenol	Shallow	81	16000	3525	NA	3525	ND	270
	Intermediate	1.2	13000	2542	NA	2542		
	Deep	29	150	45.92	NA	45.92		
2-Methylphenol (o-Cresol)	Shallow	3.8	7900	1950	NA	1950	ND	720
	Intermediate	2.4	7100	1092	NA	1092		
3-Methylphenol (m-Cresol)	Shallow	6.3	24000	5034	NA	5034	ND	720
	Intermediate	40	19000	2502	NA	2502		
4-Methylphenol (p-Cresol)	Shallow	6.3	24000	5034	NA	5034	ND	1400
	Intermediate	40	19000	2502	NA	2502		
Pentachlorophenol	Shallow	7.5	310	54.26	NA	54.26	ND	0.035
	Intermediate	59	2600	432.9	NA	432.9		
Phenol	Shallow	6.7	6800	1580	NA	1580	ND	4500
	Intermediate	18	6600	717.7	NA	717.7		

Key
TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
µg/L = micrograms per Liter
[1] Minimum/maximum detected concentration in groundwater
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

ND = Not detected
NC = Not calculated due to small sample size
NA = Not applicable

Table 3 Risk Characterization Summary – Carcinogens in Surface Soil - Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Off-Site SS114	BaP TEQ	4.4E-05	1.3E-09	1.5E-04	2.0E-04
						Soil Risk Total =	**2.0E-04**
		Off-Site SS119	2,3,7,8-TCDD TEQ	2.8E-05	1.9E-09	7.7E-06	3.6E-05
						Soil Risk Total =	3.6E-05
		Off-Site SS121	2,3,7,8-TCDD TEQ	1.9E-05	1.1E-09	5.0E-06	2.4E-05
						Soil Risk Total =	2.4E-05
		Off-Site SS126	2,3,7,8-TCDD TEQ	1.2E-05	7.0E-10	3.3E-06	1.6E-05
						Soil Risk Total =	1.6E-05
		Off-Site SS128	2,3,7,8-TCDD TEQ	1.2E-05	6.9E-010	3.3E-06	1.5E-05
						Soil Risk Total =	1.5E-05
		Off-Site SS145	2,3,7,8-TCDD TEQ	1.8E-05	9.9E-10	4.7E-06	2.2E-05
						Soil Risk Total =	2.2E-05
		PYC Area	2,3,7,8-TCDD TEQ	3.3E-05	1.8E-09	8.8E-06	4.1E-05
						Soil Risk Total =	4.1E-05
		Right-Of-Way	BaP TEQ	3.8E-05	1.1E-09	1.3E-04	1.7E-04
			Pentachlorophenol	6.0E-07	1.5E-12	4.0E-06	4.6E-06
			2,3,7,8-TCDD TEQ	8.3E-04	4.7E-08	2.2E-04	1.1E-03
						Soil Risk Total =	**1.2E-03**
		Industrial Area West	2,3,7,8-TCDD TEQ	2.6E-05	1.5E-09	7.1E-06	3.4E-05
						Soil Risk Total =	3.4E-05
		Industrial Area North	2,3,7,8-TCDD TEQ	2.6E-05	1.5E-09	7.1E-06	3.4E-05
						Soil Risk Total =	3.4E-05

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
Bold values indicates cancer risks are greater than 1E-04 upper bound risk
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

Table 4 Risk Characterization Summary – Non-carcinogens in Surface Soil - Current/Future Child Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	Surface Soil	Off-Site SS114	BaP TEQ	NC	NC	NC	NC
						Soil HI Total =	NC
		Off-Site SS119	2,3,7,8-TCDD TEQ	3	0.000002	0.4	3
						Soil HI Total =	3
						Total Reproduction HI =	**3**
		Off-Site SS121	2,3,7,8-TCDD TEQ	2	0.000002	0.2	2
						Soil HI Total =	2
						Total Reproduction HI =	**2**
		Off-Site SS126	2,3,7,8-TCDD TEQ	1	0.000001	0.2	1
						Soil HI Total =	1
						Total Reproduction HI =	**1**
		Off-Site SS128	2,3,7,8-TCDD TEQ	1	0.000001	0.2	1
						Soil HI Total =	1
						Total Reproduction HI =	**1**
		Off-Site SS145	2,3,7,8-TCDD TEQ	2	0.000002	0.2	2
						Soil HI Total =	2
						Total Reproduction HI =	**2**
		PYC Area	2,3,7,8-TCDD TEQ	3	0.000003	0.4	3
						Soil HI Total =	3
						Total Reproduction HI =	**3**
		Right-Of-Way	2,3,7,8-TCDD TEQ	75	0.00007	10	85
			BaP TEQ	NC	NC	NC	NC
						Soil HI Total =	85
						Total Reproduction HI =	**85**

Table 4 Risk Characterization Summary – Non-carcinogens in Surface Soil/Dry Sediment - Current/Future Child Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
		Industrial Area West	2,3,7,8-TCDD TEQ	2	0.000002	0.3	3
						Soil HI Total =	3
						Total Reproduction HI =	**3**
		Industrial Area North	2,3,7,8-TCDD TEQ	2	0.000002	0.3	3
						Soil HI Total =	3
						Total Reproduction HI =	**3**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
HI = Hazard Index
Bold values indicate target organ HI ≥ 1
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014).

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Non-cancer toxicity criteria not available.

Table 5 Risk Characterization Summary – Carcinogens in Surface Soil Current/Future Industrial Worker (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	**Surface Soil**	On Site	2,3,7,8-TCDD TEQ	1.9E-04	2.9E-08	1.3E-05	2.0E-04
			BaP TEQ	3.8E-05	2.9E-09	3.3E-05	7.1E-05
						Soil Risk Total =	**2.7E-04**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
Bold values indicate cancer risk ≥ 1E-04 upper bound risk
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent

Table 6 Risk Characterization Summary – Non-carcinogens in Surface Soil Current/Future Industrial Worker (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	**Surface Soil**	On Site	2,3,7,8-TCDD TEQ	6	0.00005	0.4	6
			BaP TEQ	NC	NC	NC	NC
						Soil Total HI =	6
						Total Reproduction HI =	**6**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
HI = Hazard Index
Bold values indicate target organ HI ≥ 1
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Non-cancer toxicity criteria not available

Table 7 Risk Characterization Summary – Carcinogens in Surface Soil Current/Future Recreational User (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	**Surface Soil**	On Site	2,3,7,8-TCDD TEQ	1.3E-04	7.2E-09	3.4E-05	1.6E-04
			BaP TEQ	2.5E-05	7.3E-10	8.8E-05	1.1E-04
			2-Methyl Naphthalene	NC	NC	NC	NC
						Soil Risk Total =	**2.7E-04**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
Bold values indicate cancer risk ≥ 1E-04 upper bound risk

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not calculated. . Cancer toxicity criteria not available

Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

Table 8 Risk Characterization Summary – Non-Carcinogens in Surface Soil Current/Future Recreational User (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Recreational User
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Soil	**Surface Soil/**	On Site	2,3,7,8-TCDD TEQ	11	0.00001	2	13
			BaP TEQ	NC	NC	NC	NC
			2-Methyl Naphthalene	.04	NC	.07	0.1
						Soil Total HI =	13
						Total Reproduction HI =	**13**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
HI = Hazard Index
Bold values indicate target organ HI ≥ 1
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Non-cancer toxicity criteria not available.

Table 9 Risk Characterization Summary – Carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks		
				Ingestion	Inhalation and Dermal	Exposure Routes Total
Groundwater	Shallow Groundwater	Shallow Groundwater	2,3,7,8-TCDD TEQ	2.1E-05	NE	2.1E-05
			Benzene	5.0E-05	9.8E-05	1.5E-04
			Ethylbenzene	5.4E-06	1.7E-05	2.2E-05
			Xylenes	NC	NC	NC
			Acenaphthene	NC	NC	NC
			Benzo(a)Anthracene	1.6E-04	NE	1.6E-04
			Benzo(a)Pyrene	4.6E-03	NE	4.6E-03
			Benzo(b)Fluoranthene	7.4E-05	NE	7.4E-05
			Benzo(k)Fluoranthene	5.2E-05	NE	5.2E-05
			Carbazole	NC	NC	NC
			Chrysene	1.2E-06	NE	1.2E-06
			Dibenzofuran	NC	NC	NC
			Fluoranthene	NC	NC	NC
			Fluorene	NC	NC	NC
			Naphthalene	NC	3.6E-02	3.6E-02
			2-Methylnaphthalene	NC	NC	NC
			Phenanthrene	NC	NC	NC
			Pyrene	NC	NC	NC
			1,1-Biphenyl	8.8E-06	NE	8.8E-06
			2,4,6-Trichlorophenol	1.7E-06	NE	1.7E-06
			2,4-Dimethylphenol	NC	NC	NC
			2-Methylphenol	NC	NC	NC
			3-Methylphenol	NC	NC	NC
			4-Methylphenol	NC	NC	NC
			Pentachlorophenol	3.2E-04	NE	3.2E-04
			Phenol	NC	NC	NC
					Shallow Groundwater Risk Total =	**4.1E-02**

Table 9 Risk Characterization Summary – Carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks		
				Ingestion	Inhalation and Dermal	Exposure Routes Total
	Intermediate Groundwater	Intermediate Groundwater	2,3,7,8-TCDD TEQ	4.6E-04	NE	4.6E-04
			Benzene	6.8E-05	1.3E-04	2.0E-04
			Ethylbenzene	7.4E-06	2.3E-05	3.1E-05
			Xylenes	NC	NC	NC
			Acenaphthene	NC	NC	NC
			Benzo(a)Anthracene	2.0E-05	NE	2.0E-05
			Benzo(b)Fluoranthene	2.3E-05	NE	2.3E-05
			Carbazole	NC	NC	NC
			Dibenzofuran	NC	NC	NC
			Fluorene	NC	NC	NC
			Naphthalene	NC	3.5E-02	3.5E-02
			2-Methylnaphthalene	NC	NC	NC
			Phenanthrene	NC	NC	NC
			1,1-Biphenyl	5.7E-06	NE	5.7E-06
			1,2,4-Trichlorobenzene	2.2E-05	NE	2.2E-5
			2,4-Dimethylphenol	NC	NC	NC
			2-Methylphenol	NC	NC	NC
			3-Methylphenol	NC	NC	NC
			4-Methylphenol	NC	NC	NC
			Pentachlorophenol	2.6E-03	NE	2.6E-03
			Phenol	NC	NC	NC
					Intermediate Groundwater Risk Total =	**3.8E-02**

Table 9 Risk Characterization Summary – Carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Lifetime

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risks		
				Ingestion	Inhalation and Dermal	Exposure Routes Total
Deep Groundwater	**Deep Groundwater**		2,3,7,8-TCDD TEQ	1.1E-05	NE	1.1E-05
			Benzene	1.4E-05	2.7E-05	4.1E-05
			Ethylbenzene	3.2E-06	1.0E-05	1.3E-05
			Xylenes	NC	NC	NC
			Acenaphthene	NC	NC	NC
			Carbazole	NC	NC	NC
			Dibenzofuran	NC	NC	NC
			Fluorene	NC	NC	NC
			Naphthalene	NC	1.7E-02	1.7E-02
			2-Methylnaphthalene	NC	NC	NC
			Phenanthrene	NC	NC	NC
			1,1-Biphenyl	2.9E-06	NE	2.9E-06
			2,4-Dimethylphenol	NC	NC	NC
					Deep Groundwater Risk Total =	**1.7E-02**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
NE = Not evaluated
Bold values indicate cancer risk ≥ 1E-04 upper bound risk
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Cancer toxicity criteria not available.

Table 10 Risk Characterization Summary – Non-carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index		
				Ingestion	Inhalation Dermal	Exposure Routes Total
Groundwater	Shallow Groundwater	Shallow Groundwater	2,3,7,8-TCDD TEQ	1	NE	1
			Benzene	1	1	2
			Ethylbenzene	0.02	0.02	0.04
			Xylenes	0.03	0.5	0.5
			Acenaphthene	0.3	NE	0.3
			Benzo(a)Anthracene	NC	NC	NC
			Benzo(a)Pyrene	NC	NC	NC
			Benzo(b)Fluoranthene	NC	NC	NC
			Benzo(k)Fluoranthene	NC	NC	NC
			Carbazole	NC	NC	NC
			Chrysene	NC	NC	NC
			Dibenzofuran	10	NE	10
			Fluoranthene	0.1	NE	0.1
			Fluorene	0.3	NE	0.3
			Naphthalene	17	828	844
			2-Methylnaphthalene	8	NE	8
			Phenanthrene	0.4	NE	0.4
			Pyrene	0.4	NE	0.4
			1,1-Biphenyl	.009	89	89
			2,4,6-Trichlorophenol	0.7	NE	0.7
			2,4-Dimethylphenol	11	NE	11
			2-Methylphenol	2	NE	2
			3-Methylphenol	6	NE	6
			4-Methylphenol	3	NE	3
			Pentachlorophenol	0.7	NE	0.7
			Phenol	0.3	NE	0.3
					Shallow Groundwater Total HI =	982

Table 10 Risk Characterization Summary – Non-carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index		
				Ingestion	Inhalation Dermal	Exposure Routes Total
	Shallow Groundwater	Shallow Groundwater			**Total Liver HI =**	**90**
					Total Reproduction HI =	**2**
					Total Respiratory HI =	**928**
					Total Blood HI =	**13**
					Total Kidney HI =	**90**
					Total Body Weight HI =	**26**
					Total Motor Coordination HI =	**12**
					Total Growth and Body Fat HI =	**10**
					Total Lethargy and Prostration HI =	**11**
					Total CNS HI =	**10**
	Intermediate Groundwater	Intermediate Groundwater	2,3,7,8-TCDD TEQ	22	NE	22
			Benzene	1	1	3
			Ethylbenzene	0.03	0.02	0.05
			Xylenes	0.04	0.6	0.6
			Acenaphthene	0.2	NE	0.2
			Benzo(a)Anthracene	NC	NC	NC
			Benzo(b)Fluoranthene	NC	NC	NC
			Carbazole	NC	NC	NC
			Dibenzofuran	6	NE	6
			Fluorene	0.1	NE	0.1
			Naphthalene	16	815	831
			2-Methylnaphthalene	6	NE	6
			Phenanthrene	0.1	NE	0.1
			1,1-Biphenyl	0.006	57	57
			1,2,4-Trichlorobenzene	0.3	12	12
			2,4-Dimethylphenol	8	NE	8
			2-Methylphenol	1	NE	1
			3-Methylphenol	3	NE	3

Table 10 Risk Characterization Summary – Non-carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index		
				Ingestion	Inhalation Dermal	Exposure Routes Total
	Intermediate Groundwater	Intermediate Groundwater	4-Methylphenol	2	NE	2
			Pentachlorophenol	6	NE	6
			Phenol	0.2	NE	0.2
					Intermediate Groundwater Total HI =	958
					Total Liver HI =	**63**
					Total Reproduction HI =	**22**
					Total Respiratory HI =	**892**
					Total Blood HI =	**11**
					Total Kidney HI =	**57**
					Total Body Weight HI =	**21**
					Total Motor Coordination HI =	**9**
					Total Growth and Body Fat HI =	**6**
					Total Lethargy and Prostration HI =	**8**
					Total CNS HI =	**5**
	Deep Groundwater	Deep Groundwater	2,3,7,8-TCDD TEQ	0.5	NE	0.5
			Benzene	0.3	0.3	0.5
			Ethylbenzene	0.01	0.009	0.02
			Xylenes	0.01	0.2	0.2
			Acenaphthene	0.1	NE	0.1
			Carbazole	NC	NC	NC
			Dibenzofuran	5	NE	5
			Fluorene	0.1	NE	0.1
			Naphthalene	8	384	391
			2-Methylnaphthalene	2	NE	2
			Phenanthrene	0.1	NE	0.1
			1,1-Biphenyl	0.003	29	29
			2,4-Dimethylphenol	0.1	NE	0.1
					Deep Groundwater Total HI =	430

Table 10 Risk Characterization Summary – Non-carcinogens in Groundwater Current/Future Resident (2014 HHRA Addendum)

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Non-cancer Hazard Index		
				Ingestion	Inhalation Dermal	Exposure Routes Total
	Deep Groundwater	Deep Groundwater	**Total Liver HI =**			**30**
			Total Respiratory HI =			**415**
			Total Kidney HI =			**30**
			Total Body Weight HI =			**8**
			Total Growth and Body Fat HI =			**5**

Key
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
NE = Not evaluated
Bold values indicate target organ HI ≥ 1
Source: Human Health Risk Assessment Addendum (Black & Veatch, 2014)

TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
NC = Not Calculated. Non-cancer toxicity criteria not available.

Table 11 Cleanup Levels for Soil Chemicals of Concern

Chemical of Concern	Residential Cleanup Goal[1]	Commercial/Industrial Cleanup Goal[1]	Basis
BaP TEQ	0.1 mg/kg	0.7 mg/kg	FDEP SCTL[1]
Pentachlorophenol	7.2 mg/kg	28 mg/kg	FDEP SCTL[1]
2-Methylnaphthalene	210 mg/kg	2,100 mg/kg	FDEP SCTL[1]
2,3,7,8 TCDD TEQ (dioxin)	7 ng/kg	30 ng/kg	FDEP SCTL[1]

Key:
BaP TEQ = Benzo(a)pyrene Toxicity Equivalent
ng/kg = milligrams per kilogram
TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
ng/kg = nanograms per kilogram

FDEP Soil Cleanup Target Level (SCTL) based on 1E-06 cancer risk or hazard index of 1

Naphthalene concentrations onsite exceed the State Commercial -SCTL for naphthalene was screened out as a COC by the risk assessment. The Site remedy includes engineering controls (caps or 2 ft thick soil covers) throughout the Site property, which will effectively address these naphthalene concentrations."

Table 12 PRGs for Groundwater Chemicals of Concern

Chemical of Concern	Medium	Residential Lifetime (10^{-6} Risk) (µg/L)	Residential Child (HQ=1) (µg/L)	EPA MCL (µg/L)	FDEP GCTL (µg/L)
2,3,7,8 TCDD TEQ (dioxin)	Groundwater	5.2E-07	1.1E-05	3.00E-05	3.00E-05
Benzene	Groundwater	6.2E-04	3.1E+01	5.00E+00	1.0E+00
Ethylbenzene	Groundwater	2.0E-03	NA	7.00E+02	3.0E+01
Xylenes	Groundwater	NA	2.0E+02	1.00E+04	2.0E+01
Acenaphthene	Groundwater	NA	9.4E+02	NE	2.0E+01
Benzo(a)anthracene	Groundwater	3.6E-02	NA	NE	5.0E-02
Benzo(a)pyrene (BaP)	Groundwater	3.6E-03	NA	2.0E-01	2.0E-01
Benzo(b)fluoranthene	Groundwater	3.6E-02	NA	NE	5.0E-02
Benzo(k)fluoranthene	Groundwater	3.6E-01	NA	NE	5.0E-01
Carbazole	Groundwater	NA	NA	NE	1.8E+00
Chrysene	Groundwater	3.6E+00	NA	NE	4.8E+00
Dibenzofuran	Groundwater	NA	1.6E+01	NE	2.8E+01
Fluoranthene	Groundwater	NA	6.3E+02	NE	2.8E+02
Fluorene	Groundwater	NA	6.3E+02	NE	2.8E+02
Naphthalene	Groundwater	5.2E-03	6.1E+00	NE	1.4E+01
2-Methylnaphthalene	Groundwater	NA	6.3E+01	NE	2.8E+01
Phenanthrene	Groundwater	NA	4.7E+02	NE	2.1E+02
Pyrene	Groundwater	NA	4.7E+02	NE	2.1E+02
1,1-Biphenyl	Groundwater	8.4E+00	8.3E-01	NE	5.0E-01
1,2,4-Trichlorobenzene	Groundwater	2.3E+00	4.1E+00	7.0E+01	7.0E+01
2,4,6-Trichlorophenol	Groundwater	6.1E+00	4.1E+00	NE	3.2E+00
2-Methylphenol o-cresol	Groundwater	NA	1.6E+01	NE	3.5E+01
3-Methylphenol m-cresol	Groundwater	NA	3.1E+02	NE	3.5E+01

Table 12 PRGs for Groundwater Chemicals of Concern

Chemical of Concern	Medium	Residential Lifetime (10^{-6} Risk) (µg/L)	Residential Child (HQ=1) (µg/L)	EPA MCL (µg/L)	FDEP GCTL (µg/L)
4-Methylphenol p-cresol	Groundwater	NA	7.8E+02	NE	3.5E+01
2,4-Dimethylphenol	Groundwater	NA	1.6E+03	NE	3.5E+00
Pentachlorophenol	Groundwater	1.7E-01	7.8E+01	1.00E+00	1.0E+00
Phenol	Groundwater	NA	4.7E+03	NE	1.0E+01

Key:
TCDD TEQ = Tetrachlorodibenzo-p-dioxin (dioxin) Toxicity Equivalent
µg/L is micrograms per liter
[1] EPA Site Specific Remedial Action Level (SS-RAL) based 10^{-5} cancer risk
FDEP's GCTL are the presumptive remedial goals.
MCL - Maximum Contaminant Level
NA = Not Applicable; constituent not a concern for cancer risk or non-cancer hazard
NE = Not Established

Table 13 Potential Chemical-specific ARARs

Chemical–Specific ARARs			
Action/Media	**Requirement**	**Prerequisite**	**Citation**
Protection of surface water from recharge of contaminated groundwater	All surface waters of the State shall at all places and at all times be free from: (a) Domestic, industrial, agricultural, or other man-induced non-thermal components of discharges, which, alone or in combination with other substances or in combination with other components of discharges (whether thermal or non-thermal): 1. Settle to form putrescent deposits or otherwise create a nuisance; or 2. Float as debris, scum, oil, or other matter in such amounts as to form nuisances; or 3. Produce color, odor, taste, turbidity, or other conditions in such a degree as to create a nuisance; or 4. Are acutely toxic; or 5. Are present in concentrations which are carcinogenic, mutagenic, or teratogenic to human beings or to significant, locally occurring, wildlife or aquatic species, unless specific standards are established for such components in subsection 62-302.500(2) or Rule 62-302.530, F.A.C.; or 6. Pose a serious danger to the public health, safety, or welfare.	Presence of pollutant in Waters of the State of Florida as defined in Section 403.031(13), F.S. – **Relevant and Appropriate**	F.A.C. 62-302.500(1)(a)1-6 Minimum Criteria for Surface Waters
	Shall not exceed the surface water quality criteria for the pollutants listed in Table entitled *Surface Water Quality Standards*.	Presence of pollutant in Waters of the State of Florida as defined in Section 403.031(13), F.S. – **Relevant and Appropriate**	F.A.C. 62-302.530 Surface Water Quality Criteria.
Removal of contaminated *surface* soil for Commercial/Industrial use	Specifies Default Soil Cleanup Target Levels (CTLs) for site rehabilitation. F.A.C. 62-777 Table II lists the cleanup levels for Commercial/Industrial Direct Exposure. • See ROD Table 11 Surface Soil Remedial Cleanup Levels for list of the COCs and corresponding CTL	Rehabilitation (i.e., remediation) of site contaminated soil and sediment – **Relevant and Appropriate**	F.A.C. 62-777, Table II Soil Cleanup Target Levels

Chemical–Specific ARARs

Action/Media	Requirement	Prerequisite	Citation
Removal of contaminated *surface* soil for Residential use	Specifies Soil Contaminant Cleanup Target Levels (CTLs) for site rehabilitation. FAC 62-777 Table II lists the cleanup levels for Residential Direct Exposure. • See ROD Table 11 Surface Soil Remedial Cleanup Levels for list of the COCs and corresponding CTL	Rehabilitation (i.e., remediation) of site contaminated soil and sediment – **Relevant and Appropriate**	F.A.C. 62-777, Table II Soil Cleanup Target Levels

ARAR = applicable *or* relevant and appropriate requirement
CFR = Code of Federal Regulations
COCs = contaminants of concern
CTL = cleanup target level
F.A.C. = Florida Administrative Code, Chapters as specified
F.S. = Florida Statutes
ROD = Record of Decision
TBC = To Be Considered guidance

Table 14 Potential Action-specific ARARs

Action–Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
General Construction Standards — All Land-disturbing Activities (i.e., excavation, clearing, grading, etc.)			
Control of storm water runoff from soil disturbing activities	Must comply with the substantive provisions in the "Generic Permit for Stormwater Discharge from Large and Small Construction Activities," document number 62-621.300(4)(a), issued by the FDEP and effective February 17, 2009. Requires development storm water pollution prevention plan and implementation of best management practices and erosion and sedimentation controls for stormwater runoff to ensure protection of the surface waters of the state. *NOTE*: Plan would be part of CERCLA document such as Remedial Design or Remedial Action Work Plan.	Stormwater discharges from large and small construction activities to surface waters of the State as defined in Section 403.031, F.S. – **Applicable**	F.A.C. 62-621.300(4)(a) *Generic Permit for Stormwater Discharge from Large and Small Construction Activities*
Control of storm water runoff from soil disturbing activities	No discharge from a stormwater discharge facility shall cause or contribute to a violation of water quality standards in waters of the state.	Construction activity (e.g., alteration of land contours or land clearing) that results in creation *of stormwater management system* as defined in F.AC. 62-25.020(15) – **Applicable**	F.A.C. 62-25.025 *Regulation of Stormwater Discharge*
	Erosion and sediment control best management practices shall be used as necessary during construction activity to retain sediment on site. These practices shall be designed by an engineer or other competent professional experienced in the fields of soil conservation or sediment control according to specific site conditions and shall be shown or noted on the plans of the stormwater management system. *NOTE*: Plan would be part of CERCLA document such as Remedial Design or Remedial Action Work Plan.		F.A.C. 62-25.025 (7)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
Control of Fugitive Dust	No person shall cause, let, permit, suffer or allow the emissions of unconfined particulate matter from any activity, including vehicular movement; transportation of materials; construction, alteration, demolition or wrecking; or industrially related activities such as loading, unloading, storing or handling; without taking reasonable precautions to prevent such emissions.	Land disturbing activity that has potential for unconfined emissions of particulate matter – **Applicable**	F.A.C. 62-296.320(4)(c) General Pollutant Emission Limiting Standards
Groundwater Monitoring and Extraction Wells – Installation, Operation, and Abandonment			
Groundwater Monitoring Well Installation	Provides detailed guidance to assist in monitoring well design and material specifications for construction of groundwater monitoring well.	Installation of groundwater monitoring well to detect migration of contaminants – **To Be Considered**	FDEP, Monitoring Well Design and Construction Guidance Manual (2008)
Construction and repair of groundwater well	Construction of water well shall be in accordance with the substantive requirements specified in F.A.C. 62-532.500(1)(a) through(i) as appropriate.	Installation of water well as defined in F.A.C. 62-532.200 – **Relevant and Appropriate**	F.A.C. 62-532.500(1) Well Casing, Liner Pipe, Coupling and Well Screen Requirements
	Wells shall be constructed to meet the following construction criteria specified in F.A.C. 62-532.500(3)(a), (b), (e), (f), (g), (h) and (i) as appropriate.		F.A.C. 62-532.500(3) Well Construction Criteria
Well Covers and Upper Terminus	Wells shall be covered with a tamper resistant cover when there is an interruption in work and meet the criteria specified in F.A.C. 62-532.500(4)(a) and (b) as appropriate.		F.A.C. 62-532.500(4) Top of the Well
Plugging and abandonment of groundwater wells	All abandoned wells shall be plugged by filling them from bottom to top with neat cement grout or bentonite and capped with a minimum of one foot of neat cement grout. An alternate method providing equivalent protection shall be approved by the Department and EPA.	Abandonment of water well as defined in F.A.C. 62-532.200 – **Relevant and Appropriate**	F.A.C. 62-532.500(5)
Plugging and abandonment of groundwater wells *con't*	In the abandonment of a water well, caution shall be taken to minimize the potential entrance of contaminants into the bore hole and ground water resource.	Abandonment of water well as defined in F.A.C. 62-532.200 – **Relevant and Appropriate**	F.A.C. 62-532.500(3)(f)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
	Only water from a potable water source shall be used in the abandonment of a water well.		F.A.C. 62-532.500(3)(g)
Underground Injection Wells for Groundwater Treatment – Installation, Operation, and Abandonment			
Injection of In-Situ Bio-augmentation agents into groundwater	An injection activity cannot allow the movement of fluid containing any contaminant into USDWs, if the presence of that contaminant may cause a violation of the primary drinking water standards under 40 CFR part 141, other health based standards, or may otherwise adversely affect the health of persons. This prohibition applies to well construction, operation, maintenance, conversion, plugging, closure, or any other injection activity.	Class V wells [as defined in 40 CFR § 144.6(e)] – **Relevant and Appropriate**	40 CFR § 144.82(a)(1)
Abandonment for Class V wells	Wells must be closed in a manner that complies with the above prohibition of fluid movement. Also, any soil, gravel, sludge, liquids, or other materials removed from or adjacent to the well must be disposed or otherwise managed in accordance with substantive applicable Federal, State, and local regulations and requirements.	Class V wells [as defined in 40 CFR § 144.6(e)] – **Relevant and Appropriate**	40 CFR § 144.82(b)
General Criteria for Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	A well shall be designed and constructed for its intended use, in accordance with good engineering practices.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate**	F.A.C. 62-528.605(1)
	May not cause or allow fluids to migrate into underground source of drinking water which may cause a violation of a primary or secondary drinking water standard contained in Chapter 62-550, F.A.C., or minimum criteria contained in Rule 62-520.400, F.A.C., or may cause fluids of significantly differing water quality to migrate between underground sources of drinking water.		F.A.C. 62-528.605(2)
Construction of Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	Shall be constructed so that their intended use does not violate the water quality standards of Chapter 62-520. F.A.C., at the point of discharge, except where specifically allowed in subsection65-522.300(2), F.A.C.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate**	F.A.C. 62-528.605(3)

Action–Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
	All drilled wells shall, at a minimum, meet the casing and cementing requirements for water well construction set forth in Chapter 62-532, F.A.C.		F.A.C. 62-528.605(7)
Operation of Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	Shall be used or operated in a manner that it does not present a hazard to an underground source of water.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate**	F.A.C. 62-528.610(1)
	Pretreatment for fluids injected through existing wells shall be performed if necessary to ensure the injected fluid does not violate applicable water quality standards in Chapter 52-520, F.A.C.		F.A.C. 62-528.610(3)
Monitoring of Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	The need for monitoring shall be determined by the type of well, nature of injected fluid, and the water quality of the receiving and overlying aquifers. *Note:* The monitoring parameters and frequency will be specified in a CERCLA document such as Remedial or Removal Action Work Plan.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate**	F.A.C. 62-528.615(1) and (2)
Plugging and abandonment of Class V well used for underground injection (e.g., In-Situ Bio-augmentation agents)	Prior to abandoning Class V wells, the well shall be plugged with cement in a manner that will not allow movement of fluids between underground sources of water. Placement of the cement shall be accomplished by any recognized and approved method.	Operation of Class V well Group 4 (wells associated with aquifer remediation projects) – **Relevant and Appropriate.**	F.A.C. 62-528.625(3)
Reinjection of treated contaminated groundwater or treatment agent	No owner or operator shall construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 *CFR* Part 142 or may otherwise adversely affect the health or persons.	Underground injection into an underground source of drinking water – **Relevant and Appropriate**	40 CFR 144.12(a)
Operation of Groundwater Treatment Systems (e.g., Steam Enhanced Extraction, ISCO and ISEB)			

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
Operation and Monitoring of groundwater treatment system	A separate air permit will not be required if the total air emissions from all on-site remediation equipment system(s) do not exceed 5.5lbs/day for any single HAP or 13.7 lbs/day for total HAPs. *Note*: Although permit not required under CERCLA 121(e)(1) for on-site response actions, the specified thresholds are relevant to application of other air emissions requirements.	Operation of an active remediation system that emits contaminants into the air – **Relevant and Appropriate**	F.A.C. 62-780.700(3)(f)(3.)
Operation and Monitoring of groundwater treatment system including groundwater monitoring wells	Unless otherwise provided in CERCLA Remedial/Removal Action Work Plan, the following shall be obtained or determined during the active remediation: • Water level data collected from all designated wells, piezometers, and staff gauge locations each time monitoring and recovery wells are sampled (water-level measurements shall be made within 24-hour period) • Total volume of any free product recovered and the thickness and horizontal extent of free product • Total volume of groundwater recovered from each recovery well • Concentrations of applicable contaminants based on analyses performed on the effluent from the groundwater treatment system • Concentrations of applicable contaminants based on analyses performed on the untreated groundwater from select recovery wells	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.700(11)(a) through (e)
Operation and Monitoring of groundwater treatment system	Concentrations of recovered vapors from a vacuum extraction system and post-treatment air emissions if air emissions treatment is provided, must be conducted weekly for the first month, monthly for the next two months, and quarterly thereafter. Additional sampling may be performed based upon the estimated time of breakthrough as follows: 1. Concentrations of recovered vapors from individual wells shall be determined using an organic vapor analyzer with a flame ionization	Operation of an active remediation system utilizing activated carbon off-gas treatment – **Relevant and Appropriate**	F.A.C. 62-780.700(11)(i)(1.)(2.) and (3.)

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Action	Requirement	Prerequisite	Citation
	detector, or other applicable field detection device in order to optimize airflow rate and contaminant recovery; 2. The influent and effluent samples shall be collected using appropriate air sampling protocols and shall be analyzed using an analytical method. 3. The samples shall be collected using appropriate air sampling protocols as specified in FAC 62-160. *NOTE*: Monitoring frequency, sampling and analysis methods will be specified in CERCLA Remedial Action Work Plan.		
Florida active remediation regulation for groundwater bioremediation systems	Specifies that operational parameters for bioremediation systems should include measurements of dissolved oxygen at representative monitoring locations; rates of biological, chemical, or nutrient enhancement additions, an any other indicators of biological activity. Conducted weekly for the first month, monthly for the next two months, and quarterly thereafter or at approved alternative frequency. *NOTE*: Monitoring frequency, sampling and analysis methods will be specified in CERCLA Remedial Action Work Plan.	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.700(11)(h)
Florida active remediation regulation for groundwater in-situ systems	Specifies that operations parameters for in-situ systems should include measurements of biological, chemical, or physical indicators that will verify the radius of influence at representative monitoring locations. Conducted weekly for the first month, monthly for the next two months, and quarterly for the first two years and semi-annually thereafter. *NOTE*: Monitoring frequency, sampling and analysis methods will be specified in CERCLA Remedial Action Work Plan.	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.700(11)(g)

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Action	Requirement	Prerequisite	Citation
Corrective action for leaks during operation of groundwater treatment system	If effluent concentrations or air concentrations exceed specified or prescribed levels or plume migration occurs during remediation system start-up of during operation of the treatment systems, then corrective actions shall be taken.	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.700(13)
Post-Active Remediation Monitoring for groundwater treatment system	Unless otherwise provided in CERCLA Remedial Action Work Plan, the following shall be performed as follows: • A minimum of two monitoring wells is required with at least one located at the downgradient edge of the plume; and at least one located in the area(s) of highest groundwater contamination or directly adjacent; • Designated monitoring wells shall be sampled quarterly for contaminants that were present; • Water-level measurements in all designated wells and piezometers shall be made within 24-hour of initiating each sampling event.	Operation of an active remediation system – **Relevant and Appropriate**	F.A.C. 62-780.750(4)(a) through (c)
General standards for process vents used in treatment of VOC contaminated groundwater	Select and meet the requirements under one of the options specified below: • Control HAP emissions from the affected process vents according to the applicable standards specified in §§ 63.7890 through 63.7893. • Determine for the remediation material treated or managed by the process vented through the affected process vents that the average total volatile organic hazardous air pollutant (VOHAP) concentration, as defined in § 63.7957, of this material is less than 10 (ppmw). Determination of VOHAP concentration will be made using procedures specified in § 63.7943. Control HAP emissions from affected process vents subject to another subpart under 40 CFR part 61 or 40 CFR part 63 in compliance with the standards specified in the applicable subpart.	Process vents as defined in 40 CFR § 63.7957 used in site remediation of media (e.g., soil and groundwater) that could emit hazardous air pollutants (HAP) listed in Table 1 of Subpart GGGGG of Part 63 and vent stream flow exceeds the rate in 40 CFR §63.7885(c)(1) – **Relevant and Appropriate**	40 CFR § 63.7885(b) F.A.C. 62-204.800(11)(b)(59)
Emission limitations for process vents used in treatment of VOC	Meet the requirements under one of the options specified below: • Reduce from all affected process vents the total emissions of the HAP to a level less than 1.4 kilograms per hour (kg/hr) and 2.8 Mg/yr (3.0 pounds per hour (lb/hr) and 3.1 tpy);	Process vents as defined in 40 CFR § 63.7957 used in site remediation of media (e.g., soil and groundwater) that could emit hazardous air pollutants (HAP) listed in Table 1 of	40 CFR § 63.7890(b)(1)-(4)

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Action	Requirement	Prerequisite	Citation
contaminated groundwater	• Reduce from all affected process vents the emissions of total organic compounds (TOC) (minus methane and ethane) to a level below 1.4 kg/hr and 2.8 Mg/yr (3.0 lb/hr and 3.1 tpy); • Reduce from all affected process vents the total emissions of the HAP by 95 percent by weight or more; or • Reduce from all affected process vents the emissions of TOC (minus methane and ethane) by 95 percent by weight or more.	Subpart GGGGG of Part 63 and vent stream flow exceeds the rate in 40 CFR § 63.7885(c)(1) – **Relevant and Appropriate**	F.A.C. 62-204.800(11)(b)(59)
Standards for closed vent systems and control devices used in treatment of VOC contaminated groundwater	For each closed vent system and control device you use to comply with the requirements above, you must meet the operating limit requirements and work practice standards in Sec. 63.7925(d) through (j) that apply to the closed vent system and control device. *NOTE:* EPA approval to use alternate work practices under paragraph (j) in 40 CFR § 63.7925 will be obtained in a CERCLA document	Closed vent system and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7890(c) F.A.C. 62-204.800(11)(b)(59)
Monitoring of closed vent systems and control devices used in treatment of VOC contaminated groundwater	Must monitor and inspect the closed vent system and control device according to the requirements in 40 CFR § 63.7927 that apply to the affected source. *NOTE:* Monitoring program will be developed as part of the CERCLA process and included in an appropriate CERCLA document.	Closed vent system and control devices as defined in 40 CFR § 63.7957 that are used to comply with § 63.7890(b) – **Relevant and Appropriate**	40 CFR § 63.7892 F.A.C. 62-204.800(11)(b)(59)
Treatment in Miscellaneous Treatment Units (with air emissions)	Unit must be located, designed, constructed, operated and maintained, and closed in a manner that will ensure protection of human health and the environment.	Treatment of RCRA hazardous waste in miscellaneous units, except as provided in 40 CFR 264.1 – **Relevant and Appropriate**	40 CFR 264.601
	Protection of human health and the environment includes, but is not limited to, prevention of any release that may have adverse effects due to migration of waste constituents in the air considering the factors listed in 40 CFR 264.601(C)(1)-(7).		40 CFR 264.601(c)

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Action	Requirement	Prerequisite	Citation
	The requirements of RCRA Subpart A, Air Emission Standards for Process Vents do not apply to process vents that would otherwise be subject to this subpart when equipped with emission controls and operated in accordance with an applicable Clean Air Act regulation codified under 40 CFR Part 60, Part 61 or Part 63.	Process vents associated with the air or steam stripping operations that manage hazardous wastes with organic concentrations of at least 10 ppm – **Relevant and Appropriate**	40 CFR 264.1030(e)
	The requirements of RCRA Subpart CC, Air Emission Standards for Tanks, Surface Impoundments and Containers do not apply to a waste management unit that is solely used for on-site treatment or storage of hazardous waste that is placed in the unit as a result of implementing remedial activities required under RCRA 3004(u) and (v) or 3008(h), or CERCLA authorities.	Air pollutant emissions with volatile organics from a hazardous waste tank, surface impoundment or container – **Relevant and Appropriate**	40 CFR 264.1080(a)(5)
Wastewater Treatment and Disposal — Contaminated Groundwater			
Discharge of treated groundwater to a Wastewater Facility	An industrial user shall not introduce into a Wastewater faciility (WWF) any pollutant which causes pass through or interference.	Discharge pollutants into a "Wastewater Facility" as defined in F.A.C. 62-625.200(29) by an industrial user (i.e., source of discharge) – **Applicable**	F.A.C. 62-625.400(1)(a) General Prohibitions
Discharge of treated groundwater to a Wastewater Facility	The following pollutants shall not be introduced into a WWF: • Pollutants which create a fire or explosion hazard in the WWF • Pollutants which will cause corrosive structural damage to the WWF, but in no case discharges with pH lower than 5.0, unless the WWF is specifically designed to accommodate such discharges; • Solid or viscous pollutants in amounts which will cause obstruction to the flow in the WWF resulting in interference; • Any pollutant, including oxygen demanding pollutants, released in a discharge at a flow rate or pollutant concentration which will cause interference with the WWF; • Heat in amounts which will inhibit biological activity in the WWF resulting in interference, but in no case heat in such quantities that result in the discharge from the treatment plant having a temperature that exceeds 40° C (104° F) unless the Department, upon request of	Discharge pollutants into a "Wastewater Facility" as defined in F.A.C. 62-625.200(29) by an industrial user (i.e., source of discharge) – **Applicable**	F.A.C. 62-625.400(2)(a)-(h) Specific Prohibitions

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Action	**Requirement**	**Prerequisite**	**Citation**
	the control authority, approves alternate temperature limits in accordance with Rule 62-302.520, F.A.C.; • Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through; • Pollutants which result in the presence of toxic gases, vapors, or fumes within the WWF in a quantity that will cause acute worker health and safety problems; or • Any trucked or hauled pollutants, except at discharge points designated by the control authority.		
	Local Limits: Where specific prohibitions or limits on pollutants or pollutant parameters are developed by a public utility in accordance with F.A.C. 62-625.400(3), such limits shall be deemed to be pretreetment standards.	Discharge pollutants into a "Wastewater Facility" as defined in F.A.C. 62-625.200(29) by an industrial user (i.e., source of discharge) – **Applicable**	F.A.C. 62-625.400(4)
Waste Characterization – Primary Waste (e.g., excavated waste and contaminated soil, purged ground water) and Secondary Wastes (e.g., contaminated equipment or treatment residuals)			
Characterization of ***solid waste*** (all primary and secondary wastes)	Must determine if solid waste is a hazardous waste using the following method: • Should first determine if waste is excluded from regulation under 40 CFR 261.4; and • Must then determine if waste is listed as a hazardous waste under subpart D 40 CFR Part 261.	Generation of solid waste as defined in 40 CFR 261.2 – **Applicable**	40 CFR 262.11(a) and (b) F.A.C. 62-730.160
	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR part 261by either: (1) Testing the waste according to the methods set forth in subpart C of 40 CFR part 261, or according to an equivalent method approved by the Administrator under 40 CFR 260.21; or	Generation of solid waste which is not excluded under 40 CFR 261.4(a) – **Applicable**	40 CFR 262.11(c) F.A.C. 62-730.160

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Action	Requirement	Prerequisite	Citation
	(2) Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used.		
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Chapter 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous waste – **Applicable**	40 CFR 262.11(d) F.A.C. 62-730.160
Characterization of ***hazardous waste*** (all primary and secondary wastes)	Must obtain a detailed chemical and physical analysis on a representative sample of the waste(s), which at a minimum contains all the information that must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 CFR 264 and 268.	Generation of RCRA hazardous waste for storage, treatment or disposal – **Applicable**	40 CFR 264.13(a)(1) F.A.C. 62-730.180(1)
Determinations for management of hazardous waste	Must determine each EPA Hazardous Waste Number (waste code) applicable to the waste in order to determine the applicable treatment standards under 40 CFR 268 et seq. Note: This determination may be made concurrently with the hazardous waste determination required in Sec. 262.11 of this chapter.	Generation of hazardous waste for storage, treatment or disposal – **Applicable**	40 CFR 268.9(a) F.A.C. 62-730.183
	Must determine the underlying hazardous constituents [as defined in 40 CFR 268.2(i)] in the characteristic waste.	Generation of RCRA characteristic hazardous waste (and is not D001 non –wastewaters treated by CMBST, RORGS, or POLYM of Section 268.42 Table 1) for storage, treatment or disposal – **Applicable**	40 CFR 268.9(a) F.A.C. 62-730.183
Determinations for management of hazardous waste	Must determine if the hazardous waste meets the treatment standards in 40 CFR 268.40, 268.45, or 268.49 by testing in accordance with prescribed methods or use of generator knowledge of waste.	Generation of hazardous waste for storage, treatment or disposal – **Applicable**	40 CFR 268.7(a) F.A.C. 62-730.183

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Action	Requirement	Prerequisite	Citation
	Note: This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.		
	Must comply with the special requirements of 40 CFR 268.9 in addition to any applicable requirements in CFR 268.7.	Generation of waste or soil that displays a hazardous characteristic of ignitability, corrosivity, reactivity, or toxicity for storage, treatment or disposal – **Applicable**	40 CFR 268.7(a) F.A.C. 62-730.183
Waste Storage – Primary Waste (e.g., excavated waste and contaminated soil) and Secondary Wastes (e.g., contaminated equipment or treatment residuals)			
Temporary on–site storage of hazardous waste in containers	A generator may accumulate hazardous waste at the facility provided that: • waste is placed in containers that comply with 40 CFR 265.171 –173; and • the date upon which accumulation begins is clearly marked and visible for inspection on each container; • container is marked with the words "hazardous waste"; or	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10 – **Applicable**	40 CFR 262.34(a); 40 CFR 262.34(a)(1)(i); 40 CFR 262.34(a)(2) and (3) F.A.C. 62-730.160
	• container may be marked with other words that identify the contents.	Accumulation of 55 gal. or less of RCRA hazardous waste or one quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation – **Applicable**	40 CFR 262.34(c)(1) F.A.C. 62-730.160
Use and management of hazardous waste in containers	If container is not in good condition (e.g. severe rusting, structural defects) or if it begins to leak, must transfer waste from this container to a container that is in good condition.	Storage of RCRA hazardous waste in containers – **Applicable**	40 CFR 265.171 F.A.C. 62-730.180(2)
	Must use container made or lined with materials compatible with waste to be stored so that the ability of the container to contain is not impaired.		40 CFR 265.172

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Action	Requirement	Prerequisite	Citation
			F.A.C. 62-730.180(2)
	Containers must be closed during storage, except when necessary to add/remove waste. Container must not opened, handled and stored in a manner that may rupture the container or cause it to leak.		40 CFR 265.173(a) and (b) F.A.C. 62-730.180(2)
Storage of hazardous waste in container area	Area must have a containment system designed and operated in accordance with 40 CFR 264.175(b)	Storage of RCRA hazardous waste in containers with *free liquids* – **Applicable**	40 CFR 264.175(a) F.A.C. 62-730.180(1)
	Area must be sloped or otherwise designed and operated to drain liquid resulting from precipitation, or Containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA–hazardous waste in containers *that do not contain free liquids* (other than F020, F021, F022, F023,F026 and F027) – **Applicable**	40 CFR 264.175(c)(1) and (2) F.A.C. 62-730.180(1)
Closure of RCRA container storage unit	At closure, all hazardous waste and hazardous waste residues must be removed from the containment system. Remaining containers, liners, bases, and soils containing or contaminated with hazardous waste and hazardous waste residues must be decontaminated or removed. [Comment: At closure, as throughout the operating period, unless the owner or operator can demonstrate in accordance with 40 CFR 261.3(d) of this chapter that the solid waste removed from the containment system is not a hazardous waste, the owner or operator becomes a generator of hazardous waste and must manage it in accordance with all applicable requirements of parts 262 through 266 of this chapter].	Storage of RCRA hazardous waste in containers in a unit with a containment system – **Applicable**	40 CFR 264.178 F.A.C. 62-730.180(1)

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Action	Requirement	Prerequisite	Citation
Storage and processing of non-hazardous waste	No person shall store, process, or dispose of solid waste except as authorized at a permitted solid waste management facility or a facility exempt from permitting under this chapter. No person shall store, process, or dispose of solid waste in a manner or location that causes air quality standards to be violated or water quality standards or criteria of receiving waters to be violated.	Management and storage of solid waste – **Applicable**	F.A.C. 62 701.300(1)(a) and (b)
Temporary on –site storage of remediation waste in staging pile (e.g., excavated soils)	Must be located within the contiguous property under the control of the owner/operator where the wastes are to be managed in the staging pile originated. For purposes of this section, storage includes mixing, sizing, blending or other similar physical operations so long as intended to prepare the wastes for subsequent management or treatment.	Accumulation of ***solid non–flowing hazardous remediation waste*** (or remediation waste otherwise subject to land disposal restrictions) as defined in 40 CFR 260.10 – **Applicable**	40 CFR § 264.554(a)(1) F.A.C. 62- 730.180(1)
Performance criteria for staging pile	Staging pile must: • facilitate a reliable, effective and protective remedy; be designed to prevent or minimize releases of hazardous wastes and constituents into the environment, • and minimize or adequately control cross–media transfer as necessary to protect human health and the environment (e.g. use of liners, covers, run–off/run–on controls).	Storage of remediation waste in a staging pile – **Applicable**	40 CFR § 264.554(d)(1)(i) and (ii) F.A.C. 62- 730.180(1)
Operation of a staging pile	Must not operate for more than 2 years, except when an operating term extension under 40 CFR 264.554(i) is granted. *Note:* Must measure the 2-year limit (or other operating term specified) from first time remediation waste placed in staging pile	Storage of remediation waste in a staging pile – **Applicable**	40 CFR § 264.554(d)(1)(iii) F.A.C. 62-730.180(1)
	Must not use staging pile longer than the length of time designated by EPA in the appropriate decision document		40 CFR § 264.554(h)

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Action	Requirement	Prerequisite	Citation
	Extension of up to an additional 180 days beyond the operating term limit may be granted provided the continued operation of the staging pile will not pose a threat to human health and the environment; and is necessary to ensure timely and efficient implementation of remedial actions at the facility.		40 CFR § 264.554(i)(1)(i) and (ii)
Management of staging pile	Must not place ignitable or reactive remediation waste in a staging pile unless the remediation waste has been treated, rendered, or mixed before placed in the staging pile so that:	Storage of ignitable or reactive remediation waste in staging pile – **Applicable**	40 C.F.R. §264.554(e)
	• The remediation waste no longer meets the definition of ignitable or reactive under 40 C.F.R. 261.21 or 40 C.F.R. 261.23; and		40 C.F.R. §264.554(e)(1)(i)
	• You have complied with 40 C.F.R. §264.17(b); or		40 C.F.R. §264.554(e)(1)(ii)
	• Must manage the remediation waste to protect it from exposure to any material or condition that may cause it to ignite or react.		40 C.F.R. §264.554(e)(2)
	Must not place in the same staging pile unless you have complied with 40 C.F.R. § 264.17(b).	Storage of "incompatible" remediation waste (as defined in 40 C.F.R. § 260.10) in staging pile – **Applicable**	40 C.F.R. §264.554(f)(1)
	Must separate the incompatible waste or materials or protect them from one another by using a dike, berm, wall, or other device.	Staging pile of remediation waste stored nearby to incompatible wastes or materials in containers, other piles, open tanks or land disposal units – **Applicable**	40 C.F.R. §264.554(f)(2)
	Must not pile remediation waste on same base where incompatible wastes or materials were previously piled unless you have sufficiently decontaminated the base to comply with 40 C.F.R. § 264.17(b).		40 C.F.R. §264.554(f)(3)

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Action	**Requirement**	**Prerequisite**	**Citation**
Design criteria for staging pile	In setting standards and design criteria must consider the following factors: • Length of time pile will be in operation; • Volumes of waste you intend to store in the pile; • Physical and chemical characteristics of the wastes to be stored in the unit; • Potential for releases from the unit; • Hydrogeological and other relevant environmental conditions at the facility that may influence the migration of any potential releases; and • Potential for human and environmental exposure to potential releases from the unit.	Storage of remediation waste in a staging pile – **Applicable**	40 CFR § 264.554(d)(2)(i) –(vi) F.A.C. 62- 730.180(1)
Closure of staging pile of remediation waste	Must be closed within 180 days after the operating term by removing or decontaminating all remediation waste, contaminated containment system components, and structures and equipment contaminated with waste and leachate. Must decontaminate contaminated sub-soils in a manner that EPA determines will protect human and the environment.	Storage of remediation waste in staging pile in ***previously contaminated area*** – **Applicable**	40 CFR § 264.554(j)(1) and (2) F.A.C. 62- 730.180(1)
	Must be closed within 180 days after the operating term according to 40 CFR 264.258(a) and 264.111 or 265.258(a) and 265.111.	Storage of remediation waste in staging pile ***in uncontaminated area*** – **Applicable**	40 CFR § 264.554(k) F.A.C. 62- 730.180(1)
Waste Treatment and Disposal – Secondary Wastes (e.g., contaminated equipment or treatment residuals)			
Disposal of RCRA hazardous waste in a land-based unit	May be land disposed if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR 268.40 before land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA waste – **Applicable**	40 CFR 268.40(a) F.A.C. 62-730.183
	All underlying hazardous constituents [as defined in 40 CFR 268.2(i)] must meet the UTS, found in 40 CFR 268.48 Table UTS prior to land disposal	Land disposal of restricted RCRA characteristic wastes (D001 –D043) that are not managed in a wastewater	40 CFR 268.40(e) F.A.C. 62-730.183

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Action	Requirement	Prerequisite	Citation
		treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – **Applicable**	
Disposal of RCRA hazardous waste in a land-based unit	To determine whether a hazardous waste identified in this section exceeds the applicable treatment standards of 40 CFR 268.40, the initial generator must test a sample of the waste extract or the entire waste, depending on whether the treatment standards are expressed as concentration in the waste extract or waste, or the generator may use knowledge of the waste. If the waste contains constituents (including UHCs in the characteristic wastes) in excess of the applicable UTS levels in 40 CFR 268.48, the waste is prohibited from land disposal, and all requirements of part 268 are applicable, except as otherwise specified.	Land disposal of RCRA toxicity characteristic wastes (D004 –D011) that are newly identified (i.e., wastes, soil, or debris identified by the TCLP but not the Extraction Procedure) – **Applicable**	40 CFR 268.34(f) F.A.C. 62-730.183
Disposal of RCRA characteristic wastewaters in a POTW	Are not prohibited, if wastes are treated for purposes of the pretreatment requirements of Section 307 of the CWA, unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR 268.40, or are D003 reactive cyanide.	Land disposal of hazardous wastewaters that are hazardous only because they exhibit a characteristic and are not otherwise prohibited under 40 CFR 268 – **Applicable**	40 CFR 268.49(b) F.A.C. 62-730.183
Capping Waste in Place – Closure and Post-Closure Care			
RCRA C Landfill closure performance standard	Must close the unit in a manner that: • minimizes the need for further maintenance; and • controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, post –closure escape of hazardous waste, hazardous constituents, leachate, contaminated run –off, or hazardous waste decomposition products to ground or surface waters or to the atmosphere; and	Closure of a RCRA hazardous waste management unit – **Relevant and Appropriate**	40 CFR 264.111(a) – (c)

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Action	Requirement	Prerequisite	Citation
	• complies with the relevant closure and post –closure requirements of 40 CFR 264.310.		
RCRA C Landfill cover design and construction	Must cover the landfill or cell with a final cover designed and constructed to: • provide long –term minimization of migration of liquids through the closed landfill; • function with minimum maintenance; • promote drainage and minimize erosion or abrasion of the cover; • accommodate settling and subsidence so that the cover=s integrity is maintained; and • have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	Closure of a RCRA hazardous waste management unit – **Relevant and Appropriate**	40 CFR 264.310(a)(1)–(5)
	This document recommends and describes a design for landfill covers that will meet the requirements of RCRA regulations. It is a multilayered system consisting, from the top down, of: • a top layer of at least 60 cm of soil, either vegetated or armored at the surface; • a granular or geosynthetic drainage layer with a hydraulic transmissivity no less than 3 x 10"5 cm /sec; and • a two–component low permeability layer comprised of (1) a flexible membrane liner installed directly on (2) a compacted soil component with an hydraulic conductivity no greater than 1 x 10~7 cm/sec. Optional layers may be added, e.g., a biotic barrier layer or a gas vent layer, depending on the need.	Construction of a RCRA hazardous waste landfill final cover –**TBC**	*EPA Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments,* EPA OSWER 530 – SW –89 –047, (July 1989)
Run–on/run–off control systems for RCRA C landfill	Run–on control system must be capable of preventing flow onto the active portion of the landfill during peak discharge from a 25–year storm event.	Construction of a RCRA hazardous waste landfill cover – **Relevant and Appropriate**	40 CFR 264.301(g)
	Run–off management system must be able to collect and control the water volume from a runoff resulting from a 24–hour, 25–year storm event.		40 CFR 264.301(h)

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Action	Requirement	Prerequisite	Citation
Protection of closed RCRA C landfill	Post–closure use of property must never be allowed to disturb the integrity of the final cover, liners, or any other components of the containment system or the facility's monitoring system unless necessary to reduce a threat to human health or the environment.	Closure of a RCRA hazardous waste landfill – **Relevant and Appropriate**	40 CFR 264.117(c)
General post–closure care for closed RCRA C landfill	Owner or operator must: • maintain the effectiveness and integrity of the final cover including making repairs to the cap as necessary to correct effects of settling, erosion, etc.; • prevent run–on and run–off from eroding or otherwise damaging final cover; and • protect and maintain surveyed benchmarks used to locate waste cells.	Closure of a RCRA hazardous waste landfill – **Relevant and Appropriate**	40 CFR 264.310(b)(1), (5) and (6)
Post–closure notices for closed RCRA C landfill	Must submit to the local zoning authority a record of the type, location, and quantity of hazardous wastes disposed of within each cell of the unit.	Closure of a RCRA hazardous waste landfill – **Relevant and Appropriate**	40 CFR 264.119(a)
	Must record, in accordance with State law, a notation on the deed to the facility property or on some other instrument which is normally examined during a title search – that will in perpetuity notify any potential purchaser of the property that: • land has been used to manage hazardous wastes; • its use is restricted under 40 CFR Part 264 Subpart G regulations; and • the survey plat and record of the type, location, and quantity of hazardous wastes disposed within each cell or other hazardous waste disposal unit of the facility required by Sections 264.116 and 264.119(a) have been filed with the local zoning authority and with the EPA Regional Administrator.	Closure of a RCRA hazardous waste landfill – **Relevant and Appropriate**	40 CFR 264.119(b)(1)(i)-(iii)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
General Criteria for FL Landfills	A landfill shall be designed, constructed, operated, maintained, closed, and monitored throughout its design period to control the movement of waste and waste constituents into the environment so that water quality standards and criteria and air quality standards will not be violated.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.340(1)
FL Solid Waste Landfill cover design and construction	Landfills shall have a final cover designed to minimize infiltration and erosion, which shall include a barrier layer consisting of a soil layer, a geomembrane, or a combination of a geomembrane with a low permeability material.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(3)(g)(1)
	All geosynthetic and soil components used in the final cover shall meet the [substantive] standards and specifications contained in subparagraphs 62-701.400(3)(d)1. and 2., (3)(d)5.-11., paragraph (e), and (f), F.A.C.		F.A.C. 62-701.600(3)(g)(1)
	For unlined Class I landfills (i.e., unlined landfills containing "Class I waste"), the barrier layer shall have a permeability of 1 x 10^{-7} cm/sec or less. "Class I waste" means solid waste that is not hazardous waste, and that is not prohibited from disposal in a lined landfill under Rule 62-701.300, F.A.C. See F.A.C., 62-701.200(13).		F.A.C. 62-701.600(3)(g)(1)
FL Solid Waste Landfill cover design and construction (barrier layer)	• If the barrier layer consists only of soil, follow the design specifications provided in F.A.C. 62-701.600(3)(g)(2). • If the barrier layer consists only of a Geosynthetic Clay Liner (GCL), follow the design specifications provided in F.A.C. 62-701.600(3)(g)(3). • If a geomembrane is used in the barrier layer, follow the design specifications provided in F.A.C. 62-701.600(3)(g)(4).		F.A.C. 62-701.600(3)(g)(2) through (4).
FL Solid Waste Landfill cover design and construction (Alternate design)	One may use an alternate design for the barrier layer or parts of the barrier layer, or for the protective soil layer, upon a demonstration that the alternate design will result in a substantially equivalent rate of storm water infiltration through the final cover. *NOTE*: Remedial Design and Remedial Action Work Plan will document any approved alternative design.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(3)(g)(6)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
FL Solid Waste Landfill cover design and construction (Stormwater control)	The closure design plan shall demonstrate how the stormwater management systems shall be operated and maintained as necessary to meet the requirements of subsection 62-701.400(9), F.A.C. *NOTE*: Remedial Design and Remedial Action Work Plan will include necessary information.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(3)(h)
FL Solid Waste Landfill cover design and construction (Access control)	The closure design plan shall show how access to the closed landfill shall be restricted to prevent any future waste dumping or use of the facility by unauthorized persons. *NOTE*: Remedial Design and Remedial Action Work Plan will include necessary information.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(i)
FL Solid Waste Landfill cover design and construction (Boundary markers)	Concrete monuments shall be installed to mark the boundaries of the landfill property and other permanent markers shall be installed to outline the general waste filled areas. These markers shall be tied to one or more of the boundary markers by a survey performed by an engineer or a Florida Licensed Professional Surveyor and Mapper. The location and elevation of all markers shall be shown on a site plan filed with the "Declaration to the Public" described in F.A.C. 62-701.600(7)	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) with a final elevation of less than 20 feet above the natural land surface – **Relevant and Appropriate**	F.A.C. 62-701.600(6)(a)
FL Solid Waste Landfill Deed Notice	Once closure construction has been completed, the landfill owner or operator shall file a declaration to the public in the deed records in the office of the county clerk of the county in which the landfill is located. The declaration shall include a legal description of the property on which the landfill is located and a site plan specifying the area actually filled with solid waste. The declaration shall also include a notice that any future owner or user of the site should consult with the FDEP prior to planning or initiating any activity involving the disturbance of the landfill cover, monitoring system or other control structures. A certified copy of the declaration shall be filed with the FDEP.	Closure of a Class I solid waste landfill as defined in F.A.C 62-701.340(2)(a) – **Relevant and Appropriate**	F.A.C. 62-701.600(7)
FL Solid Waste Landfill cover design and construction	The final cover shall be vegetated to control erosion and provide a moisture infiltration seal, with species that are drought resistant and have roots that will not penetrate the final cover.	Closure of a Class I solid waste landfill as defined in F.A.C 62-	F.A.C. 62-701.600(3)(f)(2)

Action–Specific ARARs			
Action	**Requirement**	**Prerequisite**	**Citation**
(Vegetation and Grading)		701.340(2)(a) – **Relevant and Appropriate**	
	Top gradients of final cover on landfill areas shall be graded to maximize runoff and minimize erosion, considering total fill height and expected subsidence caused by decomposing waste, and shall be designed to prevent ponding or low spots.		F.A.C. 62-701.600(3)(f)(3)
Warning Signs at Hazardous Waste Sites	Shall place warning signs pursuant to Chaper 62-730, F.A.C.	Site located in Florida where risk of exposure to the public exists due to contaminated soil and sediment– **Relevant and Appropriate**	F.A.C. 62-780.220(5)
Waste Transportation – Primary and Secondary Wastes			
Transportation of hazardous waste *on–site*	The generator manifesting requirements of 40 CFR 262.20–262.32(b) do not apply. Generator or transporter must comply with the requirements set forth in 40 CFR 263.30 and 263.31 in the event of a discharge of hazardous waste on a private or public right–of–way.	Transportation of hazardous wastes on a public or private right–of–way within or along the border of contiguous property under the control of the same person, even if such contiguous property is divided by a public or private right–of–way – **Applicable**	40 CFR 262.20(f) F.A.C. 62-730.160
Transportation of hazardous waste *off–site*	Must comply with the generator standards of Part 262 including 40 CFR 262.20–23 for manifesting, Sect. 262.30 for packaging, Sect. 262.31 for labeling, Sect. 262.32 for marking, Sect. 262.33 for placarding,	Preparation and initiation of shipment of hazardous waste off–site – **Applicable**	40 CFR 262.10(h); F.A.C. 62-730.160
Transportation of *hazardous materials*	Shall be subject to and must comply with all applicable provisions of the HMTA and HMR at 49 CFR 171–180 related to marking, labeling, placarding, packaging, emergency response, etc.	Any person who, under contract with a department or agency of the federal government, transports "in	49 CFR 171.1(c)

Action–Specific ARARs

Action	Requirement	Prerequisite	Citation
		commerce," or causes to be transported or shipped, a hazardous material – **Applicable**	
Transportation of samples (i.e. contaminated soils and wastewaters)	Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when: • the sample is being transported to a laboratory for the purpose of testing; or • the sample is being transported back to the sample collector after testing; • the sample is being stored by sample collector before transport to a lab for testing	Samples of solid waste or a sample of water, soil for purpose of conducting testing to determine its characteristics or composition – **Applicable**	40 CFR 261.4(d)(1)(i)–(iii) F.A.C. 62-730.030

ARAR = applicable *or* relevant and appropriate requirement
CFR = Code of Federal Regulations
CWA = Clean Water Act
F.A.C. = Florida Administrative Code, Chapters as specified
FDEP = Florida Department of Environmental Protection
F.S. = Florida Statutes
HAP = hazardous air pollutant
HMTA = Hazardous Materials Transportation Act
HMR = Hazardous Materials Regulations
RCRA = Resource Conservation and Recovery Act
TCLP = toxicity characteristic leaching procedure
UHCs = underlying hazardous constituents
USDW = Underground Sources of Drinking Water
UTS = Universal Treatment Standards
VOC = volatile organic compound

Table 15 Selected Remedy Cost Estimate Summary

CMZ Selected Alternative		Capital Cost	Estimated Annual O&M Costs*	Estimated Present Worth Cost (5% Discount Rate)	Estimated Present Worth Cost (7% Discount Rate)	Estimated Construction Timeframe	Estimated Time to Achieve RAO/Cleanup Levels (years)
	CMZ-1 Main Source Area (On-Facility)						
Alternative 2	Barrier Wall Containment with Cap	$4,822,503	$12,000	**$5,067,800**	**$5,020,600**	12 months	30
	CMZ-2A Extended NAPL Plume (On-Facility)						
Alternative 3	SEE	$10,993,334	$0*	**$10,993,300**	**$10,993,300**	12 months	1
	CMZ-2B Extended NAPL Plume (Off-Facility)						
Alternative 3	SEE	$5,002,200	$0*	**$5,002,200**	**$5,002,200**	12 months	1
	CMZ-3 Secondary Source Area/Absorbed Phase (On-Facility)						
Alternative 2	ISCO/ISEB Barriers	$2,731,942	$125,000	**$3,182,200**	**$3,161,000**	6 months	6
	CMZ-4A On-Facility Surface Soil Contamination						
Alternative 2	Excavation, Encapsulate On-Facility in Barrier Wall on top of CMZ-1	$1,502,736	$0	**$2,006,200**	**$2,006,200**	8 months	1
	CMZ-4B Off-Facility Surface Soil Contamination						
Alternative 4	Excavation/Disposal On-Facility Over CMZ-2A/-3 Areas	$4,064,746	$0*	**$5,426,400**	**$5,426,400**	12-18 months	1
	CMZ-5 Dissolved Groundwater Plume						
Alternative 3	ISCO/ISEB Treatment Barrier	$926,521	$150,300	**$3,409,300**	**$3,138,000**	8 months	10
	Site-wide Costs						
Statutory Costs	Institutional Controls, Five-Year Reviews	$28,400	$213,307	**$241,600**	**$241,600**	NA	30
Total Costs:		**$35,329,000**			**$34,989,300**		

Notes: * - Long term O&M costs included in Site-wide Statutory Costs

Figure 1 Site Location Map

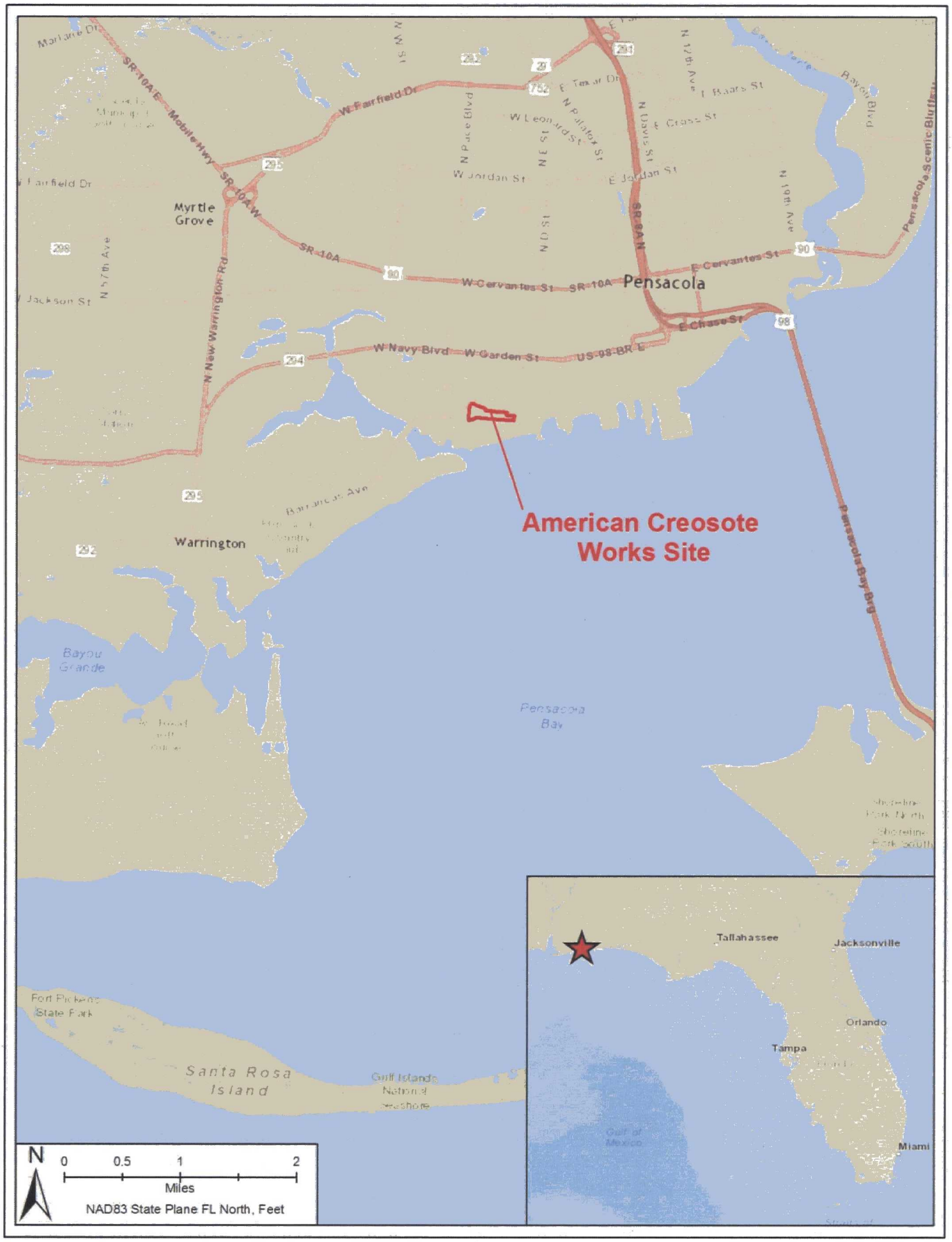


Figure 2 Site Layout

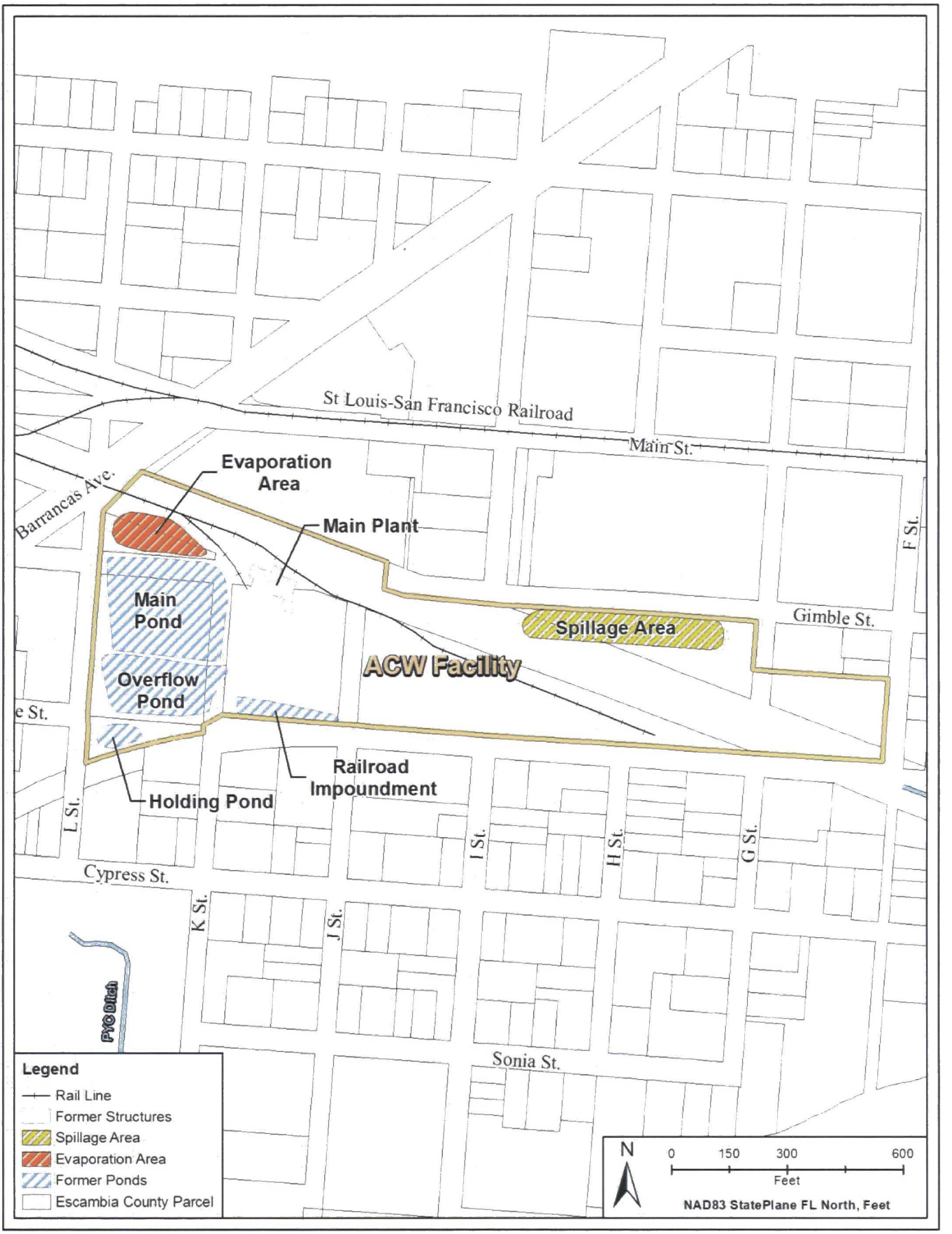
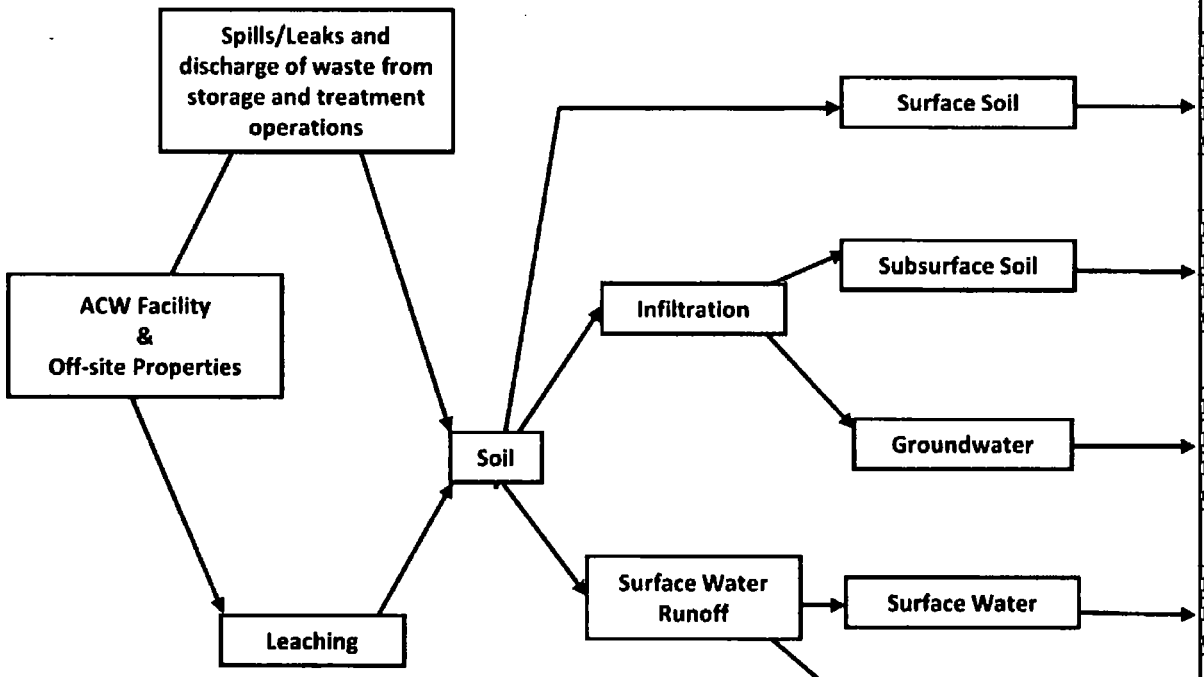


Figure 3
Human Health Conceptual Site Model
American Creosote Works Superfund Site
Pensacola, Escambia County, Florida



X Pathway was quantitatively evaluated
NA Not applicable.

Potential Human Receptors

Exposure Route	Current			Future		
	Industrial/Commercial Worker	Resident (Lifetime & Child)	Recreational User (Lifetime & Child)	Industrial/Commercial Worker	Resident (Lifetime & Child)	Recreational User (Lifetime & Child)
Ingestion	X	X	X	X	X	X
Inhalation	X	X	X	X	X	X
Dermal Contact	X	X	X	X	X	X
Ingestion	NA	NA	NA	NA	NA	NA
Inhalation	NA	NA	NA	NA	NA	NA
Dermal Contact	NA	NA	NA	NA	NA	NA
Ingestion	NA	NA	NA	NA	X	NA
Inhalation	NA	NA	NA	NA	X	NA
Dermal Contact	NA	NA	NA	NA	X	NA
Ingestion	NA	NA	NA	NA	NA	NA
Dermal Contact	NA	NA	NA	NA	NA	NA
Ingestion	NA	X	X	NA	X	X
Dermal Contact	NA	X	X	NA	X	X

Figure 4
Ecological Conceptual Site Model
American Creosote Works Superfund Site
Pensacola, Escambia County, Florida

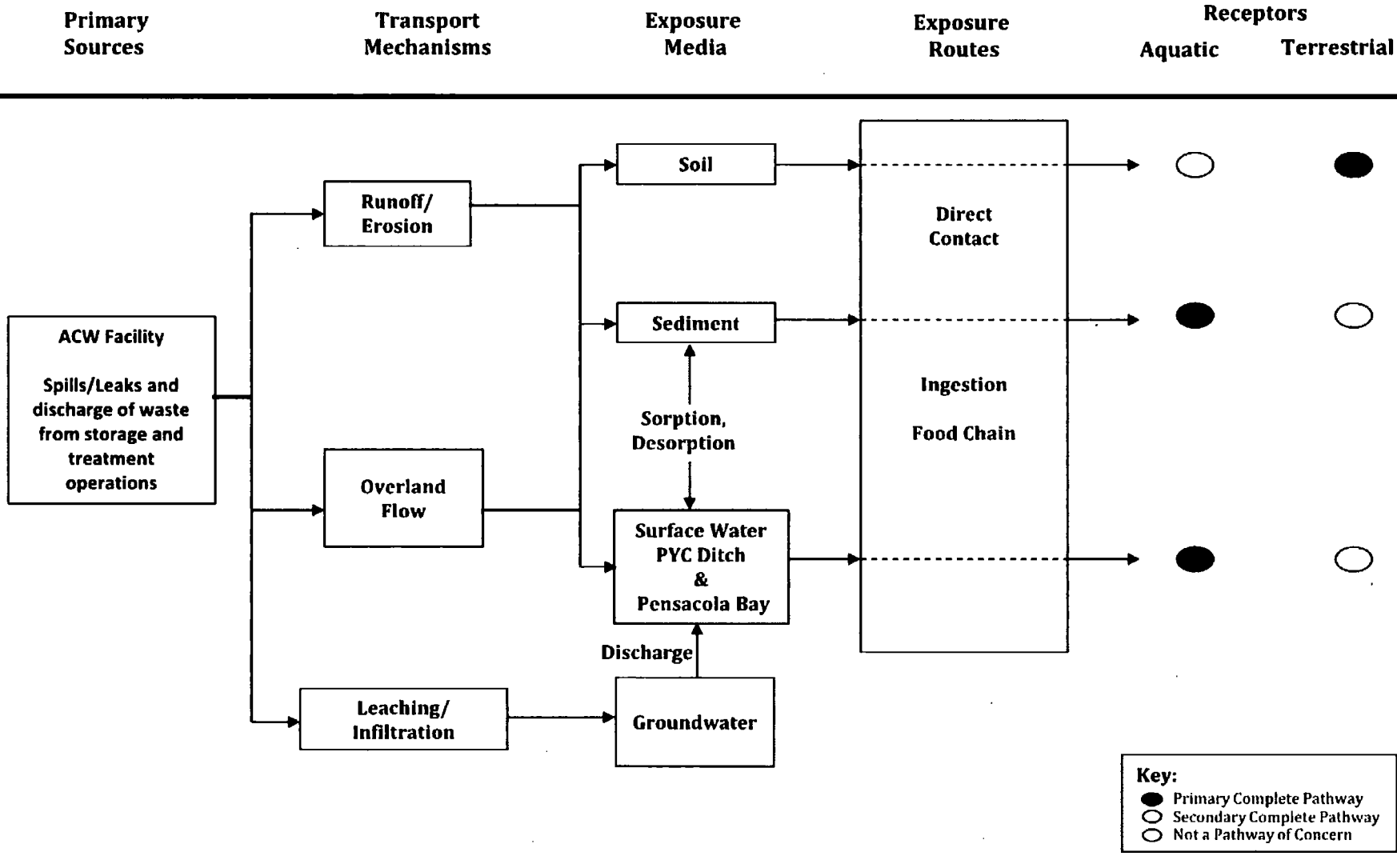


Figure 5 Dioxin Exposure Units Due to Overland Flow

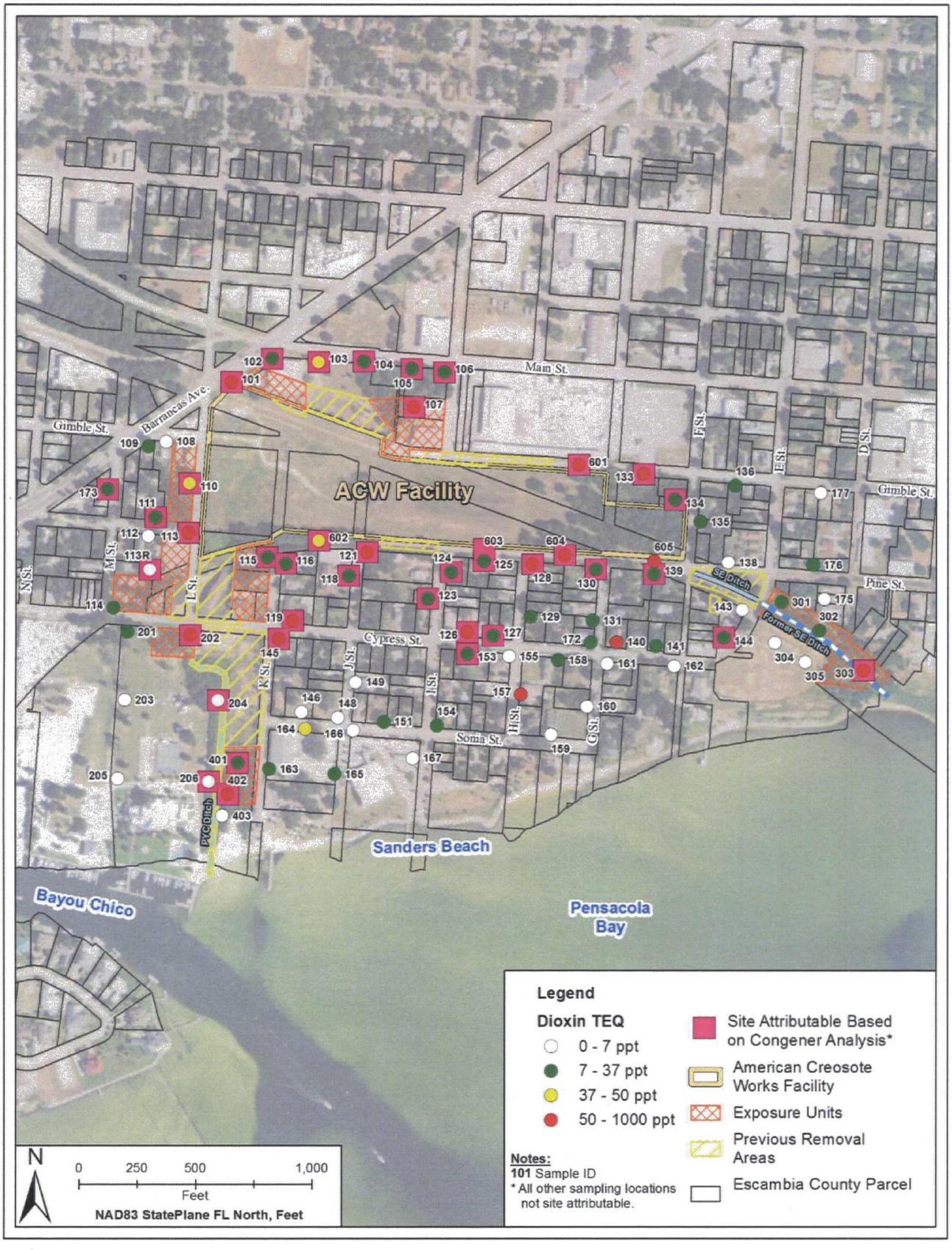


Figure 6 Dioxin Exposure Units Due to Vehicular Traffic

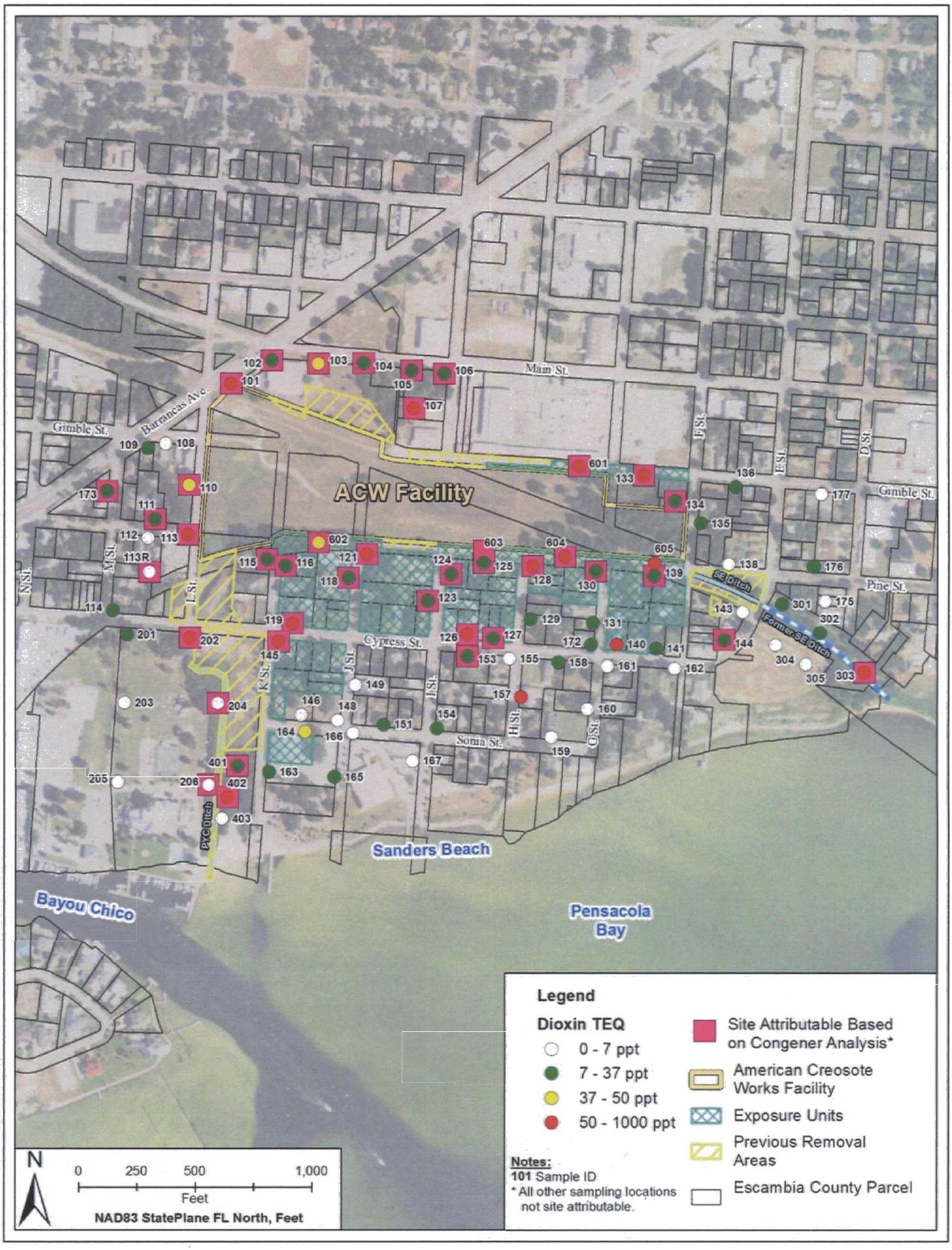


Figure 7 Contaminated Media Zones

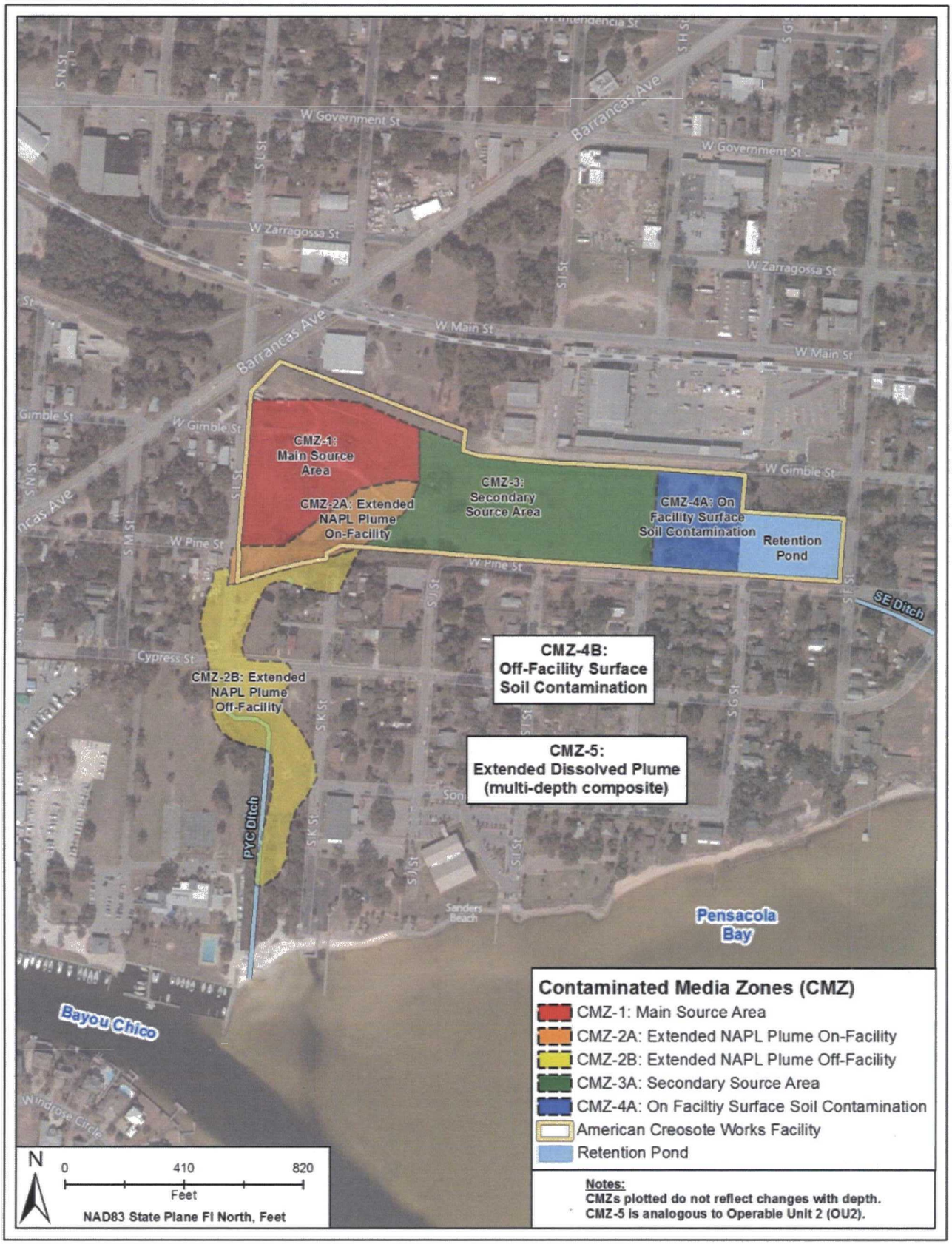


Figure 8 Approximate Extent of NAPL in Upper Sand – November 2011

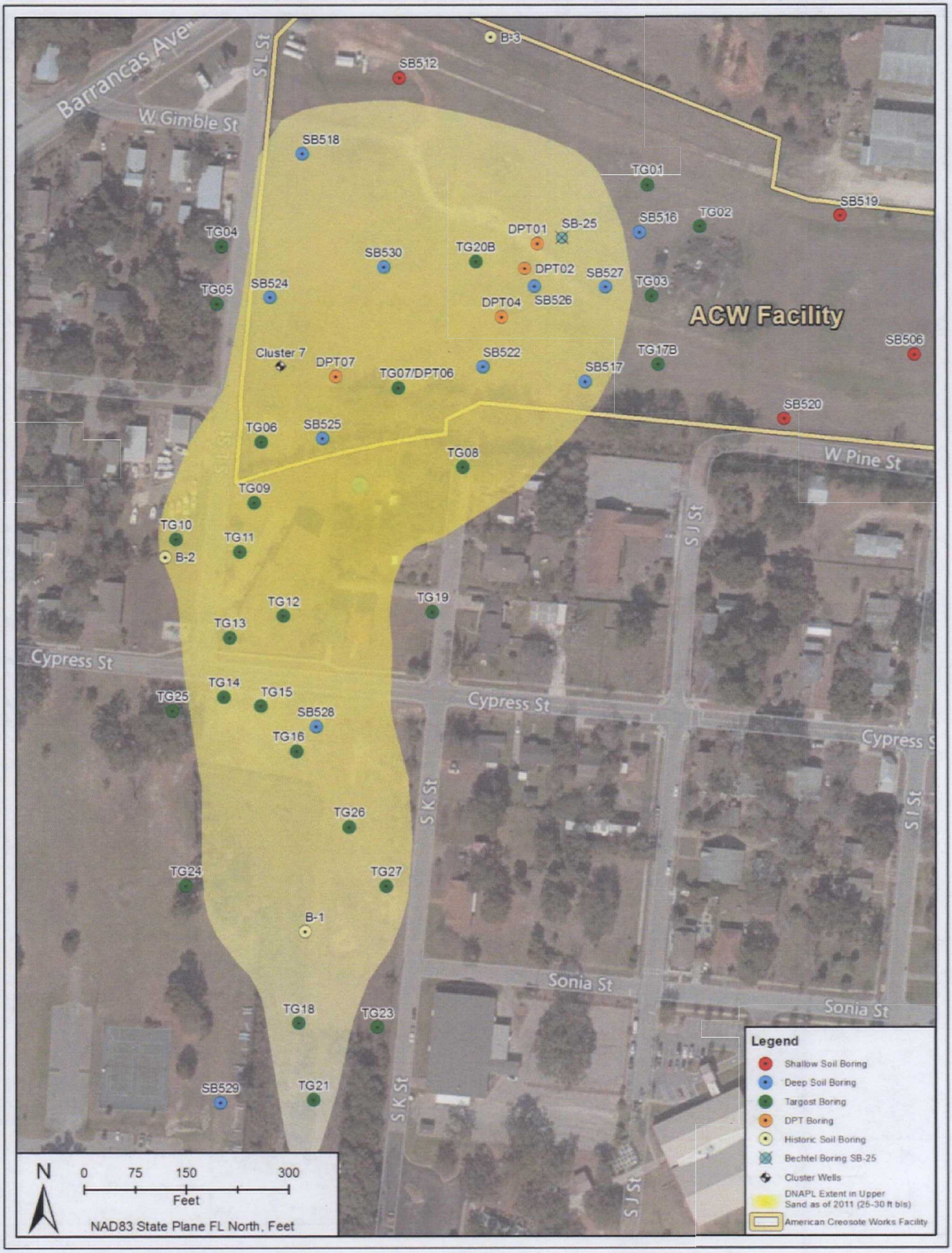


Figure 9 Approximate Extent of NAPL in Lower Sand – November 2011

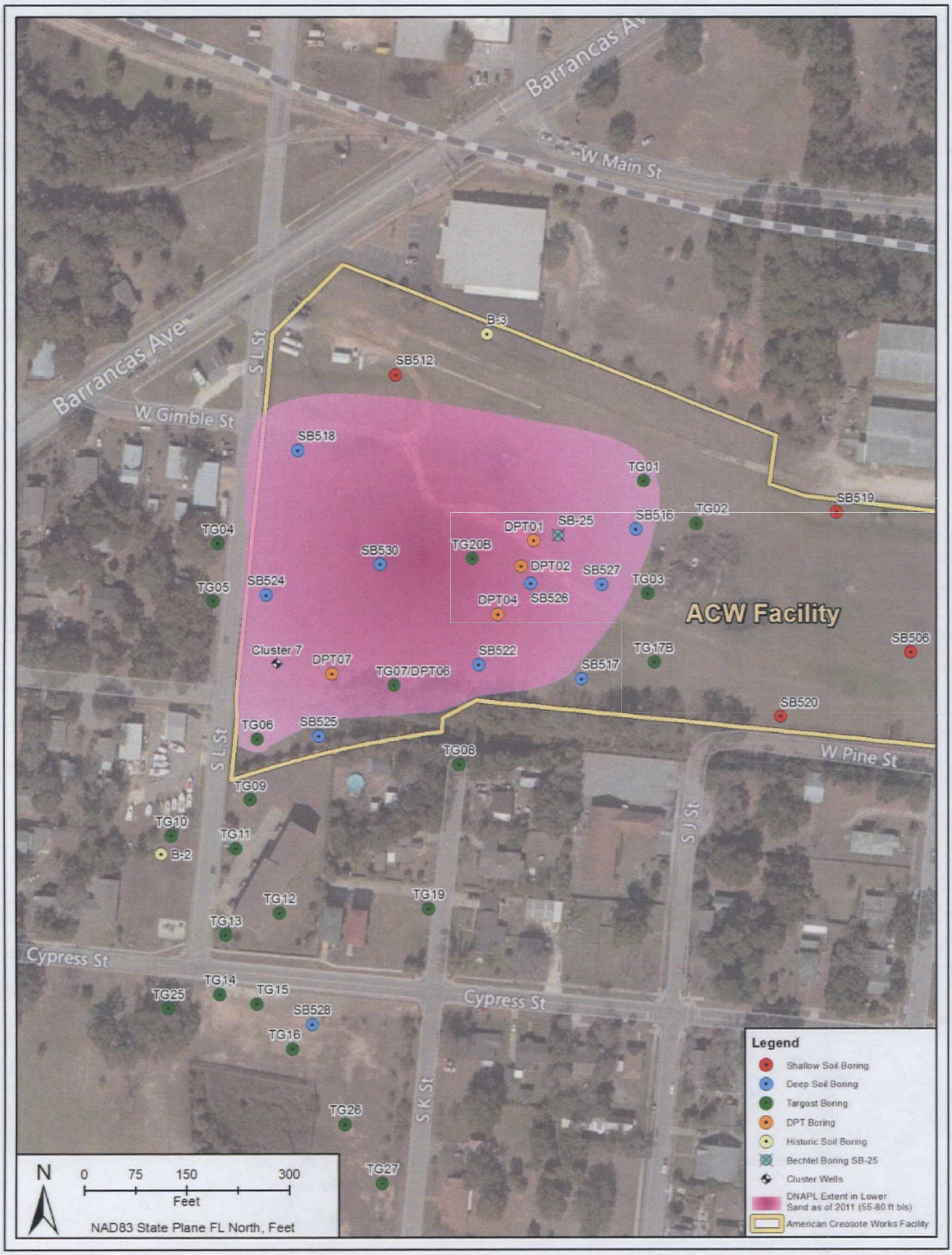
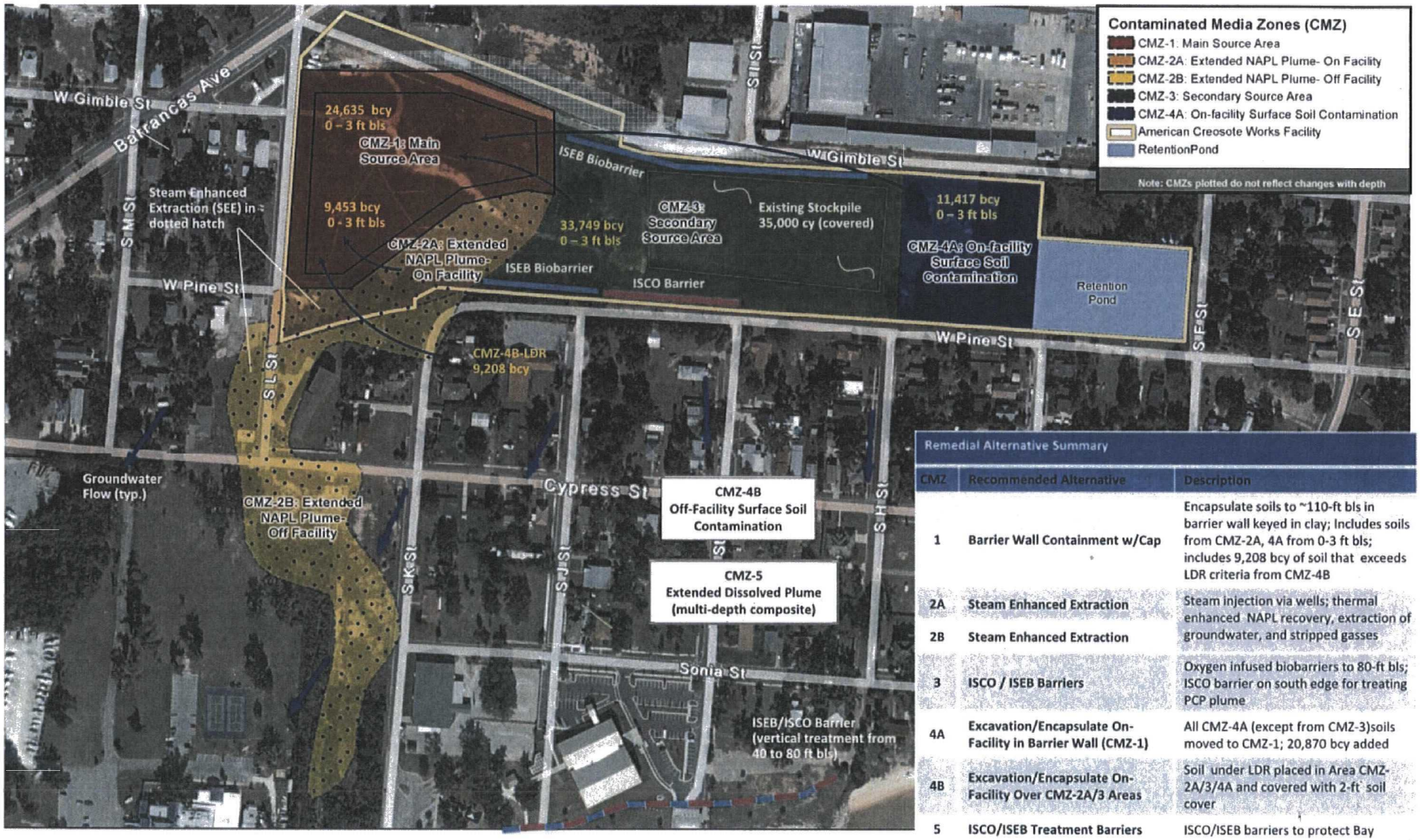


Figure 10 Preferred Remedial Alternatives



Remedial Alternative Summary

CMZ	Recommended Alternative	Description
1	Barrier Wall Containment w/Cap	Encapsulate soils to ~110-ft bls in barrier wall keyed in clay; Includes soils from CMZ-2A, 4A from 0-3 ft bls; includes 9,208 bcy of soil that exceeds LDR criteria from CMZ-4B
2A	Steam Enhanced Extraction	Steam injection via wells; thermal enhanced NAPL recovery, extraction of groundwater, and stripped gasses
2B	Steam Enhanced Extraction	
3	ISCO / ISEB Barriers	Oxygen infused biobarriers to 80-ft bls; ISCO barrier on south edge for treating PCP plume
4A	Excavation/Encapsulate On-Facility in Barrier Wall (CMZ-1)	All CMZ-4A (except from CMZ-3)soils moved to CMZ-1; 20,870 bcy added
4B	Excavation/Encapsulate On-Facility Over CMZ-2A/3 Areas	Soil under LDR placed in Area CMZ-2A/3/4A and covered with 2-ft soil cover
5	ISCO/ISEB Treatment Barriers	ISCO/ISEB barriers to protect Bay

APPENDIX A
RESPONSE TO COMMENTS

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
Dorothy Bishop (b) (6)	I was born in Pensacola in (b) (6). I clearly recall riding over the viaduct looking down on the Black Lake of creosote with floating telephone poles. I purchased my home at (b) (6) (b) (6) My first thought was to put in my deep well pump. The installer said not to drink the water or let my granddaughter swim in a kiddy pool. Only to water flowers. It didn't happen. Everything I planted died. Having lived in all areas of Pensacola I assumed anything I planted would leap out of the soil. The existing plants died after a few years. Now, if I want flowers (or trees) I have to use a pot with my own created soil. I have lots of flowers, all of them in pots. It's very depressing, I'm (b) (6) my pleasures are few. But, it's not planting anything – trees, shrubs, perennials, cut flowers. I'm hoping you can help me in my last years, doing what I love. There are many extenuating circumstances. Thank you, Sincerely,	Your address of (b) (6) (b) (6) is 800 feet up gradient and north of the site. The is no evidence of any ACW related groundwater contamination flowing up gradient to this address. The nearest well cluster is cluster number 10 located north of Pine Street. Cluster number 10 is approximately 1000 feet to the Southeast of your property. It was most recently sampled in 2015. The groundwater was sampled and analyzed. It showed no contamination in the groundwater. There is no evidence that contamination from ACW would migrate up gradient by 800 feet to your address. If you do have issues with your soil it could be related to other non-ACW sources.
Ashton J. Hayward, Mayor Jewel Cannada-Wynn, Councilwoman Dist. 7	This letter is in response to the solicitation for comments and to state our support of the Proposed Cleanup Plan for the American Creosote Works (ACW) Superfund Site. ACW is situated immediately adjacent to the Sanders Beach neighborhood as well as in close proximity to Pensacola Bay. Sanders Beach is within the City's Westside Redevelopment Area which suffers from a high degree of economic distress. Fifty percent of the structures are in dilapidated to slightly deteriorated condition. Fifty-five percent of these structures were built prior to 1950. Thirty percent of the families live below the poverty level.	EPA is moving forward with remediating the entire site with this sitewide record of decision (ROD). Once the cleanup has been completed, there will be no exposure routes to the public from soil exposure. The groundwater remedy is an interim remedy. There will be a lot of groundwater remediation included in this ROD. Once the final groundwater ROD is signed, all groundwater risk will be eliminated as well. All contamination will be destroyed, removed or contained. EPA shares the City's

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
	However, recently the City and private sector efforts to alleviate those conditions are resulting in a promising turn around. Two significant commercial enterprises have relocated to the area and housing rehab is beginning to occur. The major limitation to a successful turnaround and economic stimulus is the presence of this 19-acre contaminated, orphan industrial site. For decades, the site freely spilled creosote and its derivatives into Pensacola Bay at a popular neighborhood swimming beach and park. Contaminated groundwater seeped out into Pensacola Bay and Bayou Chico. Pensacola Bay is designated as a 303d listed impaired water body by EPA and Bayou Chico is the first body of water in Escambia County to be addressed through a Basin Management Action Plan resulting from industrial contaminants and septic seepage. Much progress has been made to improve the water quality of both bodies but stopping the discharge of industrial contaminated groundwater is paramount to providing a safe and ecologically sound waterfront. EPA has worked on this cleanup for over 30years and is now only four years away from completion. The community can sense success. Now is the time to continue funding and to proceed with the federal effort in abating this very public and ecological health threat. Sincerely,	need to get the site cleaned up and put back into a productive reuse. EPA also looks forward to working with the City on turning the site into a park.
Kenneth J. Kelson Sr. (b) (6) (b) (6)	Grew up at the corner of (b) (6) . My father still lives there. We bought our house in 1990 located (b) (6) . Unfortunately, I along with many children grew up during the	In the short-term, the fence will remain up and the grass will be cut. EPA is moving forward with remediating the entire site

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
(b) (6)	time the ACW was most active. We played in it, we breathed it, and washed our dogs and cats that fell into the pools. (b) (6) I guess my point is, we need you (EPA) to make it safe for the neighborhood. No matter how much soil you bring in, there is no way all the poisons will be removed. It's better than it was, but it's still obvious the groundwater, the drainage lines still smell like creosote. My suggestion, just keep it fenced and the grass cut and we can live with that, or if a park, just a leisure park for walking & sitting. Thank you for your time.	with this sitewide ROD. Once the cleanup has been completed, there will be no exposure routes to the public from soil exposure. The groundwater remedy is an interim remedy. There will be a lot of groundwater remediation included in this ROD. Once the final groundwater ROD is signed, all groundwater risk will be eliminated as well.
Robert Neiger Chairman Emeritus, Sanders Beach Community Association	Thank you for your April 2017 American Creosote Works presentation to the neighbors living most nearly adjacent to the superfund site. As Chairman of Sanders Beach Community Association through 2010 I've worked with and participated with the EPA on American Creosote Works Pensacola since we organized in 2001. Other neighbors were involved with Project Manager Mark Fite since the site was fenced in 1981. So, when do all the talking, meetings, discussions, RODs, ROD amendments, etc., end and actual, REAL ACW site cap installation begin? Can EPA provide Sanders Beach assurance there will be money provided to complete site cleanup and capping? Where does American Creosote Works Pensacola fall on a list of spending priorities? Other questions include: 1) How effective will monitoring wells placed on and around the site be in ensuring site contamination will be kept isolated	After the ROD and remedial design, EPA Region 4 can't guarantee that funding will definitely be available for remedial action. The EPA funding levels are determined by Congress. Remedial action money will be allotted in the future after the remedial design. 1) There are shallow groundwater wells near the Bay. Those monitoring wells show no unacceptable levels of contamination in them. This is the water that could potentially "day light" out in the middle of the Bay. Creosote/DNAPL sinks over time so most of the contamination is found deeper in the aquifer. More monitoring wells will be installed during the remedial design to further our understanding.

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
	away from the Sanders Beach Community and Pensacola Bay, where people use the boat ramp facilities very regularly? 2) Has the EPA plan provided for additional site work regarding creosote deposits (pool(s)) that might become known after EPA has deemed their work here "complete"? Would there be any provision for treatment of offshore sediment testing in Pensacola Bay south of the Sanders Beach Community at that point? 3) Will the EPA be the final word for governing future land use? Will the Sanders Beach Community be advised of any and all possible uses proposed by the City of Pensacola and/or Escambia County, and various private owners, as final cap construction is decided? Installed controls have been referred to by the EPA as "long term"; exactly what does the EPA consider "long term"? 4) Many in the Sanders Beach Community, in working together on this 36-year+ old EPA Superfund Site, have concerns that the City, County and private owners will work to find ways to override neighborhood wants regarding the site; what safeguards can be offered by the EPA to ensure that such by-passing doesn't occur? I look forward to your reply	2) The groundwater portion of this cleanup is an interim remedy. EPA will need to write an additional final ROD for the groundwater at some point in the future. If a pool of creosote is discovered between now and the future final groundwater ROD, the cleanup of that creosote pool would be addressed. The sediments directly outside of the former PYC ditch mouth were sampled in a 2008 United States Corps of Engineers report. The results show no evidence of site related contamination in the sediment. There are no plans for sampling the sediment in relation to ACW. 3) EPA does not approve or reject specific uses of the property. That is a local government issue. Institutional Controls are part of the remedy. ICs will have restrictions on the types of property uses that are compatible with the remedy. ICs remain in place forever. Restrictive covenants, a type of ICs, could be executed by the property owners that outline the prohibition of any residential, industrial, or recreational reuse of the property unless prior written approval is obtained from EPA and FDEP. The covenant could also prohibit interference with the integrity of any existing or future monitoring

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
		or remediation system without prior EPA and FDEP approval. Notice of the application of ICs to the site through restrictive covenant would be provided to the local regulatory agencies. Should any IC fail, EPA and FDEP will ensure that appropriate actions are taken to reestablish the remedy's protectiveness and may initiate legal action to either compel action by a third party and/or to recover costs for remedying any discovered IC violations. 4) EPA doesn't control site redevelopment. It would appear from all indications that the City is planning on turning the site into a park. The site is currently zoned conservation so the zoning would need to be changed for another reuse purpose.
Nancy Neiger, SBC Historian	Thank you for your April 2017 American Creosote Works presentation to the neighbors living most nearly adjacent to the superfund site. We appreciate the EPA's willingness to make such presentations. I personally have worked with and participated with the EPA on American Creosote Works Pensacola since 2001. Other neighbors were involved since the FIRST go-round on the site with Project Manager Mark Fite. So, my first and foremost comment is: when do all the meetings, discussions, RODs, ROD amendments, etc., end and actual, REAL ACW site cap	With no unexpected delays or funding issues, the remedial design would start in September 2017 and last for approximately 12 to 18 months. The remedial action of moving soil would start between September 2018 and March 2019. There is a ranking process for which Superfund sites get remedial action funding called the Priority Panel. All of the sites from the EPA 10 Regions will be compared and evaluated for funding through this process. The sites are

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
	installation begin? If there is an EPA site ranking process that will precede the appropriation of money for site cleanup, please provide a description of that process, including the "points of entry" for commentary by the affected community. Additionally, we'd appreciate learning where American Creosote Works Pensacola falls on such a list. 1) Will there be "paired" monitor wells placed inside and outside the containment wall proposed for the western end of the site? The purpose of these paired wells would be to allow for "performance monitoring" of the containment wall during the remediation that occurs within the containment wall (and ensure the absence of hydraulic continuity between affected horizons inside and outside of the containment wall). 2) What will the EPA plan provide concerning the recovery of "free liquid" creosote deposits (pool(s)) that underlie the western end of the Sanders Beach neighborhood? If the EPA has determined that such pools or deposits might have dissipated in the intervening 30+ years, what proof is there of such dissipation (e.g., perhaps owing to offshore sediment testing in Pensacola Bay south of the Sanders Beach Community)? 3) What "institutional controls" will the EPA impose to govern future land use? Will those controls ultimately be the "governing" controls and conditions, even overriding City of Pensacola, Escambia County, and various private owner proposals? The controls have been referred to by the EPA as "long term"; exactly what duration does the EPA have in mind when it references them as "long term"? 4) Many in the Sanders Beach Community, in working together on this 36-year+ old EPA Superfund Site, have	usually ranked by risk to the human health and the environment. There is no mechanism for public input at the Priority Panel. 1) Yes, there will be paired monitoring wells placed inside and outside the containment wall. The paired wells will be monitored to ensure there is no hydraulic connection between inside and outside the containment wall. 2) There is little to no evidence that the free product on the westerns side of the site has dissipated. It has been relatively stable. EPA does not plan on recovering the DNAPL. Instead, it plans on installing a slurry wall around the majority of the free product creosote. This will not destroy or recover the DNAPL, but it will hydraulically isolate the contamination inside the slurry wall. 3) EPA does not approve or reject specific uses of the property. Institutional Controls are part of the remedy. ICs will place restrictions on the types of uses that are compatible with the remedy and could override certain public and private use options. ICs remain in place forever. 4) EPA doesn't control site redevelopment, which is a local government issue. It would appear from all indications that the City is

American Creosote Works Superfund Site Pensacola, Florida Response to Public Comments		
Identifier	Comment Summary	Response
	concerns that the City, County and private owners will work to find ways to override neighborhood wants regarding the site; what safeguards can be offered by the EPA to ensure that such by-passing doesn't occur? I look forward to your reply	planning on turning the site into a park. EPA supports this reuse option. The site is zoned conservation so the zoning would need to be changed to implement any other reuse purpose.
Thad Quinlan (b) (6)	Hello Mr. Thorpe, Thank you for your informative session with the neighborhood. My name is Thad Quinlan, I asked you about a couple of points at the meeting. The actual owner of the property I reside at is Jose Corredera. He's in Miami and asked me to represent his interests. Two properties, (b) (6) and (b) (6) . I would like to know if these were tested, can they be retested and may I have my own testing done? Thank you.	Neither of these properties have been sampled by EPA. There are four soil sample points near those property addresses. All four sample points had dioxin results well below EPA's trigger for dioxin cleanup of 50 parts per trillion. The highest dioxin concentration found between all four samples locations was 9.8 parts per trillion. These properties are not included in the two exposure units with site-related dioxin contamination because there is no evidence to support it. There is no plan to sample these locations in the future. You are welcome to have your soil tested by a laboratory.

APPENDIX B
TRANSCRIPT OF APRIL 2017 PUBLIC MEETING

U.S. ENVIRONMENTAL PROTECTION AGENCY

AMERICAN CREOSOTE WORKS SITE

PENSACOLA, FLORIDA

PUBLIC MEETING TO

DISCUSS THE PROPOSED CLEANUP PLAN

WEDNESDAY, APRIL 26, 2017

AT 6:00 P.M.

SANDERS BEACH-CORINNE JONES RESOURCE CENTER

913 SOUTH I STREET

PENSACOLA, FLORIDA

Reported by: Rebecca T. Fussell

APPEARANCES:

PETER THORPE,
EPA REMEDIAL PROJECT MANAGER

L'TONYA SPENCER,
EPA COMMUNITY INVOLVEMENT COORDINATOR

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P R O C E E D I N G S

MR. THORPE: Let's get started. We have a good bit of material to go through, so I just want to make sure everyone has a chance to talk and ask questions, everyone's questions are answered.

If you will look upfront. I apologize that I don't have the bigger screen like I usually do. We have to go by this. So if you want to move up closer to the front, feel free. Hopefully, you can still read it off of that TV screen.

And L'Tonya Spencer, my Community Involvement Coordinator, she's not here yet. Once she gets here, she will pass around a sign-in sheet and make it available to everybody.

And she will also have some -- I think everyone got the fact sheet, the Proposed Plan Fact Sheet. It's eight pages long. Excellent, okay. And she will have additional copies of those Proposed Plan Fact Sheets if anyone didn't have one or is missing theirs. They will be there, some more additional ones for you guys.

So today we are here for the Proposed Plan meeting for ACW.

Okay.

UNKNOWN SPEAKER: I just wanted to know are these going to be online at any point on your Web Site? I have somebody that wants --

MR. THORPE: I'm going to try to. Our Web sites didn't upload and refresh, but I will try to.

UNKNOWN SPEAKER: Because I got somebody who wants to have a copy, but she's not right here right now in the immediate area.

MR. THORPE: Okay. Does she have an e-mail? I can e-mail it to her.

UNKNOWN SPEAKER: Yes.

MR. THORPE: Okay. I'll e-mail it to her.

And, additionally, we wanted to have -- these are the fact sheets, the condensed version. There is also the Proposed -- the actual Proposed Plan, which is about 35 pages. It goes into more detail. It has more figures.

We were supposed to have those copies here tonight to hand out. There was a mixup at the hotel with L'Tonya, and we don't have them.

What I'm going to do from here on out is I'm going to have a stack of them here at the community center here. So if anyone wants to come by and pick it up.

And, also, leave your mailing address on the sign-in sheet, and we will mail you a copy if you want. Okay?

UNKNOWN SPEAKER: What about if we already got the pink sheet?

MR. THORPE: If that's all you want, that's cool.

UNKNOWN SPEAKER: But I mean, you already got our address for it.

MR. THORPE: Yeah. But if you want the longer, more detailed version.

So now on to the meeting. So we are here for the Proposed Plan meeting. The purpose of this meeting is for the EPA to present what we think are the best technologies at the ACW Site.

It's a complicated site. There are a lot of different areas. There is different contamination located in different areas. And we propose different technologies for each one of those.

And the main thing tonight is either I want to hear what your comments are, what you feel about those remedies we are going to put in place.

Also, I want to -- if you're shy and don't want to talk about it today, on the back of that fact sheet, there is a little area where you can write in your comments and mail them to me. That's fine, too. Either one.

And at the end of the day when I get all of those comments -- the comment period is open right now from April 22nd to May 22nd. And then at the end of May 22nd, I will look at all of your comments, respond to each one individually. And that will be recorded in the Record of Decision that will be filed in the fall of this year.

So what I will be talking about today is I want to get a little bit background about the site, what has been going on, what our remedial objectives are going forward with this new clean-up, what the remedial alternatives were that we looked at, as far as what would address each section of the site. Then at the end of the day, what we are proposing is the

preferred alternative for the site.

ACW was an 18-acre site that operated as a wood treater for approximately 80 years. There is soil contamination on-site and off-site. There is groundwater contamination on-site and off-site with COCs, pH's, PCPs and creosote and dioxin.

It's a funding site. Right now there are no responsible parties. So the taxpayers are paying for it right now.

The site has been broken out over the years into three different operable units. OU1 is the sludge, soils and sediments. That was done back in '99. OU2 is the groundwater. It was done in '94. OU3 was the off-site dioxin that was done in 2007.

The goal right now with this Proposed Plan and this Record of Decision going in in the fall will be to write a site-wide ROD for all three of them. That means all of the media, all of the groundwater, all of those as well will be addressed in the upcoming cleanup.

OU2 will be an interim remedy. I will talk about that a little bit later.

Here is a historical photo of ACW.

This is the east. This is the west. You can see where the wood would come in from the east, and the logs would be debarked. And then you would see them going farther west. They would dip them into the pond and set them up over there to dry out.

You have two large unlined creosote pits sitting over there. And during large rainfall events, those would fill up and flow over land directly south. And you can see the stain, the stain on the road. That is creosote. Then it will go farther south into the Pensacola Yacht Club ditch and out to the bay. And that's what historically operated at the site.

Here's what it looks like today. You will see that it's residential on the east, south and to the west. You have commercial and industrial to the north of the property.

I will talk about this a little bit later, but we have done various removals throughout the neighborhood. And we brought that soil back to the site. That is where this soccer pitch looking place is right here. And we brought in more soil after this photo was

taken over here.

Before I get into the operable units, each one of the operable units, I wanted to address what we have done historically at ACW up until now.

When we initially came out to the scene when it was DEP and EPA, we stabilized and covered the dipping ponds. There will be no farther migration into the groundwater.

In '98, we started up a groundwater pump and treat system that recovered just under 200,000 gallons of DNAPL.

In 2003, we excavated properties to the north, part of a road, the apartment complex, part of the Pensacola Yacht Club ditch property, all of those were excavated in 2003.

In 2010, we remediated the southeast ditch over on -- over by Pine. Then in 2012, we assisted the City of Pensacola with rerouting the storm water out of the Pensacola Yacht Club ditch.

Then in the summer of last year, we excavated that entire 1,000 length of the Pensacola Yacht Club ditch and brought that soil back to the property and capped it.

OU1, the RODS in place were signed in '99. It was a ROD amendment. And, basically, the objective of that was to prevent risks posed by injection and inhalation of direct soils, sludge and sediment and to take care of that by digging it up and bringing it back to the site.

And all of the areas that were supposed to be remediated by this ROD had been completed, except for the site itself. That was the only place that wasn't. The ROD wasn't fully implemented.

OU2, this was done in '94. EPA selected an alternative cleanup limit. The goal was to protect discharge into the bay, not to let any contaminated groundwater go out into the Pensacola Bay.

And, basically, we divided that ROD into two phases. Phase I is to extract all of the DNAPL that was underneath former dipping ponds. Then II was to address the dissolved plume.

Phase I, we -- it operated very well for awhile. Like I said, we excavated almost -- we extracted almost 200,000 gallons of

DNAPL.

We had some problems. Hurricane Ivan took it out of commission for awhile. Also, the creosote was not compatible with most piping materials. We had to find Chouinard, which was the only type of material that would actually stand up to the creosote. So that operated for 10 or 12 years very successfully.

Here's -- OU2 is the groundwater. This is directly below where the dipping ponds are. We have basically just straight DNAPL from -- DNAPL is creosote -- from 20 feet down to 80 feet down. We recovered some of it through the recovery system, but most of it is still there.

And I said in that previous slide, here's the creosote in the upper sand. This is more shallow, 20 to 30 feet. This is some of the creosote that would have flowed over land during the hard rainfall events and so percolated down to the land.

OU3, this was created in 2007 in response to Florida's Soil Cleanup Target Levels. It was a new cleanup standard that Florida had put in place.

At the time, our cleanup number for dioxin was a 1,000. Florida is a 7. So it kind of -- we had to go back to the drawing board as far as what was considered -- what are we going to do with soil in the area of ACW, kind of introduce the large volume of soil that we hadn't planned on before.

We went out and sampled all of the yards, not all of the yards. We sampled some of the yards in the neighborhood in 2008, 2009 and 2010.

This is the remedial action objectives for our current site-wide ROD. The first one is to prevent human exposure to circulate contaminated soil above the appropriate levels in federal and state levels.

Number two is to prevent congestion of groundwater that contains concentrations of compounds representing a total cancer risks greater than 10 to the negative six for an HI greater than one or meeting all of the state and federal rules and regulations.

Number three is to prevent or eliminate long-term leachability of soil contaminants of concern into the groundwater.

And the last one is to protect Bayou Chico and Pensacola Bay by not letting any contaminated groundwater migrate into the bay.

The preliminary remedial goals for this is where we are going to clean up to our clean-up standards. Soil is basically Florida's Soil Cleanup Target Levels. That will be what we'll be using. Those are in table form. You can find them on the DEP Web site.

For groundwater, OU2 is going to be an interim remedy. It's not final, so it doesn't have cleanup numbers associated with it. The reason we are making it a non-final remedy for that is that -- we're going to talk about all of the technologies that we are going to do to address the source area, the dissolved plume and what we think it's going to drastically remove. A lot of contamination of groundwater will be done in five years. It will be cleaned up.

But in case that's not the case and we have to do something more aggressive, I'm leaving it open that way so that we can go in and do something more aggressive later on.

But like I said, I'll talk about all of the technologies that are going to be employed in that. The State will be cleaned up in five or ten years. We can come back and do a final ROD for the groundwater doing something as simple as monitored natural attenuation where we just sample the monitoring wells.

Okay. So I have broken the site out to the different areas because each different area has different characteristics.

CMZ-1, the red area, that's the main source area. This is an area where the vast majority of creosote that is below the surface, is 20 to 80 feet of just pure creosote. That is where that is located.

That area also has a marine clay located 100 feet down, which is very important. CMZ-2A, which is the orange part, that is still on-site, but there is no marine clay below that to tie into. Marine clay is like a thick ten-foot clay layer that will act as a good confining area.

2B, that's the shallow creosote that I talked about 20 to 30 feet below the surface. It's off the property. That is a different

contaminated media zone. This is all groundwater.

CMZ-3 is a secondary source here. We have a small PCP plume over there that is shallow, 20 to 30 feet down. That is the groundwater issue over there.

And 4A, this purple area over here, that is basically the entire site but for soil. That is the on-site soil for ACW.

We also have 4B, which is all the off-site residential soils.

And then CMZ-5, that is the dissolved plume. Anything that is not free product and still has contaminants in it, that is CMZ-5.

Here's a recap of what I just talked about that I have broken down into these different areas. Let me just go right into it.

This is CMZ-1. The preferred technology that we are going to implement for CMZ-1 is the barrier wall. We basically will use a large cutter like this, which actually goes down into the subsurface, grinds down 100 feet down and ties into that marine clay layer.

Once it hits contact with that clay

layer, it will back out and inject the concrete slurry, which will be impervious to groundwater. It won't be able to pass through it. So once that happens, it will form a box. We will have a slurry wall all the way around that will run the perimeter of that CMZ-1. It will tie into the marine clay at the bottom. And then we will put a cap on top. It will be a box where no water can get out. No contamination -- no water can get in, and no contamination can get out.

And we do this on a lot of our wood treaters in the Southeast throughout the country. It's the default technology for using for wood treaters.

This is CMZ-2A, so this is still on-site but no marine clay below, so we can't tie it into anything. The clay is gone. This has still a lot of creosote but not as -- but not as grossly contaminated. And it's much deeper. It goes down to 120 or 140 feet.

And when you get down that far, it will be clean, but there will be a little finger of creosote sticking around. And our goal is to get rid of all of that creosote.

So we chose thermal excavation, where basically you heat up water until it's a steam. You inject it into the creosote. Creosote is very thick and viscous. It's not very easily pumped out. So we heat the steam up and make it more pump-able, and we basically just put a vacuum on it and pull it out of the ground.

This is also very successful when it's so deep. This is a successful technology that we have used before.

2B, this is the stuff that is shallow, off-facility, 20 or 30 feet down.

We ranked all the different technologies, and thermal and large-diameter stabilization came out pretty much the same. Large-diameter stabilization is basically where you take a big six-foot auger, and you drill down. And when you get down toward the creosote, just back it out and pump it full of concrete. You basically make a giant model of the concrete.

And that would have stabilized it. It would have made it mobile. It would have made impervious to any more groundwater contamination. But we went with thermal for 2B

because we already have one contractor on 2A using thermal, so we have cost savings there. And thermal is more aggressive. You don't get the concrete there. It just will be gone. So we went with thermal for 2B.

CMZ-3, this is the stuff that's -- the small PCP plume that is on the eastern side of the property where we need to do a little more investigation during remedial design to figure out a little more of where the PCP plume is going. We have an idea. We have a couple of wells but nothing in between. We will do that during remedial design.

So what we selected would probably address either whether it's a larger-scale problem or a smaller-scale problem, which is chemical oxidation and bioremediation.

Here is a picture of chemical oxidation where basically you inject a -- and we would have to do treatability studies to see what we would actually inject. You can inject hydrogen peroxide, permanganate. There is a whole suite of things you can inject into the ground to actually destroy the PCP and the contamination of groundwater, so it will be

gone.

The bioremediation, that might be helpful as well. That's where you actually either -- if it's anaerobic bacteria, you inject oxygen in there and kind of give it a little food boost. Or if it's anaerobic, you give them some more food substance, like vegetable oil or a lactated milk, which they eat up, and it fuels the bugs that are already down there eating the contamination up. It just gives them a little energy boost, a little Monster Drink.

Okay. Here's 4A. This is the excavation of the on-facility soils. And, basically, there aren't many options. We are just going to dig it up and capsulate it right there in place and put a -- you know, we are going to put a liner of contaminated soil, another liner on top and clean-clean soil on top of that. And then we will be able to turn it into a park or whatever, whatever we see fit.

4B, this is the off-facility soil. This is residential properties. It's basically the same thing. We are going to dig up the

properties one by one. Once we are done with it, we will restore it the way we found it. If we have to take out a fence, we will put the fence backup. If we dig up a shrub, we will put a new shrub in there. But we will leave it the way we found it.

We will dig up all of the yards, bring that back to the site, and we cap -- put that into the cap of all the other soil.

UNKNOWN SPEAKER: How deep? How deep are you talking?

MR. THORPE: On residential properties, no more than two feet.

UNKNOWN SPEAKER: Two feet?

MR. THORPE: Yeah. But it depends on what the contamination is. Some yards might just be six inches. It might be a foot but no more than two feet.

UNKNOWN SPEAKER: The water table around here is only two feet.

MR. THORPE: Yeah.

UNKNOWN SPEAKER: And stinky slush.

MR. THORPE: That's one of the reasons that I went more than two feet is the water table.

UNKNOWN SPEAKER: Thank you.

MR. THORPE: This is CMZ-5. This is the dissolved plume, not the free product. It's a little bit less. It's the stuff that as the water passes through the creosote, it takes like little pieces of naphtha and some of the contaminants and passes through.

This is what is heading out toward Pensacola Bay. We are going to do the same thing, chemical and bioremediation, or we are going to do probably an oxygen shield where we will inject oxygen right there where it enters the bay. That will actively destroy any of the -- it will get the bugs out into eat up all the contamination before it goes to the bay.

And the entire price tag for all of these is 34.1 million dollars. That includes long-term five-year reviews, putting ICs in place, everything.

So here's the perimetry in one incapsulated area. We are talking about CMZ-1, the main source area, a barrier wall, capped on top and marine clay on the bottom.

2A and 2B, this is stuff that is on facility deep down, thermal. CMZ-2B, off

facility, kind of shallow, we would do thermal there as well.

3, the PCP plume and leaches on the property, chemical and bioremediation.

4A, excavate and bring it back to the site. 4B, excavate and bring it back to the site.

CMZ-5, chemical oxidation and bio.

We will also be doing site-wide activities, including a long-term groundwater monitoring and five-year reviews. We will do placements of ICs on the property so that we won't come back in five years and see someone digging up their calf and stuff like that.

This is a map of -- the one I showed you before with all of the technologies on it to be selected.

And now this is what your guys are interested in, the next steps forward. Where are we going from here?

The comment period, that started April 22nd. Like I said, at the beginning, everyone got their Proposed Plan Fact Sheets. At the back of that, there is a page for writing comments. Send them to me. I want to

hear from you guys. That ends May 22nd.

I'll get all of those comments. I'll get the transcript of the meeting tonight, and I will respond to all of the comments you guys tell me today or e-mail them into me.

After that, we will move on with the Record of Decision. I'll respond to all of the comments I get today. In the Record of Decision, there will be a whole section called responsive summary.

So whether you tell me verbally, I will respond you verbally tonight. But, also, if you write one in, I'll write in the responsive summary what your comments are, what are response to them are.

MS. SPENCER: Hi, everybody. I'm sorry I'm late. I was at the hotel waiting on UPS, but they sent your documents back to EPA opposed to the hotel. So if anybody -- I think Pete is pretty much finished, but if you want copies of the fact sheet, I ran to Kinko's and made a couple of copies.

But if you would, please make sure you sign in, because the full document that Pete went through tonight is what I was having

delivered to the hotel, so we are just going to send them out e-mail.

MR. THORPE: I also told them I was going to have some mailed here.

MS. SPENCER: Okay.

MR. THORPE: So people who didn't make the meeting, if they weren't here and they want one, just come over here.

MS. SPENCER: Yes, that's fine. Sorry they sent it back to the EPA as opposed to the hotel.

MR. THORPE: So the Record of Decision will be finalized in August of this year. That will be -- basically, it's a proposed plan, what is in your hand and what is in the more detailed proposed plan.

But it's a more -- Record of Decision is just a more technical, detailed document where it just provides more details. It has a big, long list of what federal and state laws we're going to comply with. And it's just -- it's a lot more technical.

After that is signed in August of 2017, we will start with remedial design. Like I said, there is a little more work to do on

the PCP plume. We also have to do some treatability studies to determine what is the best injection to do, what is the best chemical injection to use in CMZ-3. Maybe we should do bio over there.

It should only take about a year while we do a couple of more test borings for the marine clay in CMZ-1. But that will take about a year to 15 months.

And then the remedial action starts. We start cleaning up the yards and bringing the soil back to the property, clean up the groundwater. That will take about two years. And so we will be done July 2021.

This is my contact information. During the comment period, after the comment period any time, call me, e-mail me. That's what I'm here for. Feel free to contact anytime.

MS. SPENCER: And, also, as we go into the questions and answers, because we have a transcription, if you would state your name and who you represent if you're a representative or an aide for the city or local government so that we can have it on file.

MR. THORPE: Oh, Keith.

MR. KEITH WILKINS: Keith Wilkins for the City of Pensacola.

For your timeline going forward, how much of that is dependent on funds not yet allocated or not yet approved? I mean, what steps do you have to go back and get money?

MR. THORPE: There is a funding process when it comes to remedial design or remedial action. The budget process right now is ongoing up in D.C., so I really can't comment on that.

I don't really know what the budgets will be when we get to each one of the stages right now.

MR. KEITH WILKINS: So is the -- and I won't ask a bunch of difficult questions. In August, I guess, of this year, how far into this are we funded now?

MR. THORPE: Oh, we are funded to remedial design. I mean, to the Record of Decision. I'm sorry.

MR. KEITH WILKINS: Okay. Okay.

MR. THORPE: So the Record of Decision, we are funded to that. We will need additional

funds for remedial design. Generally, those are easier to come by because it's a shorter -- you're only doing like a one-year project.

For remedial action, they don't usually approve you, unless you're going to have -- they know you're getting money for the whole thing. You can't start one and then stop in the middle. That's really bad.

UNKNOWN SPEAKER: (Inaudible.) How do they determine which yards are being dug up, and how would we know? How is that determined?

MR. THORPE: Well, I have a map with what yards we sampled. And, generally, when we get to that stage, we are going to -- in the Record of Decision, there will be two maps where there's -- we have looked at how the soil -- how the contamination came off the property.

There is one large area adjacent to the property where it was overland flow. And it's basically a large section of property to the west and to the south of it. It's an exposure unit. Anything inside that exposure unit is going to be cleaned up if it's above seven parts per trillion.

MR. RICK MILLER: What area is that? What

street are you in?

MS. SPENCER: Can you state your name, please, for the transcriptionist?

MR. RICK MILLER: It's Rick Miller. I'm a property owner.

MR. THORPE: The red areas, the orange areas are ones that are closer to the property. And these are all areas that we did a dioxin analysis, where we did a fingerprint analysis. Dioxin is not just one chemical. It's not just naphthalene. It's a whole suite of things.

So we looked at what chemicals came from ACW and which ones didn't. There is other natural occurring -- you can create dioxin by burning trash, by diesel exhaust. Anytime you have barbecues, those all create dioxins.

So the fingerprint analysis, anything that had an orange or purple box around it, that was site related from ACW. So those boxes that were site related, this was -- it came off from the facility. We're not -- we can't clean up stuff that is not site related. It's regulated by law.

This is the overland flow exposure unit, and this is vehicular traffic. The main

entrance to the site was back over here. So a lot of this stuff, you know, dust that was on the facility, came off the facility by trucks going in and out all the time. Those yards will be cleaned up.

If anything was above seven parts per trillion, which is Florida's SCTL for dioxin, and this is a residential neighborhood, so it's seven, will be cleaned up.

Does that answer your question?

MR. RICK MILLER: Yes, mostly. I live across the street from where it's purple. How do I know that my yard is not seven parts per trillion? The box literally goes around my house.

MR. THORPE: We might -- we might sample your yard, and it might be below seven. And that's why. A lot of these -- a lot of the areas where it was a seven, either it's -- it was really low levels, below seven. Or if it was -- it had a purple box next to it, it's not site related. You can't clean it up. It's not related to ACW.

MR. RICK MILLER: My concern is mine is 6.9, and across the street, it's seven. So how

did you get to that level? Why is it seven parts per trillion?

MR. THORPE: It's state law.

MR. RICK MILLER: Thank you.

MR. THORPE: Yes, sir.

MR. STEVE STEWART: Hi. I'm Steve Stewart. I own the property in the Cypress and K Street area.

What is the expectancy of us living in our homes or whatever while this cleanup, two feet of dirt coming out of there? For those of us that live with our dogs, we have animals.

MR. THORPE: Yes, I understand.

MR. STEVE STEWART: Where do we stand? I mean, what do we do?

MR. THORPE: I understand your concern. What we would do is, if it were amenable to you, we would come in and put you in a hotel for a week or however long it takes. It probably won't take a week, but a couple of days. We would move you out, board your dog.

This is what we have done on other public properties. They would come in and clean up your dirt, backfill it, put the sod

down. We would leave it the way we found it. Then you would come back to your house.

MR. STEVE STEWART: I have 14 lots, and I have all of my family living around me in these houses. I'm not going to live with anybody in my family. Wouldn't that be interesting to see?

MR. THORPE: We are not going to do, like, a whole block at a time. We would just do one yard, so there would be minimal disruption to the neighborhood.

MR. STEVE STEWART: Well, I'm 400 foot from the pond site. I'm right there on "K" in that area.

A motel?

MR. THORPE: Yes.

MR. STEVE STEWART: No pets?

MR. THORPE: No. The pets would be boarded.

MR. STEVE STEWART: I'm sorry?

MR. THORPE: The pets would probably be boarded, unless we can find a hotel where it's pet friendly.

MR. STEVE STEWART: That would probably be a problem right there.

MR. THORPE: If we can find a hotel where pets are welcome.

MR. STEVE STEWART: Is this mandatory? Is it going to be mandatory?

MR. THORPE: Well, if your property was selected to be cleaned up and there is contamination in your yard, I would encourage you to go forward with it and have your yard cleaned up.

MR. STEVE STEWART: We'll see.

MR. THORPE: Nancy?

MS. NANCY NEIGER: Hi. I'm Nancy Neiger. I'm a resident here at Sanders Beach.

Kind of adding on to Mr. Stewart, if we decide to sell a house, is there something that the EPA will provide once the cleanups are done that says you're now clean or free of liability or any responsibility?

MR. THORPE: Rudy.

MR. RUDY TANASIJEVICH: The proposed cleanup plan, there will be a document that will document all of the work that the EPA has done and what the status of that is. And on the residential cleanups, it will identify the yards, like Pete said, that were contaminated

and needed cleaned up. And there will be documentation showing what was done in those yards and where we got consent from the property owners.

So it kind of goes back to your question, Mr. Stewart. It's not mandatory. But like Pete says, it's highly encouraged.

MR. STEVE STEWART: I mean, you're expressing to me, like, why wouldn't I want it cleaned up?

I'm (b) (6) . I eat fruit. We have grapefruit trees that's been tested. We donate them, or Dan. Everybody knows Dan. I think he helps donate them to -- what is that? Humana Food Bank.

And the roots of these grapefruit trees go how deep? Farther than your two feet that you're talking about. I don't know if any of us are dying in this neighborhood from creosote. So I guess I'm a little confused as to the importance that you're saying that I should want to go with having my yard done.

MS. NANCY NEIGER: I'm glad to know that there is somebody else who is not giving up his grapefruit tree.

MR. STEVE STEWART: Well, I mean, really. Think about it.

MR. THORPE: Well, I think in the future I can understand your reluctance. You have lived here most of your life.

MR. STEVE STEWART: I was born and raised right there on that property.

MR. THORPE: But going forward to the property value of your property in the future, I mean, all the property around you will be cleaned up and yours might not, so that might be --

MR. STEVE STEWART: And I'm different because I don't sell property. I was born and raised there. It doesn't do anything to the value of my property.

My grandfather died there. My daddy died there, and I'm going to die there, and my kids will take it. They are already there. So my situation is totally different. But people that are looking at the property value, I certainly understand.

MR. RUDY TANASIJEVICH: Let me clarify. I'm Rudy Tanasijevich. I work with the EPA.

On the comment about your grapefruit

trees or any structure or shrubbery or certain landscaping and sites where we have residential cleanups, like Pete suggested, we try to work as close as we can with the property owners. If there are certain area of the property that you don't want touched for certain reasons, we work around that.

You know, we try to clean up as much contamination as we can if we get consent. We use much smaller equipment. They're not going to go in there with a backhoe around the grapefruit trees.

MR. STEVE STEWART: So, basically, this is a service to us if we want it?

MR. RUDY TANASIJEVICH: Well, I mean, the Superfund program is a program that assesses contamination and identifies a risk to human health. And once we do that, we design cleanups to address that risk, so human health and the environment and ecosystems are not impacted.

MR. STEVE STEWART: I wouldn't object to anything that involved anybody's health in here. I'm just asking questions about how deep, what has been tested, what is

contaminated and what is not contaminated. And I guess, basically, why we are doing it?

MR. RUDY TANASIJEVICH: That's what we are here for.

MR. STEVE STEWART: That's why I'm here. I've never been to one of these meetings. I have never been concerned about what goes on outside of my fence. But now you're talking inside of it.

In terms of your property, we can share the information or the data that we have on your property and help inform you whether or not your parcels or some of your parcels are ones that we would like to see cleaned up or not.

MR. THORPE: I understand. After the meeting, give me your street address, and I will let you know if we sampled it or not.

UNKNOWN SPEAKER: Can we request to be tested or retested?

MR. THORPE: During the remedial design we could -- we're going to sample all the additional yards inside those different exposure units. Right now we only have some yards sampled, but anything inside those boxes,

every single yard was sampled if it was inside those boxes.

MS. ALLIE NORTON: I'm Allie Norton, and I'm with Channel 3.

Do you have any idea how many homes are impacted or will be impacted with the remediation?

MR. THORPE: I don't have the exact number. It's probably somewhere between 40 to 50. I'm not quite sure off the top of my head, but it's a fair bit.

MS. ALLIE NORTON: Do you have any idea how many you have already tested?

MR. THORPE: I sampled approximately 90 yards so far. And a lot of them, the farther -- the closer you are to the site, the more contaminated they are, and those are the ones that will be cleaned up.

The farther away you go from the site, it drops off pretty fairly to the area where you're not below seven parts per trillion, which won't be cleaned up.

Nancy?

MS. NANCY NEIGER: I'm Nancy Neiger again. I have a question that is my favorite topic,

aside from my grapefruit tree, and that is the bankruptcy status.

I know we had a flurry of excitement when the person bought the tax lien or liens up. Does that transaction affect anything that we have seen here tonight at all?

MR. THORPE: Not yet, no.

MS. ALLIE NORTON: Not yet. I don't like the way that one sounds.

MR. THORPE: Well, right now there are no responsible parties, as we know. An individual bought seven acres of the site during a tax sale. I, Keith Wilkins and Rebecca Ferguson met with that individual two weeks ago near the site to talk to him about it. He was interested. I talked to him about the site, what had gone on on the site historically.

He told me what he was planning to use the site for. And he said he was interested in working with City, in turning the property over to the City so that the City can turn it into a park.

Now, we sent him the general notice of liability letter saying that he is responsible -- or could be responsible for the

past, what occurred on the site. And we are going to move forward with that and possibly send him a 104(e) letter, which says, send us any information that you have on the site and how you came in possession of the property, and he may could potentially become a responsible party.

Yes.

UNKNOWN SPEAKER: (Inaudible.) I'm concerned about the CMZ-4A, which is the blue square here on the paper.

MR. THORPE: Right.

UNKNOWN SPEAKER: Does that incorporate the fenced-in area that is right behind my house?

MR. THORPE: No. That is the lumber yard's retention pond. ACW is not a part of that retention pond. I drove past it before this meeting. That is pretty overwhelmed.

UNKNOWN SPEAKER: Yes. It hasn't been tended to in 22 years. Everybody that I talk to acts like they didn't hear a word I said.

MR. THORPE: That's frustrating, I know.

UNKNOWN SPEAKER:

Yes, because when you go out in your

yard, you're attacked by mosquitoes. And the more rain, the more mosquitoes. We cannot use our yard, period.

MR. THORPE: And I apologize --

UNKNOWN SPEAKER: And the City -- excuse me for interrupting you. But the City is aware of this, and they have done zippo. And that's very irritating with the different types of mosquitoes and diseases that they bring. They could care less.

MR. THORPE: And it seems like the City or there must be some ordinance that they can make the lumber yard clean up their retention pond. There must be some kind of local city --

MR. RICK MILLER: That's code enforcement.

MR. THORPE: Code enforcement.

UNKNOWN SPEAKER: They went out there. This was several years ago. Zippo.

UNKNOWN SPEAKER: The only way that you're going to get any kind of follow through is to bug them once a week. Somebody will finally get so ticked off, that they will know your name, and they might actually take action. I say this from prior experience.

UNKNOWN SPEAKER: Well, the thing is there

must be different rules or regulations for a private pond than those that you see that are very well manicured. Now, these -- this pond has a Sycamore tree in it. It's three stories tall, which when I moved back home 22 years ago, it was a great big dirt pit that my house and Mrs -- Ms. Ward's house could sit in.

Nobody wants to be bothered. It seems like those mosquitoes only bother me. It doesn't bother anybody else in the neighborhood.

UNKNOWN SPEAKER: Mr. Wilkins, is there a way -- how do we find out who is responsible for what on that particular item? I mean, if she's been asking the wrong person or department, I'm personally happy to stand up and make all of the noise I need to. I'm sure you-all know that.

MR. KEITH WILKINS: There are two jurisdictions over that. One is the City, and the other one is the health department. The City from a code enforcement standpoint, I don't know what their findings were and why nothing happened. But I think we have talked about it. I went by and looked at the

property, too. I can find out why code enforcement didn't feel like it warranted any action.

MR. RICK MILLER: Code enforcement sends me a letter, and they can't clean that up.

MR. KEITH WILKINS: That's a problem.

And then the health department, they have a jurisdiction also.

UNKNOWN SPEAKER: I called them. They sent a man out with some little fish and put it in the water. And when the water went down, the fish died.

MR. KEITH WILKINS: (Inaudible). You're right. They can't survive if they are not in the water.

UNKNOWN SPEAKER: That's fine. My grandfather used to run that department, so I know about it.

MR. KEITH WILKINS: I will look into the city side. Call the health department.

UNKNOWN SPEAKER: I will see you after the meeting.

MR. THORPE: Any more questions?

MS. ALLIE NORTON: How much money has already been put into this in the 34 years that

it's been going on?

MR. THORPE: Approximately 30 million dollars has been spent on the site so far.

MS. ALLIE NORTON: Now, this -- we have this attorney that has purchased some of the property, and you said that he might be responsible for the past -- the past costs on that. How much are you talking about with seven acres of land?

MR. KEITH WILKINS: How much would he be responsible for?

MS. ALLIE NORTON: Yes.

MR. KEITH WILKINS: Potentially, it depends on how much -- he could be incurred -- it's yet to determined. He might be a responsible party. It could be whatever he's able to pay.

MR. THORPE: Pat?

MR. PAT JOHNSON: Pat Johnson, president of the neighborhood association.

So you went through the presentation. Basically, it says the remediation. At that point, we had talked about what would ultimately go on the property. Has anything changed there? A park is where we left on

that.

MR. THORPE: Right. Right. We had that meeting in December of last year where we met with you guys. We got feedback from you guys and talked to you guys about what you wanted to see the site be turned into.

Nothing has changed as far as that goes. We are still working with the City. As far as I know, the City is still moving forward with buying the rest of the site.

And the new property owner, the attorney, he has been cooperative so far. He has signed an access agreement with the EPA and the DEP. We can go down to the site and take samples.

But like I said, from our last conversation with him, it sounded as if he is willing to hand the property over to the City swell. So there shouldn't be, as I know right now, any disruptions in how things will develop. Because towards the end of your remediation, it's going to be tailored to future usage. It's going to be a park, so it would be tailored towards that, so ultimately, you are going to have to know that decision

before you can finish.

And the property right now, I don't see any changes. The property is zoned recreational, which means a park. I don't see how it's going to change anytime soon, so we are going to move forward with that assumption.

MR. KEITH WILKINS: Conservation. It's on conversation.

MR. THORPE: On conservation. I'm sorry.

Any more questions? I'll give you a chance.

MR. JOE MORRIS: Joe Morris, property owner. We have a couple of vacant lots, and we plan on building on them. We recently tore down a house that had been on the property, so the ground has been disturbed in the middle of the lot, at least.

My question is: How does that affect us building on the property?

MR. THORPE: Well, I would like to see where you're -- if you want to give me your information after the meeting, I can tell you if your lot has been sampled or not.

MR. JOE MORRIS: It's on the corner of "J" and Cypress, the northwest corner.

MR. THORPE: Okay. So it has been sampled is what you're telling me?

MR. JOE MORRIS: According to that, it was sampled real near it, if not on it. The little red things, those were sampled?

MR. THORPE: Some of them were not. In fact, some of them were higher.

MR. JOE MORRIS: It was in the purple area.

MR. THORPE: Okay. Then we can talk after the meeting. And when I get back to the office, I can look up the information and tell you whether it will be cleaned up or not based our current information.

MR. JOE MORRIS: I mean, I would prefer to have it cleaned up before we break ground to build. But I don't want on have to wait forever.

MR. THORPE: I understand.

MR. JOE MORRIS: I'm getting old.

MR. THORPE: When we get to the remedial phase of the cleanup, the number one priority will be to get residential yards cleaned up first.

But, yeah, if you stick around, let

me get your information.

MR. JOE MORRIS: I will.

MR. THORPE: In the corner.

MR. KEVIN ROBINSON: Kevin Robinson, the Pensacola News Journal.

Will there be any health concerns for -- if you're working on one residential property for people living in the surrounding area, and stuff just picked up and that sort of thing?

MR. THORPE: Well, we have a dust-monitoring program put in place. Every time we do a residential cleanup like that, we have monitors surrounding the property, usually in the four directions to see what is going on with the property, if it's hazardous or not. That is pretty much standard procedure when we do residential cleanups. So we will know if dust is kicking up and going in someone else's hard, we will know that in real time.

Yes.

You're next.

UNKNOWN SPEAKER: (Inaudible.)

This --

MR. THORPE: Go ahead.

UNKNOWN SPEAKER: This new retention pond, like I need another one two doors over, can you explain how that is going to work specifically?

MR. THORPE: Well, we are going to be capping a large portion of the property. Most of the property will be capped, and it's doing to produce a lot of storm water runoff.

Now, we could just slope it off, but then it will go in someone's yard, their backyard. We can work with the City and slope it all in that direction so that it goes to the retention pond to reduce storm water going into people's backyards and flooding their backyards. It's all going into one retention pond.

I think we can get pretty creative with the City and maybe make it like a -- put a fountain in the middle and a full-time pond. But it will be a city park, so I imagine it will be more well maintained that be the lumber yard's.

UNKNOWN SPEAKER: Is it going to look like the one down there on Ninth Avenue and the front, the bay front, but in miniature?

MR. THORPE: I'm not familiar with that.

I live in Atlanta. Sorry.

UNKNOWN SPEAKER: Admiral Mason Park, I think is what you're referring to on Bay Drive.

UNKNOWN SPEAKER: Right. It has a fountain and keeps the water moving and stuff like that. Would it be a miniature like that and be fenced in?

UNKNOWN SPEAKER: There is not a design yet, but it would be similar, I guess, in concept where there are walking trails and benches and things like that. But that's yet to be designed.

MR. DAN BOWEN: Dan Bowen. I live on the corner of (b) (6) .

And like Steve, I have been down here for three generations. And, hopefully, it will last a little bit loner.

But did I hear you right that there has been 30 billion spent so far?

MR. THORPE: Yes, that's correct.

MR. DAN BOWEN: And then the cost of this project is?

MR. THORPE: 34.1 billion?

MR. DAN BOWEN: Thirty-four?

MR. THORPE: Yes.

MR. DAN BOWEN: Billion?
MR. THORPE: Yes.
MR. DAN BOWEN: Okay. I mean, I have been to quite a few of these meetings. This isn't too much different from what we have been told before; correct?
MR. THORPE: Correct. Go ahead.
MR. DAN BOWEN: Okay. What is the probability of this being funded then? I know you say the ROD was funded. But the actual design and work is still out; correct?
MR. THORPE: Right.
MR. DAN BOWEN: I mean, is it another 50/50, or are we --
MR. THORPE: I can't really tell you too much. You probably -- it all happens -- the progress is ongoing in D.C. And you know as much as I do with what is going to happen with that.
MR. DAN BOWEN: Right.
MR. THORPE: It's all in their hands. Like I said before, the remedial design, usually, the costs of that are lower. So to implement a remedial design is usually easier.
And I think this story -- or this

site might have a good story that might get it funded. But there is really no guarantee. You have an entire community being clean up, all the groundwater cleaned up. It's going to be turned into a park. That's a great story, but I don't know about funding. I really can't promise you anything.

MR. DAN BOWEN: So is it high on your list? And as far as being on the list, is it a large, medium or small project?

MR. THORPE: It is a large project, a larger.

MR. DAN BOWEN: And it's high on the list?

MR. THORPE: When they go to D.C. to figure out what sites are going to be cleaned up or which are not, they look at risks, risk reduction.

I think your groundwater here and the soil on-site, you have some contamination that needs to be addressed. It's hard to say, though, about the process.

MR. DAN BOWEN: Thank you.

UNKNOWN SPEAKER: Back to this retention pond. Is the water that is collected there going to seep down into the ground, or is it

going to go into a pipe and then go to the bay?

MR. THORPE: I imagine it will go out to the bay.

MR. KEITH WILKINS: The clean water.

MR. THORPE: Yes, the clean water.

MR. KEITH WILKINS: You're talking about clean water, not his water?

UNKNOWN SPEAKER: Right.

UNKNOWN SPEAKER: Rainwater.

UNKNOWN SPEAKER: The rainwater will be going out to the bay.

MR. THORPE: And plus, the whole set is going to be lined, too. So it's going to go through clean dirt into the retention pond.

MR. DAN BOWEN: So where is that dirt going to be funneled to? Down F Street? Is it going to be directed right down F Street.

MR. THORPE: It will have to tie into some storm water line somewhere.

MR. DAN BOWEN: So I'm not contaminated now, but I will be.

MR. THORPE: The water going into the retention pond will be clean.

MR. STEVE STEWART: Three or four years ago when they eliminated storm water at L

Street, it came down to I Street to eliminate it from going into the Pensacola Yacht Club property. They did all this, shooting the 20-inch pipes, three of them under the ground. Were you around? Are you familiar with all of that?

MR. THORPE: No.

MR. STEVE STEWART: Well, anyway, they did for a city block in front of my house all the way to L Street.

And there was a Corps of Engineer that was with us for about 30 order days while all of this work was being done. He was out of New York. And he told me that this creosote works was the third-largest dirt contamination in the United States.

UNKNOWN SPEAKER: I agree with that.

MR. STEVE STEWART: Do you agree with that?

MR. THORPE: I --

MR. STEVE STEWART: Have you ever thought about it? Is it that about? The Corps of Engineer.

MR. THORPE: I don't think it's the third-most soil contaminated property in the

United States. I don't think it's anywhere near that, no.

MR. KEITH WILKINS: He may have been referring to Escambia Treating --

MR. STEVE STEWART: No, sir. He said the United States. I'm pretty familiar with the other sites and all that that was done out there.

MR. KEITH WILKINS: Escambia Treating was the third largest --

MR. STEVE STEWART: He was from New York, sir, and he was speaking where he's been with the Corps of Engineers. And he's older than I am. He told me that he would rank it about the third in the three largest contaminations in the United States. It may be. I don't guess it matters. But I mean, when we're speaking of a problem.

MR. RICK MILLER: We still don't know if there is money coming for us or not, so it's just another meeting?

MR. THORPE: No, no, no. This meeting is we are moving forward with the Proposed Plan. So in the past, as someone was alluding to, I have talked about the technologies in the past.

I have talked about doing a barrier wall. I have talked about doing thermal extraction.

But I have always had a caveat where I have said, I think this is what we are going to do. This is the formal process we're putting forward. This is what we're doing. We want to hear your feedback, and then we're moving forward.

So the only thing that is going to stop us from moving forward is the funding. That's it. There is no administrative --

MR. RICK MILLER: So we still don't have the funding, you're pretty sure?

MR. THORPE: For sure, yes. But it could be there. That's above my pay grade.

MS. M. PORTER: Is there anyone or anyway we can vote or help to get funded for this?

MR. RUDY TANASIJEVICH: Like Pete is saying, this comment period is the probably the most important part for the community's voice to be heard. So like he said, this is not just these ideas that we are thinking may or may not happen.

This is the culmination of years of work to come up with a site-wide final revenue.

And this proposed plan process and the public notice and comment period is your opportunity to say what you like about it, what you don't like about it, what you would like to see changed, what you don't want to see changed. And providing your comment on funding is something that is totally valid and that we would respond to and provide whatever information we can.

I think, Pete, and correct me if I'm wrong, we're competing for resources at the regional level with the states in the Southeast, but, also, like he says, when we go to headquarters or D.C. as a part of the budget process, all of our Region 4 sites are also competing against all the other sites around the country.

So Mr. Stewart was asking, where does this -- or that gentleman over there, where does this fit on the priority or the funding line? We could say, well, within the region, it may fall here, but that doesn't guarantee money because it's a much more complicated funding process.

But the importance of getting this

site cleaned up and the importance of having money is a part of EPA's budgeting process. It's a very valid comment that we can take, and we can respond to and pass along.

MS. SPENCER: Can we have your name, please, for the record? Your name for the record?

MS. M. PORTER: Porter.

MS. SPENCER: Porter?

MS. M. PORTER: Yes.

MS. SPENCER: Thank you.

MR, BOB NEIGER: Bob Neiger, resident.

In answer to your question, our Congressman was here the other day, and he was out on the site. He wants it cleaned up. So that's who you go to. That's where you start.

I'm sure those people are already doing that because we put an awful lot of time as a neighborhood into getting that site looked at and worked on. It's been 17 years that we have been doing this. And this is just another ROD.

But the neighborhood is in to getting it cleaned up. And there have been a lot of comments we have seen hear. And, of course,

there is the senator, too. But that goes with the people, along with our city representatives and our county representatives, you can knock on their doors and say, we have an interest. I'm sure that our association president probably will write a letter to our local Congressman since he was here and say, listen, our whole neighborhood is interested in getting this done, or the taxpayers. We all would like to get something done. But if we don't as a group, you could sit here and wait, but something will be done.

If you don't know anything about Congress and Senators and our government anymore, sitting on your haunches means sitting on your haunches, but you have to knock on the door.

So as a group of people, we have an association. Our president is right there. He's willing to write a letter or something that gets them moving. Pete has been trying to get it cleaned up for years. He's interested.

There is already a design for the park out here. The park has been designed for ten years. So we know it's out there. We

talked about it having a fountain.

I'm covering stuff that I already know because I have around this stuff for so damn long. But if you really want to generate some interest, get ahold of our new Congressman. He's been here. He knows the site. He wants it cleaned up. And I know the City has probably had conversations with him. The news media was there. Of course, the only people who showed up were protesters, but none of the neighborhood showed up to actually talk about remediating the site. And there was a lot of stuff about saving the EPA and saving the whales. But that's how we have to get it done. That's what you folks have got to do.

When he's done talking with this man, get ahold of your congressman. Get ahold of your senator. Get ahold of the association. They are very, very important. They carry an awful lot of weight within the City. You just have to do it that way.

MR. PAT JOHNSON: I think it's important if we can get Pete to the point where it's shovel ready, he probably has a better chance of getting it approved --

MR, BOB NEIGER: Yes, that's the truth.
MR. PAT JOHNSON: -- if there is still more stuff you're asking to get through.
If we can get through this meeting and get your responses back to where you can say, here's what we are going to do. Then when he's asking for approval, it's shovel ready. We just want to know.
MR. THORPE: Yes, once I get the responses back, we'll sign the Record of Decision this fall and have a year of remedial design. Then at the end of the remedial design, it's shovel ready to go.
MR. RICK MILLER: I thought I heard on the news today that -- I thought it was one of our congressmen, but I'm not sure. But someone at the federal level used the Superfund site here as an example of why they should take a part the EPA.
MR. THORPE: What did he say?
MR. RICK MILLER: He said it today.
MR. THORPE: What did he say?
MR. RICK MILLER: Because of how bad of a joke you have done with it. It's a fine example of --

UNKNOWN SPEAKER: Can I come to your defense?

MR. RICK MILLER: No. I'm just repeating what I heard on the news.

UNKNOWN SPEAKER: I understand. I have an opinion that may not reflect everybody's. And that, as much as you want to pick on the EPA, there are other parties that are responsible for nothing being done hear. A big one is the City of Pensacola, because I have seen more news on TV in the last four lays than I have in the prior eight years.

We tried everything we knew to get that TV camera down here when we are really ginned up and ready to go.

And then there is the FDEP. They should have shown some interest in making this an urgent site.

What about Escambia County?

So I'm not all for dumping on the EPA as being the only party that has not done what they were supposed to do down here. They are just one of at least four.

MR. RICK MILLER: I wasn't dumping on them. I was just repeating what I heard.

UNKNOWN SPEAKER: No, I understand that. But I just want everybody to be aware that the EPA shouldn't the one walking away from this with the only black hat on because there are a whole bunch of other parties that could have been doing more and chose to look the other way.

We were laughing when we sat down before the meeting started. This neck of the woods always used to be considered the armpit of Pensacola. And that's why it never got any attention. Once the treatment plant we moved, now we are pretty again. So that is what the City's interest is. We're not for the City's information. People who live here understand that.

MR. THORPE: I guess I would say we have done a lot of remedial action out here. That one little case I listed of all the properties we cleaned up; two ditches, several yards, part of the Yacht Club, an apartment complex, 200,000 gallons of DNAPL recovered. We have done a lot of work out here.

It hasn't put the site, its final use to bed. We have done a lot of work out here.

So I think we are doing a lot of good work out there.

MR. RICK MILLER: It just makes me very concerned that no funding is going to come if they are talking about us on that level, specifically this setup.

UNKNOWN SPEAKER: That means you need to write that letter to Mr. Bates.

UNKNOWN SPEAKER: I do have one last question. It has to do with reuse, though, and I don't know whether or not you can even address it at this point.

Once the cap is there or plans are made for it, is it going to be non-vehicular traffic? We still have concerns that the City has the intention to put a pass-through street on that somewhere. I Street is the one that is usually pointed out.

MR. THORPE: It would have to be -- it could be done, but it would have to be done in remedial design where you have to plan it that way. Once the cap is on there and it's finalized, you can't put a road over it. It would destroy the cap.

UNKNOWN SPEAKER: So we will know during

the remedial phase, the phase whether that will be a part of the plan.

MR. THORPE: Right. And after the comment period is over, I don't want to throw too many documents at you guys, but after the comment period is over, we are going to issue that Reeves plan that we talked about back in December. I will issue that.

I believe that we did -- there is no mention of a road going north/south to the site. But there was a lot of interest from the public about a road going farther along to --

UNKNOWN SPEAKER: Gimbal?

MR. THORPE: Gimbal, yes. And that was going to be part of the reuse plan.

UNKNOWN SPEAKER: Yes. The road will continue past my house on Gimbal Street. Now, that is going to be a real road, not dirt, with curbs. And is it going to have piping put on the side to catch the rain as it goes? Do you know about that?

MR. THORPE: That is infrastructure. We don't -- we just clean up sites. We don't. I'm sorry.

UNKNOWN SPEAKER: That is probably where

the piping is going to come.

MR. KEITH WILKINS: If the City builds a street, if the City built a street, we build them to an engineering standard that includes storm water, banks, curb gutter, asphalt and all that. So that's your question.

Now, I don't know about Gimbal Street. Specifically, I have not heard a single conversation, but I have only been with the City a year and a half, but I have not heard a single conversation about a through street across the property in any direction but Pine Street.

UNKNOWN SPEAKER: Pine Street is a dirt street south of Gimbal.

UNKNOWN SPEAKER: Gimbal was the one that we talked about in the plan where the City was intending to make that commercial in some way to connect with Main Street.

UNKNOWN SPEAKER: I understand the whole area is intended to be a buffer, to suffer Sanders Beach from commercial development.

UNKNOWN SPEAKER: Well, how would they get to the park?

UNKNOWN SPEAKER: Again, it hasn't been

designed, but what I envision is on the perimeter, there would be parking off of some of these streets with walkways. It's all off-perimeter to access.

MR. DAN BOWEN: I actually have a copy of all those plans. It's by the City. I'm sure you can get a copy of it if you want. It's quite detailed on all of the shops.

MR. THORPE: Can I see that, Dan?

MR. DAN BOWEN: Sure. That's an old reuse plan.

MR. THORPE: A 2010 reuse plan.

MR. DAN BOWEN: I didn't write a date on it, but I'm sure we can research when it was done.

MR. THORPE: But I would wait to look at the new reuse plan because that incorporates the new understanding of how we're gone to -- the current situation at the site. This and the previous reuse plans, we were going to put the dirt on a smaller footprint. We can put the soil where the dipping ponds were where the remediation system used to be. We can take the same amount of soil and spread it out over a larger footprint, so the cap will be much

lower.

In the past, I came here and said the cap was going to be 10, 14 feet high. You guys didn't like that. So we went back to the drawing board and found another way to make it lower, five feet. I think this is the original one from like 2003.

UNKNOWN SPEAKER: That one is completely wiped out now, though; right? That won't happen? Three will just be a big park and have like commercial and housing and stuff on it?

MR. DAN BOWEN: Well, it was a multitude of plans. It had the park, and it had retail.

MR. THORPE: That's what I don't like about it. The reuse plan looked like somebody was going to buy out the lumber yard and turn it into some kind of real estate development. We can't do that. Someone else has to do that. That is not part of what a reuse plan should be. It's just the site itself. And we're cleaning up what I have control over.

MS. SPENCER: And since I have been around a long time through like four RPMs, that was like before Shea and before the -- there has been like five RPMs. So I was here when that

was done. It was a whole different concept of what we thought about redevelopment at that time.

MR. DAN BOWEN: The Corps of Engineer guy told me that that property could be cleaned up and then capped off and used for something top surface, such as a park or what have you. There could never be any major structure on that property. There would be no digging or doing anything heavy. It would be a top-surface park. Do you agree with that?

MR. THORPE: Pretty much. In remedial design, the City wants to put a small -- not any big structure, a small structure, like a one-story building here or there. That could be accommodated.

MR. DAN BOWEN: But no mall or no big structure going in out there for people to make money. It's for the neighborhood for the people.

MR. THORPE: It couldn't be anything too big, nothing like a mall or depot or nothing like that.

MR. DAN BOWEN: That's how he explained it.

MR. THORPE: That is correct.

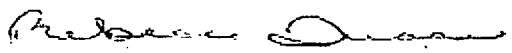
We're done.

(Whereupon, the meeting adjourned at 7:20 p.m.)

CERTIFICATE OF REPORTER

STATE OF FLORIDA)
COUNTY OF ESCAMBIA)

I, Rebecca T. Fussell, Court Reporter, do hereby certify that I was authorized to and did stenographically report the foregoing proceedings; and that the transcript is a true record.



Rebecca Fussell

APPENDIX C
SELECTED REMEDY DETAILED COST ESTIMATE SHEETS

Feasibility Study Cost Estimate | **Alternative #: CMZ-1 Alternative #2** | **NPW Cost: $5,067,800**

Title: Barrier Wall Containment with Cap

Project: ACW Pensacola
Location: Pensacola, FL | **Project Number:** 049019 | **Base Year:** 2016
Project Phase: FS | **Date:** 12/5/2016 | **Revision:** 0
Task Description: Construct Barrier Wall: Perimeter slurry wall keyed into base clay at approximately 110 ft bls installed with cuttr soil mixer system. Surface cap.
Cost Basis: RECON Construction Service estimate (April 2010), Oasis Construction, GA (2007)

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
Slurry Wall VEB				
CSM Costs are order of magnitude. RECON costs assume $10 to $13 per vertical square foot of slurry wall.				
Slurry Wall Design				
Remedial Design Professional Labor	1		$ 59,951	**$59,951**
Slurry Wall Construction				
Perimeter Work Platform	13,239	cy	$ 7.00	$92,673
Trench Wall Thickness 3 ft				
Depth of Wall 110 ft				
Perimeter Linear Feet 1,980 ft				
Excavation/Trenching, and Construction of Slurry Wall	217,800	sf	$ 13.00	$2,831,400
Bench Scale Test	1	ls	$ 38,324	$38,324
Mobilize/Demobilize Drilling Rig & Crew	1	ls	$ 2,767	$2,767
Auger holes for wall bench scale test	2,383	lf	$ 50	$119,309
Decontaminate Rig, Augers, Screen (Rental Equipment)	15	day	$ 794	$11,906
				$3,096,379
Composite Cap for Containment Cell				
Engineered composite liner over proposed containment area to consist of the following components (listed from contaminants to ground surface): (1) high strength geotextile - geogrid; (2) GeoNet - leachate collection system; (3) by-product gas vents; (4) Fill Material (for contouring the requisite drainage slope); (5) a geo-membrane layer (HDPE or LDPE); (6) a geocomposite drain layer; (7) a protective soil layer; (10) a top soil layer and (11) vegetation. This estimate assumes that contaminated material is in-place, grubbed and graded, and ready to be covered. In addition to these components, anchor trenching will be required.				
Mobilization/Demobilization - Geosynthetic Contractor	1	ls	$ 20,000	$20,000
Re-vegetation / restoration	4.16	acres	$ 1,500	$6,240
Top soil layer (6") 181,120 sf	336	cy	$ 10.00	$3,356
Protective soil layer (18")	10,062	cy	$ 8.00	$80,498
Geocomposite drainage net layer	181,120	sf	$ 0.91	$164,819
HDPE geo-membrane	181,120	sf	$ 1.00	$181,120
				$456,033
			Subtotal - Capital Costs:	**$3,612,362**
Contractor Fee	10%	of Capital Cost		$361,236
Legal Fees, Licenses & Permits	0.5%	of Capital Cost		$18,062
Engineering & Administrative	8%	of Capital Cost		$288,989
Contingency	15%	of Capital Cost		$541,854
			Total Cost:	**$4,822,503**

Item	Qty.	Unit	Unit Cost	Subtotal ($)
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
	30	Total Years for O&M		
Cap Maintenance and Monitoring				
Monitoring and Maintenance, repair vegetation	4	per	$ 3,000	$12,000
				$12,000
			NPW Subtotal:	**$184,469**
Contractor Fee	10%	of NPW Cost		$18,447
O&M Contingency	15%	of NPW Cost		$27,670
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$14,758
Total O&M Cost				**$245,344**
TOTAL ESTIMATE				
			Total NPW Cost:	**$5,067,800**

S = Subcontractor; L = Labor; M = Material; R = Rental; O = Other Direct Charge; PD = Per Diem; T = Travel

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)

Feasibility Study Cost Estimate | **Alternative #: CMZ-2A Alternative #3** | **NPW Cost: $10,993,300**

Title: Steam Enhanced Extraction (SEE)

Project: ACW Pensacola
Location: Pensacola, FL | **Project Number:** 049019 | **Base Year:** 2016
Project Phase: FS | **Date:** 12/5/2016 | **Revision:** 1
Task Description: SEE for treatment of NAPL and source area soils; Aboveground treatment and discharge.
Cost Basis: SEE -ERM 2013 Cost Estimate

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
Steam-Enhanced Extraction (SEE)				
SEE unit cost ERM based on 2013 Cost Estimate actual treatment costs for steam stripping. Includes design, construction and operation for one year.				
	Depth (ft bls)	NAPL Saturated Volume (cy)		
SEE Treatment Volumes	0 - 3	-		
	3 - 20	43,120		
	20-40	36,030		
	40-60	24,180		
	60-80	13,270		
	80-100	7,580		
	100-120	3,080 yd^3		
	120-140	3,080 yd^3		
		130,340		
Thermal Remediation Costs				
Project Planning and Design	1	total	$ 170,937	$170,937
Mobilization	1	total	$ 20,150	$20,150
Treatment Well Installation (steam injection, extraction wells, SVE)	1	total	$ 301,730	$301,730
Thermal Treatment Equipment Installation/Fabrication - Steam Plant	1	total	$ 1,259,050	$1,259,050
Thermal Treatment Equipment Installation/Fabrication - Treatment System	1	total	$ 1,816,230	$1,816,230
Phase 1 - Heat Up Period Operation	1	total	$ 1,509,820	$1,509,820
Phase 2 - Active Treatment Period	1	total	$ 2,926,690	$2,926,690
Post Remediation Activities/Demobilization	1	total	$ 230,100	$230,100
		Net Unit Cost (capital and O&M costs):	$ 63.00	
			Subtotal:	**$8,234,707**
			Subtotal - Capital Costs:	**$8,234,707**
Contractor Fee	10%	of Capital Cost		$823,471
Legal Fees, Licenses & Permits	0.5%	of Capital Cost		$41,174
Engineering & Administrative	8%	of Capital Cost		$658,777
Contingency	15%	of Capital Cost		$1,235,206
			Total Cost:	**$10,993,334**

Item	Qty.	Unit	Unit Cost	Cost ($)
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
Monitoring Period 1	0	Total Years for O&M		
All long term monitoring associated with this alternative are included under Site-wide costs for 30 years.				
			NPW Subtotal:	$0
Contractor Fee	10%	of NPW Cost		$0
O&M Contingency	15%	of NPW Cost		$0
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$0
Total O&M Cost				$0
TOTAL ESTIMATE				
			Total NPW Cost:	**$10,993,300**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)
4. CMZ 2A and 2B completed as a single project with one mobilization.
5. All wells installed in one field event. Waste disposal of drill cuttings assumes F-listed waste. No on site disposal considered.
6. Portable steam plant and treatment compound used to complete 2A first then 2B, not simultaneously.
7. Piping system and well heads constructed with flanges and reused for 2B after completion of 2A.
8. Construction estimate based on experience and vendor quotes from other projects. No vendor quotes for this estimate.
9. Equipment purchases are for new equipment. Rental or leases not considered. Used equipment could further reduce costs.
10. Demobilization will be completed after completion of 2B project. Fifteen soil borings at each CMZ are assumed with one mobilization.

Feasibility Study Cost Estimate | **Alternative #: CMZ-2B Alternative #3** | **NPW Cost: $5,002,200**

Title: Steam Enhanced Extraction (SEE)

Project: ACW Pensacola
Location: Pensacola, FL | **Project Number:** 049019 | **Base Year:** 2016
Project Phase: FS | **Date:** 12/5/2016 | **Revision:** 1
Task Description: SEE for treatment of NAPL and source area soils; Aboveground treatment and discharge.
Cost Basis: SEE -ERM 2013 Cost Estimate

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
Steam-enhanced Extraction (SEE) 3 - 20 ft bls				
SEE unit cost developed from ERM site-specific estimate for steam stripping. Includes design, construction and operation for one year.				
	Depth (ft bls)	**NAPL Saturated Volume (cy)**		
SEE Treatment Volumes	0 - 3	-	yd^3	
	3 - 20	46,740	yd^3	
	20-40	-	yd^3	
	40-60	-	yd^3	
		46,740		
Thermal Remediation Costs				
Project Planning and Design	1	total	$ 170,933	$170,933
Mobilization	1	total	$ -	$0
Treatment Well Installation (steam injection, extraction wells, SVE)	1	total	$ 233,770	$233,770
Thermal Treatment Equipment Installation/Fabrication - Steam Plant	1	total	$ 511,835	$511,835
Thermal Treatment Equipment Installation/Fabrication - Treatment System	1	total	$ 239,782	$239,782
Phase 1 - Heat Up Period Operation	1	total	$ 1,203,969	$1,203,969
Phase 2 - Active Treatment Period	1	total	$ 1,271,628	$1,271,628
Post Remediation Activities/Demobilization	1	total	$ 115,050	$115,050
	Net Unit Cost (capital costs):		$ 80	
			Subtotal:	**$3,746,967**
			Subtotal - Capital Costs:	**$3,746,967**
Contractor Fee	10%	of Capital Cost		$374,697
Legal Fees, Licenses & Permits	0.5%	of Capital Cost		$18,735
Engineering & Administrative	8%	of Capital Cost		$299,757
Contingency	15%	of Capital Cost		$562,045
			Total Cost:	**$5,002,200**
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
	0	Total Years for O&M		
				$0
Contractor Fee	10%	of NPW Cost		$0
O&M Contingency	15%	of NPW Cost		$0
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$0
Total O&M Cost				**$0**
TOTAL ESTIMATE				
			Total NPW Cost:	**$5,002,200**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)

Feasibility Study Cost Estimate | **Alternative #: CMZ-3 Alternative #2** | **NPW Cost: $3,182,200**

Title: ISCO and ISEB Barriers

Project: ACW Pensacola

Location: Pensacola, FL | **Project Number:** 049019 | **Base Year:** 2016

Project Phase: FS | **Date:** 12/5/2016 | **Revision:** 1

Task Description: Installation of Aerobic biodegradation barriers using infused oxygen along the northern and southwest edge of the CMZ. Also includes installation of a slow release oxidation reactive wall on the southern edge.

Cost Basis: Escambia O2 Infusion Pilot Test, Professional judgment and engineering experience. Carus Corp for SR ISCO material costs.

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
ISCO Slow Release Treatment Barrier				
Installation of slow release (SR) ISCO barrier wall along southern boundary. Treatment extends to 80 ft bls. Drilling of 114 injection wells for oxidation barrier. Two- 575-ft rows. Assumes 3 points/day/rig, 2 rigs/day. 9 hr day (19 days or 2 weeks total). Task includes well development. Permanent wells used for subsequent application and performance monitoring.				
Treatability Studies				
ISCO Treatability Study	1	total	$ 20,000	$20,000
SR Oxidant Installation				
Labor	1	total	$ 57,783	$57,783
Travel	1	total	$ 11,424	$11,424
Drilling Costs	1	total	$ 137,555	$137,555
Well Materials	1	total	$ 39,827	$39,827
Permanganate Direct Injection - Chemicals, tax	208,320	lbs.	$ 2.49	$519,487
SR Oxidant Candles, tax (3 replacements)	6,840	each	$ 52.50	$359,100
Solar Powered Compressors	4	each	$ 26,838	$107,352
Piping., Trenching	1	total	$ 35,000	$35,000
Miscellaneous Materials/Equipment	1	total	$ 69,526	$69,526
Rentals/Consumables	1	total	$ 13,631	$13,631
			Subtotal:	**$1,370,685**
ISEB Treatment Barriers				
Installation of infused oxygen ISEB line treatment along the northern and southwest boundary. Treatment extends from 20 to 80 ft bls. ISEB to consist of injection of 90% O2 for 5 years. Drilling of (10) 2-inch 2-cluster injection wells for oxygen infusion barrier (40 wells over two 300-ft barriers. Assumes 2 points/day/rig, 2 rig/day. 9 hr day (10 days or 2 weeks total).				
Treatability Studies				
ISCO Treatability Study	1	total	$ 40,000	$40,000
ISEB Installation				
Labor	1	total	$ 62,291	$62,291
Travel	1	total	$ 10,410	$10,410
Drilling Costs	1	total	$ 114,510	$114,510
Well Materials	1	total	$ 20,352	$20,352
O2 Trailer	2.5	each	$ 139,781	$349,453
Miscellaneous Materials/Equipment	1	total	$ 67,838	$67,838
Rentals/Consumables	1	total	$ 10,859	$10,859
			Subtotal:	**$675,713**
			Subtotal - Capital Costs:	**$2,046,398**
Contractor Fee	10%	of Capital Cost		$204,640
Legal Fees, Licenses & Permits	0.5%	of Capital Cost		$10,232
Engineering & Administrative	8%	of Capital Cost		$163,712
Contingency	15%	of Capital Cost		$306,960
			Total Cost:	**$2,731,942**

Item	Qty.	Unit	Unit Cost	Subtotal ($)
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
	1	Total Years for O&M - ISCO		
	5	Total Years for O&M - ISEB		
ISCO Operation and Monitoring				
Labor, chemicals, inspecting SR oxidant, supplies, reporting, sample/analysis	1	year	$ 60,000	$60,000
				$60,000
ISEB Operation and Monitoring				
Electricity, labor, supplies, reporting, sample/analysis	1	year	$ 65,000	$65,000
				$65,000
			ISCO/ISEB NPW Subtotal:	**$338,559**
Contractor Fee	10%	of NPW Cost		$33,856
O&M Contingency	15%	of NPW Cost		$50,784
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$27,085
Total O&M Cost				**$450,283**
TOTAL ESTIMATE				
			Total NPW Cost:	**$3,182,200**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)
4. ISEB Estimate from Brunswick Wood Treating Site Full scale application
5. The first 3 feet below ground surface will be excavated per CMZ-4A remediation.
6. *Cost from O2 Trailers purchase price for Escambia Wood Treating Pilot Test*

Feasibility Study Cost Estimate | **Alternative #: CMZ-4A Alternative #2** | **NPW Cost: $2,006,200**

Title: Excavation, Encapsulate On-Facility in Barrier Wall

Project: ACW Pensacola
Location: Pensacola, FL | **Project Number:** 049019 | **Base Year:** 2016
Project Phase: FS | **Date:** 12/5/2016 | **Revision:** 1
Task Description: Alternative 2 consists of: Excavate on-facility contaminated soil to approximately 3 feet bls. Excavated material is transferred to an on-facility containment area inside the Barrier Wall (CMZ-1). (CMZ-2A and -3 volumes)
Cost Basis: See general assumptions below.

Item	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS				
Excavation and On-Facility Transport of Soils				
Excavation - Surface Soil - Source Area	61,794	CY	$ 7.00	
Dust Control & Air Monitoring	61,794	per CY	$ 2.50	$154,485
Swell Volume (5%)	64,884		$ 7.00	$454,186
				$608,671
Base Liner Installation				
Placement of 60-mil HDPE Liner and GCL basal barrier	1	ls	$ -	$0
Labor	1	ls	$ -	$0
Travel	1	ls	$ 19,400	$19,400
Mobilization/Demobilization	195,017		$ 0.88	$171,615
Base Lining System, textured HDPE, 60 mil	195,017	ft2	$ 0.80	$156,014
Base Lining System, geosynthetic clay liner (GCL)				**$347,029**
Composite Cap for Containment Cell				
HDPE and GCL cap for containment cell	1	ls	$ 20,000	$20,000
Mobilization, Utility Locates/Demobilization	4	acres	$ 1,500	$6,000
Re-vegetation/Restoration	2,954	cy	$ 18	$53,172
Top soil lay (6")	8,861	cy	$ 15	$132,915
Protective soil layer (18")	159,500	sf	$ 0.70	$111,650
Geocomposite drainage net layer	159,500	sf	$ 0.80	$127,600
HDPE geo-membrane	159,500	sf	$ 0.60	$95,700
HDPE 60-mil Liner				**$547,037**
			Subtotal - Capital Costs	**$1,502,736**
Contractor Fee	10%	of Capital Cost		$150,274
Legal Fees, Licenses & Permits	0.5%	*of Capital Cost*		$7,514
Engineering & Administrative	8%	of Capital Cost		$120,219
Contingency	15%	of Capital Cost		$225,410
			Total Cost:	**$2,006,153**
OPERATION & MAINTENANCE				
	5.00%	Discount Rate		
	0.00%	Escalation Factor		
	0	Total Years for O&M		
			O&M NPW Subtotal:	**$0**
Contractor Fee	10%	of NPW Cost		$0
O&M Contingency	15%	of NPW Cost		$0
Engineering & Administrative (applied on O&M)	8%	of NPW Cost		$0
Total O&M Cost				**$0**
TOTAL ESTIMATE				
			Total NPW Cost:	**$2,006,200**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)
4. Based on volume from 0-3 ft across CMZ-2A, 3A, and 3B * 1.05 swell factor
5. Containment construction (included in CMZ-1 Alternative #2)

Feasibility Study Cost Estimate

Alternative #: CMZ-4B Alternative #4 **NPW Cost: $5,426,400**

Title: Excavation/Disposal On-Facility Over CMZ-2A/3 Areas

Project: ACW Pensacola
Location: Pensacola, FL **Project Number:** 049019 **Base Year:** 2016
Project Phase: FS **Date:** 12/5/2016 **Revision:** 1
Task Description:

Alternative 4 consists of: excavation of soils, transport and disposal of to ACW Site over the CMZ-2A and CMZ-3 areas with a soil cover; backfill excavation areas and replace grass and ornamentals. Total volume includes 30,000 cy stockpile & 10,000 cy PYC spoils.

Cost Basis: See general assumptions below.

Item	Note#	Qty.	Unit	Unit Cost	Subtotal ($)
CAPITAL COSTS					
Mobilization of Personnel, Equipment and Supplies		1	LS	$ 100,000	$100,000
Soil Excavation, Transport, Disposal and Backfilling					
Gimble Street Excavation	10				
Clearing, Grubbing and chipping; securing of area, traffic control		17,085	SF	$ 0.18	$3,075
Excavation		3,297	CY	$ 7.00	$23,079
Transport and disposal of material to former facility		3,297	CY	$ 3.00	$9,891
Backfilling and compaction		3,297	CY	$ 12.00	$39,564
Hydro-seeding		17,085	SF	$ 0.10	$1,680
Pine Street Excavation	10				
Clearing, Grubbing and chipping; securing of area, traffic control		54,440	SF	$ 0.18	$9,799
Excavation		7,393	CY	$ 7.00	$51,752
Transport and disposal of material to former facility		7,393	CY	$ 3.00	$22,179
Backfilling and compaction		7,393	CY	$ 12.00	$88,717
Hydro-seeding		54,440	SF	$ 0.10	$5,354
Excavation of Vacant Areas	14				
Clearing, Grubbing and chipping; securing of area, traffic control		945,139	SF	$ 0.27	$253,382
Removal of fencing in impacted areas	15	1	LS	$ 6,000.00	$6,000
Excavation		8,933	CY	$ 12.00	$107,200
Transport and disposal of material to former facility		6,432	CY	$ 3.00	$19,296
Backfilling and compaction		6,432	CY	$ 12.00	$77,184
Sod Replacement (areas not occupied by trees left in place)	16	756,111	SF	$ 0.40	$302,444
Replace fencing with same	17	1	LS	$ 12,000.00	$12,000
Excavation of Improved Areas	18				
Secure areas; traffic control		1	LS	$ 50,000.00	$50,000
Clearing, Grubbing and chipping		457,832	SF	$ 0.18	$82,410
Temporary Relocation of Residents	19	60	Units	$ 700.00	$42,000
Removal of fencing in impacted areas	20	1	LS	$ 17,000.00	$17,000
Excavation		28,604	CY	$ 20.00	$572,077
Transport and disposal of material to former facility		20,595	CY	$ 3.00	$61,784
Backfilling and compaction		28,604	CY	$ 24.00	$686,492
Sod Replacement (areas not occupied by trees left in place)		457,832	SF	$ 0.60	$274,699
Landscaping: Replacement with like		60	Units	$ 2,000.00	$120,000
Replace fencing with same	20	1	LS	$ 34,000.00	$34,000

Item	Note#	Qty.	Unit	Unit Cost	Subtotal ($)
On-facility Stockpile (30,000 cy)					
Excavation and disposal on ACW under soil cover.		30,000	CY	$ 7.00	$210,000
Approved Licensed Arborist to direct / oversee tree work	21	181	Days	$ 500.00	$90,500
Perimeter Air Monitoring Program					
Real Time Particulate Monitoring w/Data logging		362	Days	$ 167.00	$60,454
Onsite personnel (10-hour days)		362	Days	$ 550.00	$199,100
Rolloff Soil Characterization (Pine and Gimble Streets)		62	Days	$ 1,000.00	$62,000
Soil Cover (CMZ-2A, 3)					
Top soil layer (6")		10,299	CY	$ 10.00	$102,990
Protective soil layer (18")		30,897	CY	$ 8.00	$247,176
Hydroseeding		556	MSF	$ 35.00	$19,465
				Subtotal - Capital Costs:	**$4,064,746**
Contractor Fee		10%	of Capital Cost		$406,475
Legal Fees, Licenses & Permits		0.5%	of Capital Cost		$20,324
Engineering & Administrative		8%	of Capital Cost		$325,180
Contingency		15%	of Capital Cost		$609,712
				Total Cost:	**$5,426,436**
OPERATION & MAINTENANCE					
		5.00%	Discount Rate		
		0.00%	Escalation Factor		
		0	Total Years for O&M		
				O&M NPW Subtotal:	**$0**
Contractor Fee		10%	of NPW Cost		$0
O&M Contingency		15%	of NPW Cost		$0
Engineering & Administrative (applied on O&M)		8%	of NPW Cost		$0
Total O&M Cost					**$0**
TOTAL ESTIMATE					
				Total NPW Cost:	**$5,426,400**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)
4. Containment construction (included in CMZ-1 Alternative #2)
5. General Contractor is responsible for soil moving and placement of GeoGrid
6. Special Contractor is responsible for geo-synthetic material installation
7. Assumed unit price was found in the general literature
8. Unit price information obtained from Oasis Construction Services (Georgia); quoted during late 2007 - early 2008
9. Assumed unit price was obtained from case study or project knowledge
10. Assumes costs of Coleman Evans Excavation Area 15; hydro-seeding costs are taken from Coleman Evans Excavation Area 6.
11. Assumes costs of Coleman Evans Excavation Area 2 are applicable; hydro-seeding costs are taken from Coleman Evans Excavation Area 6.
12. Total of 21,405sf for sidewalks in easements
13. Linear feet of sidewalks (21405/3)
14. Assumes costs of Coleman Evans Excavation Area 15 are applicable; fence replacement costs scaled up based on additional number of parcels in excavation.
15. Assumes 25% of vacant parcels have fences
16. Assumes 80% of vacant parcel to be sodded
17. Assumes 25% of vacant parcels have fences
18. Assumes costs of Coleman Evans Excavation Area 10 are applicable; landscaping / fence replacement costs are taken from Area 15 and scaled up based on additional number of parcels in excavation.
19. total of 2 nights in hotel plus meals (family of 4) # of impacted residences
20. Assumes 25% of improved parcels have fences
21. Duration of days of work = 362 days

Feasibility Study Cost Estimate

Alternative #: OU2/CMZ-5 Alternative #3
Title: ISCO/ISEB Treatment Barrier

NPW Cost: $3,409,300

Project: ACW Pensacola
Location: Pensacola, FL
Project Number: 049019
Base Year: 2016
Project Phase: FS
Date: 12/1/2016
Revision: 2
Task Description: Alternative 3 consists of: Installation of an ISCO/ISEB treatment barrier directly north of the Bay (off-facility) with 21 injection well locations. Wells screened 40-60, and 60-80 ft bls in two clusters on 40-ft spacing. Oxidant and infused oxygen to be prepared at injection trailers at each locations. Oxidant to be either permanganate slow-release candles, persulfate, or ozone. Operation costs based upon 10-year period.

Cost Basis: See general assumptions below.

Item	Note#	Qty.	Unit	Unit Cost		Subtotal ($)
CAPITAL COSTS						
Treatability Studies						
ISCO Treatability Study		1	total	$ 25,000		$25,000
ISEB Treatability Study		1	total	$ 35,000		$35,000
					Subtotal:	**$60,000**
ISCO/ISEB Injection Wells						
Oversight/Labor		1	total	$ 35,276		$35,276
Travel		1	total	$ 3,426		$3,426
Subcontractor		1	total	$ 121,485		$121,485
Materials/Rentals		1	total	$ 17,095		$17,095
					Subtotal:	**$177,281**
Recovery Wellheads						
Valves, 2-inch Tru Union		42	each	$ 65.00		$2,730
Pressure Gauges		42	each	$ 29.00		$1,218
Miscellaneous Fittings/Supplies		42	each	$ 25.00		$1,050
					Subtotal:	**$4,998**
Trenching, Piping for New Extraction Wells						
Labor		1	total	$ 24,120		$24,120
Cat 235, 2.5 cy, Soil/Sand, Trenching		92	cy	$ 3.54		$327
950, 3.25 cy, Backfill with Excavated Material		92	cy	$ 2.94		$272
Compact Soil with Vibrating Plate, 2 Passes		92	cy	$ 3.13		$289
PVC piping, fittings		1	total	$ 5,000		$5,000
					Subtotal:	**$30,009**
Groundwater Recovery Influent Manifolds						
Totalizing Flowmeters		42	total	$ 350		$14,700
Pressure Gauges		42	each	$ 38.00		$1,596
Sample Ports		42	each	$ 15.00		$630
Ball Valves		42	each	$ 55.00		$2,310
Fittings, Pipe		1	total	$ 2,500		$2,500
					Subtotal:	**$21,736**
Equipment Trailers						
South System (O3/O2, controls, turnkey)		1	total	$ 400,000		$400,000
					Subtotal:	**$400,000**
					Subtotal - Capital Costs:	**$694,024**
Contractor Fee		10%	of Capital Cost			$69,402
Legal Fees, Licenses & Permits		0.5%	of Capital Cost			$3,470
Engineering & Administrative		8%	of Capital Cost			$55,522
Contingency		15%	of Capital Cost			$104,104
					Total Cost:	**$926,521**

Item	Note#	Qty.	Unit	Unit Cost	Subtotal ($)
OPERATION & MAINTENANCE					
		5.00%	Discount Rate		
		0.00%	Escalation Factor		
		10	Total Years for O&M - ISCO		
Labor (15 hrs/wk)		1	each	$ 93,600.00	$ 93,600.00
Materials, Supplies		1	each	$ 12,800.00	$ 12,800.00
Electric Service		1	each	$ 11,500.00	$ 11,500.00
Well Rehabilitations		1	each	$ 5,200.00	$ 5,200.00
Rentals, Consumables, Services, PLC Support		1	each	$ 9,200.00	$ 9,200.00
Performance Monitoring RW, influent, effluent sampling)		1	each	$ 18,000.00	$ 18,000.00
				Subtotal:	$150,300
				NPW Subtotal:	**$1,160,577**

Annual Groundwater Sampling	Time Period	Units	Qty	Unit Cost	Line Item Cost	Net Present Worth
SUPPLIES						
Supplies/ Shipping	40	each	1	$ 5,000.00	$ 5,000.00	$ 85,795
Travel	40	events	1	$ 6,000.00	$ 6,000.00	$ 102,955
MONITORING - Period 1 (Yrs 0-5) - Semiannual						
Personnel (4-man crew @ 10-hour days, 10 days)	10	hours	400	$ 100.00	$ 40,000.00	$ 308,869
Report preparation (data summary report)	10	each	1	$ 10,000.00	$ 10,000.00	$ 77,217
MONITORING - Period 2 (Yrs 6-10)[2]						
Personnel (4-man crew @ 10-hour days, 7 days)	5	hours	280	$ 125.00	$ 35,000.00	$ 151,532
Report preparation (data summary report)	5	each	1	$ 7,000.00	$ 7,000.00	$ 30,306
MONITORING - Period 3 (Yrs 10-30)						
Personnel (3-man crew @ 10-hour days, 7 days)	20	hours	210	$ 150.00	$ 31,500.00	$ 149,325
Report preparation (data summary report)	20	each	1	$ 7,000.00	$ 7,000.00	$ 33,183
					Subtotal:	**$ 939,183**

Contractor Fee	10%	of NPW Cost	$116,058
O&M Contingency	15%	of NPW Cost	$174,087
Engineering & Administrative (applied on O&M)	8%	of NPW Cost	$92,846
Total O&M Cost			**$2,482,750**

TOTAL ESTIMATE		
	Total NPW Cost:	**$3,409,300**

General Assumptions

1. Professional rates are conservatively averaged to reflect typical labor rates for personnel who would probably work on project.
2. Cost basis derived from professional judgment and experience unless specified directly.
3. Costs are derived to be (-30% to +50%)

Feasibility Study Cost Estimate | **Site-wide Costs** | **NPW Cost:** $241,600

Institutional Controls, Five-Year Reviews

Project: ACW Pensacola
Location: Pensacola, FL | 049019 | **Base Year:** 2016
Project Phase: FS | 12/5/2016 | **Revision:** 1
Task Description: ICs and 5YRs consist of: Institutional Controls and/or deed restrictions on future site uses. Completion of 5 yr Reviews for a total period of 30 years.
Cost Basis: See general assumptions below.

Item	Units	Qty	Unit Price	Line Item Cost	Net Present Worth [1]
CAPITAL COSTS					
Administrative Restrictions (Deed and Zoning Restrictions)	LS	1	$ 20,000.00	$ 20,000.00	
			Subtotal:	$ 20,000.00	
Contractor Fee (10% of Subtotal)				$ 2,000.00	
Engineering & Administrative (Contractor Overhead) (8% of Subtotal)				$ 3,000.00	
Legal fees, permits, and other licenses (0.5% of Subtotal)				$ 400.00	
Contingency (15% of Subtotal)				$ 3,000.00	
			Subtotal:	$ 8,400.00	
			Subtotal Capital Costs	$ 28,400.00	**$ 28,400**
OPERATION AND MAINTENANCE (O&M)					
Five-Year Reviews					
Periodic cost inputs to each Five-Year Review					
Personnel (2-man crew @ 2 12-hour days)[3]	hours	48	$ 100.00	$ 4,800.00	
Supplies/ Travel[4]	days	3	$ 3,000.00	$ 9,000.00	
Soil/Groundwater Sampling and Lab Testing[5]	sample	20	$ 450.00	$ 9,000.00	
Consultant travel (for site visit and interviews)[6]	days	2	$ 500.00	$ 1,000.00	
Report Prep (interviews, research, reporting)[7]	lump sum	1	$ 25,000.00	$ 25,000.00	
				$ 48,800.00	
Five-Year Review - Year 5	Event	1		$ 48,800.00	$ 38,236
Five-Year Review - Year 10	Event	1		$ 53,680.00	$ 32,955
Five-Year Review - Year 15	Event	1		$ 58,560.00	$ 28,168
Five-Year Review - Year 20	Event	1		$ 63,440.00	$ 23,910
Five-Year Review - Year 25	Event	1		$ 68,320.00	$ 20,175
Five-Year Review - Year 30	Event	1		$ 73,200.00	$ 16,937
				Subtotal: 5 Yr Reviews:	**$ 160,381**
Contractor Fee		10%	of NPW Cost	$	16,038
O&M Contingency		15%	of NPW Cost	$	24,057
Engineering & Administrative (applied on O&M)		8%	of NPW Cost	$	12,830
				Subtotal:	**$ 52,926**
				Total NPW Cost =	**$ 213,307**
				Total NPW Cost =	**$ 241,591**

NOTES:

[1] NPW = Net Present Worth Cost
Series of Payments NPW Calculation: [Payment] x $[(1 + r)^t - 1] \div [r (1 + r)^t]$
Single Payment NPW Calculation: [Payment] $\div (1 + r)^t$
Assumed Discount Interest Rate = 5.00%
[2] Sampling crew
[3] Includes airfare + sampling equipment
[4] Includes shipping and lab fees
[5] Includes airfare + per diem
[6] Includes all costs for document prep

Source of Cost Data:
Professional judgment and engineering experience, unless specified and notated.
Labor rates for sampling personnel are based on typical labor rates for the area.

Cost Adjustment Checklist:

COST ESTIMATE FACTOR:

Includes H&S Productivity (labor & equip)?	Assumed included in cost data.
Cost escalation to base year?	Current year is base year.
Area cost factored in?	Assumed included in cost data.
Subcontractor overhead and profit included?	Assumed included in cost data.
Prime contractor overhead and profit included?	Includes 15% overhead. Profit is included with cost summary.

APPENDIX D
STATE CORRESPONDENCE

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

August 4, 2017

U.S. EPA, Region IV
Superfund Division
Attn: Mr. Peter Thorpe
61 Forsyth Street, SW
Atlanta, GA 30303

Subject: DEP Review of Draft Amended Record of Decision
American Creosote Works Superfund Site
Pensacola, Escambia County, Florida

Dear Mr. Thorpe:

Thank you for the opportunity to review the draft June 2017 Amended Record of Decision (AROD) for the American Creosote Works (ACW) Superfund site, Pensacola, Escambia County, Florida. Florida Department of Environmental Protection (DEP) review comments are provided below.

Please also find attached July 28, 2017 review comments from the University of Florida (UF)-Center for Environmental & Human Toxicology. UF review included the following: 1) the draft AROD and 2) the March 2017 Probabilistic Risk Assessment (PRA) developed by GeoSyntec Consultants for EPA and included in the Final ACW Feasibility Study. Also included in the UF correspondence are the results of the recent ACW bioavailability assessment completed by DEP, derivation of the site specific relative bioavailability of 0.59 and the corresponding calculation of site specific Alternative Soil Cleanup Target Levels (ASCTLs) for dioxin for the ACW site by UF for DEP. DEP concurs with the attached UF review comments.

Summary of the AROD recommended site remedy:

The primary contaminants in the soil, sediments and groundwater released as a consequence of the former wood treating operations at ACW are semi-volatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs) pentachlorophenol (PCP) and dioxin. Section 12.0 and Figure 10 of the draft AROD propose the following combination of containment and treatment alternatives to address onsite and offsite DNAPL/sources and soils as well as contaminated groundwater including treatment of onsite and offsite PCP in groundwater and groundwater monitoring, in the five (5) Contaminated Media Zones (CMZs) defined in the Feasibility Study and the AROD:

- CMZ-1- Main (on facility) Source Zone- Alternative #2, Barrier Wall and Containment Cap- DNAPL, residual creosote and creosote stained soils including principal threat waste (PTW) will be contained in place with a low permeability cap and slurry wall extending to the clay unit located approximately 100 ft bls. Dioxin and SVOC/PAH contaminated vadose zone soils and PTW in CMZ-4A will be excavated and relocated under the CMZ-1 cap, along with contaminated soils and debris piles from previous off-facility excavations and temporarily stockpiled in CMZ-4A.
- CMZ-2A- Extended (on facility) DNAPL plume - Alternative #3, (SEE)- DNAPL contamination in this area will be addressed using Steam Enhanced Extraction (SEE) and multiphase extraction system (MPE) to recover and treat mobile and residual DNAPL with a remedial goal of subsurface soils "free of residual DNAPL". Additional delineation will be conducted during remedial design (RD) to delineate the vertical extent of DNAPL, currently confirmed at 137 ft bls by SB-527.
- CMZ-2B- Extended (off facility) DNAPL plume- Alternative #3 (SEE)- Creosote DNAPL in the shallow zone (above the shallow clay at approximately 20 ft bls) will be addressed using SEE and MPE to recover and treat mobile DNAPL. Isolated stringers of residual contamination below the clay will not be actively treated based on Solute model predictions that the Bayou would not be impacted by groundwater contaminant discharge over the next 50 years.
- CMZ-3- Secondary Source Zone/Absorbed Phase Zone (on facility) - Alternative #2 (ISCO/ISEB)- Onsite saturated zone sources outside of the CMZ-1 area will be addressed by insitu chemical oxidation and/or enhanced bioremediation treatment barriers on the northern and southern CMZ-3 boundaries to depths of 80 ft bls to promote aerobic degradation and chemical destruction of the creosote and pentachlorophenol (PCP) source and related groundwater contamination as well as mitigate dissolved plume migration toward Pensacola Bay. Additional PCP characterization is necessary in the RD to *identify* the PCP source and support a flexible treatment system layout. Groundwater contamination has been documented in monitoring wells (MW) OW-9 and CW6 at depths of 60 ft bls. Solute modeling predicted that PCP could reach Pensacola Bay, consistent with available data.
- CMZ-4A- Surface Soil Contamination (on facility)- Alternative #2- (Excavation, Encapsulation inside CMZ-1 Barrier Wall)- All CMZ-4A vadose zone contaminated soils (0-3 ft bls)- except soils overlying CMZ-3 - will be excavated and placed inside the CMZ-1 Barrier Wall and capped. Dioxins and SVOC/PAHs in CMZ-4 exceed the LDR criteria and are considered PTW. In lieu of treatment which is cost prohibitive, *CMZ-4A vadose zone soils overlying CMZ-3 (estimated 61,794 cy) will be placed in an* ***encapsulated cell within CMZ-3.***
- CMZ-4B- Surface soil contamination (off facility)- Alternative #4- (Excavation /Disposal On-facility over CMZ-2A/3 Areas)- Excavation of approximately 53,617 cy of offsite dioxin contaminated soils (EPA action level of 50 ng/kg dioxin) to an estimated depth of 2 ft bls and disposal on the (former ACW) facility property over the CMZ-2A/3 areas. Offsite contaminated soils in Pine and Gimble Street right of ways (9208 cy) exceed the LDR, are considered PTW and will be disposed in the CMZ-1 containment cell(??).

- CMZ-5- Extended Dissolved Groundwater Plume (on and off facility)- ***Interim*** Alternative #3- (ISCO/ISEB Treatment Barriers)- This alternative supplements the onsite CMZ-3 Alternative #2 remedy. PCP groundwater contamination on and off facility on the eastern portion of the site will be treated insitu with an infusion of gaseous oxygen as well as nutrients if necessary. Monitoring of the naphthalene/SVOC plume on the western portion of the Site is proposed to confirm a decline in groundwater contaminant concentrations in response to the source remedies and contaminant flux reduction on the facility. Should monitoring not show sufficient abatement of the naphthalene plume in a 5 year timeframe following implementation of the CMZ-1, 2A and 2B source remedies, an evaluation of other alternatives will be completed so that a final remedy can be selected and documented in a Final ROD for CMZ-5. With sufficient abatement in that initial 5 year timeframe, active groundwater treatment at the Bay would not be necessary.

The estimated cost of the EPA selected remedy is $35.3 million.

DEP AROD review comments are as follows:

DEP supports the technologies selected in the draft AROD to address DNAPL, soil and groundwater contamination at the ACW site.

- Section 12.0- Selected Remedy
  - DEP recommends that Section 12 focus on a summary of the selected alternative for each CMZ. The text in this Section discussing the rationale for and comparison to other alternatives (not selected) is confusing and would seem more appropriate in Section 10, Comparative Analysis.
  - There appear to be some inconsistencies between the remedial components outlined in Section 12.0 and those phases or actions identified in Part 1: Declaration, particularly CMZ-4A.
  - CMZ-4A: In Section 4.6.2 of the Feasibility Study (FS), the proposed CMZ-4A Alternative #2 for contaminated vadose zone soils in the 0-3 ft bls interval is to excavate all those soils in CMZ-2A *and overlying CMZ-3* (estimated 61,794 cy) and place those soils inside the CMZ-1 containment system for long term isolation. Conversely, the selected remedy for CMZ-4A (based on Alternative #2 in Sections 9.5.2 and 12.2.5 of the draft AROD and including Figure 10) indicates that all CMZ-4A vadose zone soils (0-3 ft bls)- *except vadose zone soils overlying CMZ-3* - will be excavated and placed inside CMZ-1. The AROD states that *CMZ-4A vadose zone soils overlying CMZ-3 will be placed in an* ***encapsulated cell within CMZ-3****. The entire onsite facility area (excluding CMZ-1) will be covered with a 2 ft thick permeable cover consisting of backfill and hydroseeded.*
    - DEP was not able to locate previous discussion or evaluation of the use of an encapsulated cell in CMZ-4A. Please confirm or correct the above inconsistency.
    - We assume that the intended purpose of the cell is to mitigate direct contact and potential sources to groundwater. Please provide

construction information (proposed cell material and dimensions) for the encapsulated cell in the AROD consistent with that intent.

- Please clarify if on facility soil excavation, encapsulated cell construction, and redisposition of soils into the cell was considered in buildup of costs and sequencing of activities.
- Currently, proposed soil cleanup target levels (SCTLs) for onsite vadose zone soils are based on Commercial SCTLs, without consideration of potential leachability. It is likely that both vadose zone soils as well as NAPL are contributing to existing groundwater contamination. Based on the FS, DEP understood that all vadose soil (water table estimated at 3 ft bls, fluctuating at 3-5 ft bls) would be excavated and contained inside CMZ-1. Please clarify how the proposed AROD revisions to CMZ-4A Alternative #2 will ensure that onsite vadose soils remaining outside of the CMZ-1 containment unit will not continue to be a contaminant source to groundwater.

- Please state in Sections 4.0 and 12.0 of draft ROD, *where* the 35,000 cy of onsite stockpiled soils and debris will be relocated and secured on facility as part of the remedy.
- Please state in Sections 4.0 and 12.0 that soils from Pine and Gimble St that exceed LDRs will be relocated in CMZ-1 as part of the remedy, if that is the case.
- CMZ-2A: Please clarify the CMZ-2A remedial goals in Section 12.0. The selected remedy states that the goal of SEE in this area is to recover and treat mobile and residual DNAPL with a remedial goal of subsurface soils "free of residual DNAPL". It is unclear what criteria will be used to confirm that remedial goal has been met. As noted in previous DEP comments, documentation of performance and effectiveness of CMZ-1 containment unit and the 100' clay will require downgradient monitoring in CMZ-2A. Given the contiguous nature of CMZ-1 and CMZ-2, remediation of CMZ-2 should be such that releases from the CMZ-1 containment cell at concentrations above groundwater cleanup target levels (GCTLs) can be recognized. As such, DEP has recommended active remediation of CMZ-2A to GCTLs.
- CMZ-2B: DEP recommends that post active remedial monitoring in this area include monitoring of groundwater contaminant levels *below the shallow clay* to evaluate the effectiveness of the source remedy and model predictions that DNAPL stringers below the clay do not require active remediation for the groundwater to meet remedial action objectives (RAOs) and groundwater cleanup levels.
- CMZ-5:
  - Please clarify in Part 1: Declaration that the CMZ-5 groundwater remedy represents an interim remedy, consistent with Section 12.0. The Declaration states that AROD represents the final remedy.
  - Please clarify in Section 12.0 that the CMZ-5 Alt #3 remedy includes a ISCO/ISEB treatment barrier *offsite along the Pensacola Bay Shoreline to depths of 40 to 80 ft bls* on the eastern end of the Site that will be

implemented as part of this CMZ-5 remedy to address PCP. We understand that the need for additional treatment to address the remaining groundwater contaminant plume (SVOCs including naphthalene) will be based on the initial Five Year Review.

- Please clarify in Section 12.0 that evaluation of sufficient contaminant abatement in the initial 5 year timeframe will consider not only a documented decline in groundwater contaminant concentrations throughout the plume including SVOCs and PCP, but will also evaluate the continued likelihood of impacts to *surface water* via groundwater contaminant discharge. As discussed in prior DEP review comments, this evaluation may include surface water sampling of the Bay, updated groundwater modeling based on more recent data, and confirmation of a shallow clay extending into the Bay that would mitigate such discharge to surface water. Data for site related contaminants would be compared to groundwater and surface water criteria in Chapters 62-777 and 62-302, F.A.C.
- Please clarify in the Section 12.0 that the proposed insitu groundwater treatment alternatives for CMZ-3 and CMZ-5 will also be implemented prior to the FYR evaluation of the effectiveness of the interim groundwater remedy.

- Please clarify in Section 12.0 that **Institutional Controls (IC)** are an integral component of the selected remedy, and discuss the purpose of the ICs and the anticipated IC instruments.
  - ICs should include *onsite restrictive covenant(s)* to 1) restrict land use to a commercial or park scenario, 2) prohibit activities that would compromise the effectiveness and integrity of the remedy including the cap and 2 ft of clean fill onsite, outside of the CMZ-1 containment area, and 3) require management of any contaminated soils that might be brought to the surface as contaminated media. (Note that zoning restrictions, fencing, easements, and public notices/advisories and signage cited as example in the FS and AROD as ICs are not considered adequate controls.)
  - ICs should also include *groundwater use controls* to mitigate exposure to contaminated groundwater in the interim until groundwater meets groundwater cleanup target levels for unrestricted use. Groundwater use ICs should include restrictions associated with the existing designation of the site vicinity as a *"delineated area" under 62-524, F.A.C.* Please clarify if there is an *Memorandum of Agreement* in place between EPA and the Water Management District to further enhance the effectiveness of the delineated area IC.
  - In Part 1: Declaration of the AROD, the document states that "the site will have ICs for industrial/commercial uses only, which also includes recreational". These are two distinct types of land uses and exposure scenarios, with more stringent criteria for recreational land use. As

discussed elsewhere in DEP comments, ICs- as well as engineering controls- must be such that the resulting remedy is protective of both scenarios.

- Section 12.4 incorrectly references Tables 4 & 5 rather than Tables 11 & 12 as containing the final cleanup levels.

- Section 7.0- Summary of Site Risks
  - Section 7.1.5- Uncertainties
    - Please see the attached UF discussion regarding technical concerns with the approach used in development of the 37 ng/kg dioxin ASCTL (March 2017 Geosyntec PRA).
    - Please see the attached UF discussion regarding the UF development of the site specific relative bioavailability calculated from an oral bioaccessibility study using ACW soils, and the resulting site specific direct exposure ASCTLs for dioxin under residential, commercial/industrial and recreational land use scenarios using a deterministic risk assessment approach
    - Please update the placeholders in Section 7.1.5 of the AROD to reflect the DEP recommended site specific relative bioavailability (0.59) and *resulting site specific ASCTLs for dioxin derived by UF.*
  - Section 7.2- Summary of Ecological Risk Assessment-
    - Section 7.2.3 concludes that while the maximum concentrations of chemicals detected in shallow groundwater exceed Florida Marine SWQC for Class 3 Marine Surface water (Fish Consumption, Recreation, Propagation and Maintenance of Healthy Well-balanced Population of Fish and Wildlife), the impact of the shallow aquifer in the Bay is likely to be minimal due to low water volumes and tidal mixing. In addition, it was noted in the draft AROD that sampling of surface water, pore water and sediment in Pensacola Bay by USACE indicated that detected concentrations are *generally* below ecological concern. DEP requests a more detailed discussion in this Section of the frequency and extent of these exceedances to demonstrate the basis for the conclusion that *concentrations are below ecological concern. There was an EPA review* and evaluation of data contained in the June 2008 Phase II RD Activity report that may be useful in this regard (see Brett Thomas email, dated 9/23/2013).
  - Please briefly discuss the 2016 EPA removal of contaminated soil/sediment from the PYC ditch. Please clarify in Section 7.0 that the intent of that removal and backfilling of the ditch to an elevation consistent with the adjacent upland was to address human health and ecological risk posed by contaminants in the former PYC ditch sediment. Please clarify if this remedial objective has been accomplished.

- Section 7.0- Contaminants of Concern (COCs)
  - *Soils*- Site related soil COCs are identified in Table 1 based on the 2014 HHRA. The proposed soil COCs consist of BaP-TEQ, PCP, 2- methylnaphthalene and 2,3,7,8- Dioxin-TEQ. Review of AROD Tables 3-7 indicate that these contaminants were selected based on concentrations exceeding a 10-4 cancer risk or HI of 1 under an on facility industrial or recreation land use scenario and/or an offsite residential land use scenario. Based on EPA policy, such exceedances would trigger a CERCLA remedial action and application of State ARARs. A comparison of the maximum concentration of each soil contaminant presented in the FS to Chapter 62-777, F.A.C. default SCTLs, indicates that *carbazole and naphthalene* should also be identified as on facility soil COCs and included in Table 11, Cleanup Levels for Soil COCs.
  - *Groundwater*- Table 2 identifies groundwater COCs based on a comparison of the *mean* groundwater concentration to the proposed screening value. Use of the mean is not consistent with Chapter 62-780 or EPA guidance. Additionally, many of the proposed screening values in Table 2 exceed the GCTLs promulgated in Chapter 62-777. Never the less, a comparison of groundwater contaminant levels to the GCTLs does not change the list of COCs, which appears comprehensive.
    Please see UF corrections to groundwater screening values based on Chapter 62-777, F.A.C.

- Section 8.0- Cleanup Levels-
  - *Soil cleanup levels*- Table 11 reflects Chapter 62-777 residential or commercial/industrial default SCTLs. If a Park or recreational land use scenario is anticipated on the former facility property, recreational based ASCTLs should also be identified in the AROD consistent with that anticipated land use. As noted in the 2014 FS/Risk Assessment review comments, DEP recommends an exposure frequency of 200 d/y for 14 years for the non-ditch recreational scenario. These input values have been used by DEP for park visitation in Florida at other sites. Using a 10-6 risk management level and default assumptions, the recreational dioxin soil criterion, for example, would be **17 ng/kg**. If the site specific relative bioavailability at ACW is considered, the site specific recreational ASCTL for dioxin would be **28 ng/kg** (see attached UF correspondence).
    In lieu of identifying recreational SCTLs for all COCs in the AROD, the remedy could require an engineering control over the entire on facility property (such as 2 ft thickness of clean fill, low permeability cap or pavement, or combination of such controls) to effectively mitigate direct contact under a recreational land use scenario. Appropriate restrictions would be documented in a restrictive covenant (discussed above).

  - *On facility Soils*- The presence of leachable vadose zone soils should be discussed in the AROD. How the remedy will address these leachable soils and

the basis for making that determination should be clearly stated in the AROD. As noted in previous DEP comments, *leachability criteria* for all soil contaminants, particularly those with corresponding GCTL exceedances, should be included as remedial goals in the ROD. In lieu of site specific leachability criteria, Chapter 62-777, F.A.C. default leachability SCTLs would apply. Conversely, if all on facility vadose zone soils are to be excavated and placed within the CMZ-1 containment unit (or otherwise effectively encapsulated to address the leachable mass), then identification of numeric soil leachability criteria may not be required in the AROD.

- *Offsite Soils (CMZ-4B)*
  EPA has proposed offsite soil remediation based on the *Conceptual Site Model (CSM)* presented in Section 5 of the AROD, exposure units (EUs) as shown in Figures 5 and 6, and application of the EPA's remedial action trigger policy using the more stringent of an HI of 1 or 10-4 cancer risk. The dioxin trigger based on an HI of 1 will determine where remedial action of offsite soils will occur, as outlined in the following excerpt from Section 5.1 of the AROD (italics added):

  "All off-facility contamination has been divided into two exposure units based on how the contamination was transported off facility. EPA's hazard index (HI) of 1 for dioxin is 50 parts per trillion (ppt). Action is triggered in each exposure unit based on residential use and EPA's HI of 1. RA is triggered in each exposure unit. When that RA is triggered, Florida's SCTLs are applicable within each exposure unit. The cleanup number for each exposure unit will be Florida's SCTL, which 7 ppt for dioxin. There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD). "

  DEP has the following concerns with this approach to offsite soil contamination.

  - Use of a remedial action trigger that is less stringent that a 10-6 cancer risk and HI of 1 is not consistent with State ARARs and would result in elimination of properties with contamination that requires remediation to meet the State's promulgated levels of protection.
  - As noted in previous DEP review comments on the FS, congener analysis and risk assessment, it appears that exclusion of properties from Remedial Action based on the congener fingerprinting data is premature and underestimates the extent of site related soil contamination and related risk. It appears that the EUs presented in Figures 5 and 6 of the AROD represent EPA's anticipated areas of offsite soil remediation. DEP strongly recommends additional soil sampling during the RD and use of a *weight of evidence approach* that considers not only the congener analysis but also concentration gradients to determine the location and extent of offsite, site related soil contamination.

- Review of the Figures 5 and 6 and related dioxin data maps in the FS indicates that there is an absence of data to support the proposed limits of remediation and that additional delineation outside of the proposed EUs will need to be conducted during the RD or as part of confirmatory sampling during the Remedial Action to ensure that the remedy is protective, consistent with the State 10-6 risk management level.
- In Section 5.0, the CSM proposes 2 major mechanisms for transport of contamination from on facility to offsite properties- vehicular traffic and overland flow. Overland flow included surface runoff/migration from the facility south to the Bay including via the PYC ditch as well as runoff west, north and east of the facility property. The FS indicates that trucks loaded with treated poles would leave the main entrance of South J Street, driving down Pine or Cypress Streets resulting in deposition of contaminants along the vehicular traffic routes. The distribution of offsite dioxin contaminated soils would seem consistent with these migration pathways. However, it does not appear that the proposed exposure units fully consider offsite contaminant trends and the documented presence of dioxin contamination in all downgradient areas that are likely site related. These areas include:
  1) South of Cypress between J and I Streets (dioxin)
  2) North and South of Cypress between H and G Streets (dioxin; PAH to north)
  3) Northwest of F Street and Cypress intersection (dioxin)
  4) Immediately east of F Street between Pine and Gimble (dioxin)
  5) South of Gimble between F and G Streets (dioxin)
  6) South of Main Street between Barrancas Ave and I Street (dioxin)
  7) North and South of Sonya between J & K Streets, outside of the proposed EUs (PAHs)
  8) South of SE ditch at F Street (PAHs)
- The proposed areas of remediation do not consider the BAP-TEQ SCTL exceedances documented in the 1997 offsite soil sampling. While this data was based on composite samples, the data did indicate likely exceedances, particularly in the vicinity of the PYC ditch contaminant migration pathway, where DNAPL has been documented. Offsite BAP-TEQ soil concentrations were observed as high as 850 ug/kg (above the 100 ug/kg default residential SCTL). Additional soil sampling for carcinogenic PAHs is recommended during the RD to confirm that site related BAP-TEQ exceedances are not present offsite (see areas above).
- Please note that while the FS and AROD assume offsite soil remediation to 2 ft bls, soil exceeding the Chapter 62-777 F.A.C. default residential SCTL or appropriate site specific ASCTL throughout the vadose zone must be addressed to allow unrestricted residential use.

Recommendation- DEP recently completed an oral bioaccessibility study at the ACW site to evaluate site specific relative bioavailability of dioxin in soils and to

support development of site specific ASCTL(s) for dioxin based on Florida's risk management criteria of 10-6 and HI of 1. Using 12 soil samples from the ACW site, the assessment confirmed a mean bioaccessibility of 0.59 which was used as the site specific relative bioavailability for dioxin in soil. Based on a deterministic risk calculation, the site specific health based ASCTL under a residential land use scenario would be **15 ng/kg, dioxin-TEQ**. *DEP recommends that this site specific soil criterion be used to inform the offsite dioxin delineation and confirm the areas to be addressed by the offsite soil remedy.*

- *Groundwater Preliminary Remedial Goals (PRGs) (Table 12)* -
  - Table 12 identifies up to 4 different PRGs for each COC such that remedial goals are not clear. DEP understands that the proposed CMZ-5 alternative represents an *interim* groundwater remedy. As stated in the draft AROD, further evaluation of the need for additional groundwater remedial action and the effectiveness of the source and interim groundwater remedy in addressing contaminated groundwater will be conducted in a 5 year time frame after implementation of the CMZ-1, 2A and 2B source remedies. DEP recommends that a single PRG be applied to each COC and identified as the groundwater cleanup goal in the ROD to facilitate that evaluation. Consistent with CERCLA, where more stringent, the promulgated State standard or criterion (GCTL) under Chapters 62-550 and 62-777, F.A.C. would be relevant and appropriate for each contaminant and should be reflected in this AROD as the final PRGs.
  - Please correct the DEP GCTLs cited in Table 12 for the following- 2-Methylphenol (35 ug/l), 4-Methylphenol (3.5 ug/l) and 2,4-Dimethylphenol (140 ug/l).

- *Surface water-*
  - Section 8.1, Section 12.0- No summary table of surface water COCs and corresponding surface water quality criteria (SWQC) for marine surface water have been included in the AROD. In lieu of such a table, please clarify in the text that Chapters 62-302 Class II SWQC and 62-777 Surface water CTLs for site related COCs are relevant and appropriate when evaluating the effectiveness of the remedy in protecting marine surface waters from migration of contaminated groundwater into Pensacola Bay/ Bayou Chico, and to confirm that the AROD remedial action objectives (RAOs) have been met.

- <u>State Acceptance- Part I: Declaration, Section 10.8 and Appendix C</u>
  - Please remove the statement in Part 1: Declaration that "the State of Florida concurs with the Selected Remedy". Please remove the reference in Section 10.8 to "FDEP concurrence letter included as Appendix C".

DEP does not normally provide formal concurrence with a Superfund site remedy prior to receipt of the final executed ROD or AROD. The DEP concurrence letter is not included as an attachment to the ROD or AROD.

- ARARs- Tables 13 and 14
  - Action Specific ARARs- The following should be considered for ACW
    - Chapter 62-780.222, F.A.C. - requires warning signs at hazardous waste sites.
    - Chapter 62-701.340, 62-701.400 and 62-701.600, F.A.C. - provides requirements for final cover design and construction of a landfill cover.
    - Chapter 62-780.680(2) and 62-780.680(3)- provides the criteria and requirements for use of institutional and engineering controls in a risk based closure. Some portions of site may be restricted or capped.
  - Note that Section 13.2 incorrectly references tables "12 and 13" as the ARARs tables.
- Please provide the referenced Appendices. None were provided with the draft AROD for review.

Thank you for consideration of the DEP AROD review comments. Please let us know if you have any questions or would like to discuss further. I can be reached at 850-245-8969.

Sincerely,

Kelsey Helton
DEP-Waste Cleanup Program

Attachment

August 14, 2017

EPA's response to FDEP's comments from August 4, 2017 listed below in yellow.

DEP AROD review comments are as follows:

DEP supports the technologies selected in the draft AROD to address DNAPL, soil and groundwater contamination at the ACW site.

- Section 12.0- Selected Remedy
  - DEP recommends that Section 12 focus on a summary of the selected alternative for each CMZ. The text in this Section discussing the rationale for and comparison to other alternatives (not selected) is confusing and would seem more appropriate in Section 10, Comparative Analysis.
    Agreed
  - There appear to be some inconsistencies between the remedial components outlined in Section 12.0 and those phases or actions identified in Part 1: Declaration, particularly CMZ-4A.
    Agreed
  - CMZ-4A: In Section 4.6.2 of the Feasibility Study (FS), the proposed CMZ-4A Alternative #2 for contaminated vadose zone soils in the 0-3 ft bls interval is to excavate all those soils in CMZ-2A *and overlying CMZ-3* (estimated 61,794 cy) and place those soils inside the CMZ-1 containment system for long term isolation. Conversely, the selected remedy for CMZ-4A (based on Alternative #2 in Sections 9.5.2 and 12.2.5 of the draft AROD and including Figure 10) indicates that all CMZ-4A vadose zone soils (0-3 ft bls)- *except vadose zone soils overlying CMZ-3* - will be excavated and placed inside CMZ-1. The AROD states that *CMZ-4A vadose zone soils overlying CMZ-3 will be placed in an* ***encapsulated cell within CMZ-3***. *The entire onsite facility area (excluding CMZ-1) will be covered with a 2 ft thick permeable cover consisting of backfill and hydroseeded.*
    - DEP was not able to locate previous discussion or evaluation of the use of an encapsulated cell in CMZ-4A. Please confirm or correct the above inconsistency.
    - We assume that the intended purpose of the cell is to mitigate direct contact and potential sources to groundwater. Please provide construction information (proposed cell material and dimensions) for the encapsulated cell in the AROD consistent with that intent.
    - Please clarify if on facility soil excavation, encapsulated cell construction, and redisposition of soils into the cell was considered in buildup of costs and sequencing of activities.
    - Currently, proposed soil cleanup target levels (SCTLs) for onsite vadose zone soils are based on Commercial SCTLs, without consideration of potential leachability. It is likely that both vadose zone soils as well as NAPL are contributing to existing groundwater contamination. Based

on the FS, DEP understood that all vadose soil (water table estimated at 3 ft bls, fluctuating at 3-5 ft bls) would be excavated and contained inside CMZ-1. Please clarify how the proposed AROD revisions to CMZ-4A Alternative #2 will ensure that onsite vadose soils remaining outside of the CMZ-1 containment unit will not continue to be a contaminant source to groundwater.

These changes were made with the purpose to mitigate direct contact and potential sources to groundwater. An additional benefit was to level out the heights of the two caps so they were more level with each other. Without these changes the CMZ-1 cap would be significantly higher than the CMZ-2A/3 cap.

All CMZ-4A (this includes the upper 3 feet of CMZ2A) soils with the exception of soils that overlay CMZ-3 would be placed inside the CMZ-1 Alternative #2 Barrier Wall and capped for long-term isolation. CMZ-4A soils overlying CMZ-3 will be placed within an encapsulated cell within CMZ-3. The entire CMZ-2A/3 area will be encapsulated.

- in Sections 4.0 and 12.0 of draft ROD, *where* the 35,000 cy of onsite stockpiled soils and debris will be relocated and secured on facility as part of the remedy.
  They will go in CMZ-2A/3. This was changed in the ROD.
- Please state in Sections 4.0 and 12.0 that soils from Pine and Gimble St that exceed LDRs will be relocated in CMZ-1 as part of the remedy, if that is the case.
  They will go in CMZ-1. This was changed in the ROD.
- CMZ-2A: Please clarify the CMZ-2A remedial goals in Section 12.0. The selected remedy states that the goal of SEE in this area is to recover and treat mobile and residual DNAPL with a remedial goal of subsurface soils "free of residual DNAPL". It is unclear what criteria will be used to confirm that remedial goal has been met. As noted in previous DEP comments, documentation of performance and effectiveness of CMZ-1 containment unit and the 100' clay will require downgradient monitoring in CMZ-2A. Given the contiguous nature of CMZ-1 and CMZ-2, remediation of CMZ-2 should be such that releases from the CMZ-1 containment cell at concentrations above groundwater cleanup target levels (GCTLs) can be recognized. As such, DEP has recommended active remediation of CMZ-2A to GCTLs.
  A sentence will be added to the ROD stating "CMZ-2A will be remediated to a level that will be able to detect leakage from CMZ-1's containment remedy. This level will be determined during the Remedial Design. "

- CMZ-2B: DEP recommends that post active remedial monitoring in this area include monitoring of groundwater contaminant levels *below the shallow clay* to evaluate the effectiveness of the source remedy and model predictions that DNAPL stringers below the clay do not require active remediation for the groundwater to meet remedial action objectives (RAOs) and groundwater cleanup levels.

This was described in Section 12.0. Agreed.

- CMZ-5:
  - Please clarify in Part 1: Declaration that the CMZ-5 groundwater remedy represents an interim remedy, consistent with Section 12.0. The Declaration states that AROD represents the final remedy.
    The Declaration was changed.
  - Please clarify in Section 12.0 that the CMZ-5 Alt #3 remedy includes a ISCO/ISEB treatment barrier *offsite along the Pensacola Bay Shoreline to depths of 40 to 80 ft bls* on the eastern end of the Site that will be implemented as part of this CMZ-5 remedy to address PCP. We understand that the need for additional treatment to address the remaining groundwater contaminant plume (SVOCs including naphthalene) will be based on the initial Five Year Review.
    Any additional groundwater actions will be accessed during the first Five Year Review of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated.
  - Please clarify in Section 12.0 that evaluation of sufficient contaminant abatement in the initial 5 year timeframe will consider not only a documented decline in groundwater contaminant concentrations throughout the plume including SVOCs and PCP, but will also evaluate the continued likelihood of impacts to *surface water* via groundwater contaminant discharge. As discussed in prior DEP review comments, this evaluation may include surface water sampling of the Bay, updated groundwater modeling based on more recent data, and confirmation of a shallow clay extending into the Bay that would mitigate such discharge to surface water. Data for site related contaminants would be compared to groundwater and surface water criteria in Chapters 62-777 and 62-302, F.A.C.
    During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated. This sitewide ROD is an interim remedy for groundwater. The final groundwater ROD will include GCTL and surface water criteria as clean up numbers.

    This language was added to the ROD: "Any additional groundwater actions will be accessed during the first Five Year Review of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated. If signicant decreasing trends are present at the first Five Year Review a final groundwater ROD could be written at that time."

  - Please clarify in the Section 12.0 that the proposed insitu groundwater treatment alternatives for CMZ-3 and CMZ-5 will also be implemented prior to the FYR evaluation of the effectiveness of the interim groundwater remedy.

Agreed.

- Please clarify in Section 12.0 that **Institutional Controls (IC)** are an integral component of the selected remedy, and discuss the purpose of the ICs and the anticipated IC instruments.
  - ICs should include *onsite restrictive covenant(s)* to 1) restrict land use to a commercial or park scenario, 2) prohibit activities that would compromise the effectiveness and integrity of the remedy including the cap and 2 ft of clean fill onsite, outside of the CMZ-1 containment area, and 3) require management of any contaminated soils that might be brought to the surface as contaminated media. (Note that zoning restrictions, fencing, easements, and public notices/advisories and signage cited as example in the FS and AROD as ICs are not considered adequate controls.)
  - ICs should also include *groundwater use controls* to mitigate exposure to contaminated groundwater in the interim until groundwater meets groundwater cleanup target levels for unrestricted use. Groundwater use ICs should include restrictions associated with the existing designation of the site vicinity as a *"delineated area" under 62-524, F.A.C.* Please clarify if there is an *Memorandum of Agreement* in place between EPA and the Water Management District to further enhance the effectiveness of the delineated area IC.
  - In Part 1: Declaration of the AROD, the document states that "the site will have ICs for industrial/commercial uses only, which also includes recreational". These are two distinct types of land uses and exposure scenarios, with more stringent criteria for recreational land use. As discussed elsewhere in DEP comments, ICs- as well as engineering controls- must be such that the resulting remedy is protective of both scenarios.

    There is currently no MOA in place between EPA and the Water Management District. The two parties are close to getting it finalized and put into place. FDEP will be notified once that has been done.

    Language was added to the ROD describing the type of ICs needed.
- Section 12.4 incorrectly references Tables 4 & 5 rather than Tables 11 & 12 as containing the final cleanup levels.

  Agreed.

- <u>Section 7.0- Summary of Site Risks</u>
  - Section 7.1.5- Uncertainties
    - Please see the attached UF discussion regarding technical concerns with the approach used in development of the 37 ng/kg dioxin ASCTL (March 2017 Geosyntec PRA).
    - Please see the attached UF discussion regarding the UF development of the site specific relative bioavailability calculated from an oral

bioaccessibility study using ACW soils, and the resulting site specific direct exposure ASCTLs for dioxin under residential, commercial/industrial and recreational land use scenarios using a deterministic risk assessment approach

- Please update the placeholders in Section 7.1.5 of the AROD to reflect the DEP recommended site specific relative bioavailability (0.59) and resulting site specific ASCTLs for dioxin derived by UF.

Noted and the place holders have been removed.

- Section 7.2- Summary of Ecological Risk Assessment-
  - Section 7.2.3 concludes that while the maximum concentrations of chemicals detected in shallow groundwater exceed Florida Marine SWQC for Class 3 Marine Surface water (Fish Consumption, Recreation, Propagation and Maintenance of Healthy Well-balanced Population of Fish and Wildlife), the impact of the shallow aquifer in the Bay is likely to be minimal due to low water volumes and tidal mixing. In addition, it was noted in the draft AROD that sampling of surface water, pore water and sediment in Pensacola Bay by USACE indicated that detected concentrations are *generally* below ecological concern. DEP requests a more detailed discussion in this Section of the frequency and extent of these exceedances to demonstrate the basis for the conclusion that concentrations are below ecological concern. There was an EPA review and evaluation of data contained in the June 2008 Phase II RD Activity report that may be useful in this regard (see Brett Thomas email, dated 9/23/2013).

    More language was added to the ROD to describe EPA's position. Some language was added from Brett Thomas' e-mail as suggested.

- Please briefly discuss the 2016 EPA removal of contaminated soil/sediment from the PYC ditch. Please clarify in Section 7.0 that the intent of that removal and backfilling of the ditch to an elevation consistent with the adjacent upland was to address human health and ecological risk posed by contaminants in the former PYC ditch sediment. Please clarify if this remedial objective has been accomplished.

  This sentence was added to the ROD "All human health and ecological risk posed by PYC ditch was eliminated by the removal and backfilling of the ditch during July 2016"in Section 7.0.

- <u>Section 7.0- Contaminants of Concern (COCs)</u>
  - *Soils*- Site related soil COCs are identified in Table 1 based on the 2014 HHRA. The proposed soil COCs consist of BaP-TEQ, PCP, 2- methylnaphthalene and 2,3,7,8- Dioxin-TEQ. Review of AROD Tables 3-7 indicate that these contaminants were selected based on concentrations exceeding a 10-4 cancer risk or HI of 1 under an on facility industrial or recreation land use scenario and/or an offsite residential land use scenario. Based on EPA policy, such exceedances would trigger a CERCLA remedial action and application of State

ARARs. A comparison of the maximum concentration of each soil contaminant presented in the FS to Chapter 62-777, F.A.C. default SCTLs, indicates that *carbazole and naphthalene* should also be identified as on facility soil COCs and included in Table 11, Cleanup Levels for Soil COCs.

Please review table 9.1A and 9.1B in the 2014 HHRA. Those are the tables were EPA looks at the accumulated risk for a COPC and decides if it becomes a COC or not. Carbazole and Naphthalene do not have enough risk associated with them to become COCs.

- *Groundwater*- Table 2 identifies groundwater COCs based on a comparison of the *mean* groundwater concentration to the proposed screening value. Use of the mean is not consistent with Chapter 62-780 or EPA guidance. Additionally, many of the proposed screening values in Table 2 exceed the GCTLs promulgated in Chapter 62-777. Never the less, a comparison of groundwater contaminant levels to the GCTLs does not change the list of COCs, which appears comprehensive.
  Please see UF corrections to groundwater screening values based on Chapter 62-777, F.A.C.
  Noted.

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    The remedy includes engineering controls over the entire facility and the appropriate IC in the form of a restrictive covenant will be put in place on the property.

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  The water table is at 3 feet. All surficial soil across the facility will be excavated and encapsulated under CMZ-1 except the soil from CMZ-3. All surficial soil from CMZ-3 will be excavated and encapsulated under the CMZ-2A/3 area.

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  EPA has proposed offsite soil remediation based on the *Conceptual Site Model (CSM)* presented in Section 5 of the AROD, exposure units (EUs) as shown in Figures 5 and 6, and application of the EPA's remedial action trigger policy using the more stringent of an HI of 1 or 10-4 cancer risk. The dioxin trigger based on an HI of 1 will determine where remedial action of offsite soils will occur, as outlined in the following excerpt from Section 5.1 of the AROD (italics added):

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soil remediation. DEP strongly recommends additional soil sampling during the RD and use of a *weight of evidence approach* that considers not only the congener analysis but also concentration gradients to determine the location and extent of offsite, site related soil contamination.

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  7) North and South of Sonya between J & K Streets, outside of the proposed EUs (PAHs)
  8) South of SE ditch at F Street (PAHs)
- The proposed areas of remediation do not consider the BAP-TEQ SCTL exceedances documented in the 1997 offsite soil sampling. While this data was based on composite samples, the data did indicate likely exceedances, particularly in the vicinity of the PYC ditch contaminant migration pathway, where DNAPL has been documented. Offsite BAP-TEQ soil concentrations were observed as high as 850 ug/kg (above the 100 ug/kg default residential SCTL). Additional soil sampling for carcinogenic PAHs is recommended during the RD to confirm that site related BAP-TEQ exceedances are not present offsite (see areas above).

- Please note that while the FS and AROD assume offsite soil remediation to 2 ft bls, soil exceeding the Chapter 62-777 F.A.C. default residential SCTL or appropriate site specific ASCTL throughout the vadose zone must be addressed to allow unrestricted residential use.

Recommendation- DEP recently completed an oral bioaccessibility study at the ACW site to evaluate site specific relative bioavailability of dioxin in soils and to support development of site specific ASCTL(s) for dioxin based on Florida's risk management criteria of 10-6 and HI of 1. Using 12 soil samples from the ACW site, the assessment confirmed a mean bioaccessibility of 0.59 which was used as the site specific relative bioavailability for dioxin in soil. Based on a deterministic risk calculation, the site specific health based ASCTL under a residential land use scenario would be **15 ng/kg, dioxin-TEQ**. DEP recommends that this site specific soil criterion be used to inform the offsite dioxin delineation and confirm the areas to be addressed by the offsite soil remedy.

EPA has confidence in the two residential exposure units. They are based on the CSM and the dioxin congener analysis. Additional soil sampling outside of these exposure units can be performed if there is data that suggests that it might be site related to ACW in the remedial design. The sentence "There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD)." *was removed from the ROD.*

EPA's new trigger for BAP is 11,000 ug/kg (10-4) or 18,000 ug/kg (HI=1). This change is based on the recent update to the benzo(a) pyrene toxicity assessment in IRIS (link). There are no concentrations in the two residential exposure units that trigger action with a concentration exceeding either one of those numbers. The vast majority of the BAP contamination is located with the existing exposure units. The majority of BAP will be excavated with the dioxin impacted soil in the exposure units. The small amount that will be left behind will not pose a significant threat.

https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=136

Soil was sampled in intervals from 0-6 inches, 6-12 inches and 12- 24 inches below the surface. The soil will continue to be sampled and remediated until we get to the triggered remediation goal. The soil below 24 inches no longer has the same potential exposure route for the soil in a residential scenario.

- *Groundwater Preliminary Remedial Goals (PRGs) (Table 12) -*
  - Table 12 identifies up to 4 different PRGs for each COC such that remedial goals are not clear. DEP understands that the proposed CMZ-5 alternative represents an *interim* groundwater remedy. As stated in the draft AROD, further evaluation of the need for additional groundwater remedial action and the effectiveness of the source and interim groundwater remedy in addressing contaminated groundwater will be conducted in a 5 year time frame after implementation of the CMZ-1, 2A and 2B source remedies. DEP recommends that a single PRG

be applied to each COC and identified as the groundwater cleanup goal in the ROD to facilitate that evaluation. Consistent with CERCLA, where more stringent, the promulgated State standard or criterion (GCTL) under Chapters 62-550 and 62-777, F.A.C. would be relevant and appropriate for each contaminant and should be reflected in this AROD as the final PRGs.

The final groundwater ROD will have GCTLs as the cleanup goals.

- Please correct the DEP GCTLs cited in Table 12 for the following- 2-Methylphenol (35 ug/l), 4-Methylphenol (3.5 ug/l) and 2,4-Dimethylphenol (140 ug/l).

Agreed.

- *Surface water-*
  - Section 8.1, Section 12.0- No summary table of surface water COCs and corresponding surface water quality criteria (SWQC) for marine surface water have been included in the AROD. In lieu of such a table, please clarify in the text that Chapters 62-302 Class II SWQC and 62-777 Surface water CTLs for site related COCs are relevant and appropriate when evaluating the effectiveness of the remedy in protecting marine surface waters from migration of contaminated groundwater into Pensacola Bay/ Bayou Chico, and to confirm that the AROD remedial action objectives (RAOs) have been met.

One of the ROD's RAO is "Provide protection of marine surface waters from migration of contaminated groundwater into Pensacola Bay/Bayou Chico." The status of the groundwater cleanup will be evaluated during the first Five Year Review. Additional groundwater actions will be taken if significant progress has not been made at that point. If significant progress has been made, then it is possible the final groundwater ROD will be written at that time with the final appropriate groundwater remedy.

- <u>State Acceptance- Part I: Declaration, Section 10.8 and Appendix C</u>
  - Please remove the statement in Part 1: Declaration that "the State of Florida concurs with the Selected Remedy". Please remove the reference in Section 10.8 to "FDEP concurrence letter included as Appendix C".
    DEP does not normally provide formal concurrence with a Superfund site remedy prior to receipt of the final executed ROD or AROD. The DEP concurrence letter is not included as an attachment to the ROD or AROD.
    Agreed.

- <u>ARARs- Tables 13 and 14</u>
  - Action Specific ARARs- The following should be considered for ACW
    - Chapter 62-780.222, F.A.C. - requires warning signs at hazardous waste sites.

        - Chapter 62-701.340, 62-701.400 and 62-701.600, F.A.C. - provides requirements for final cover design and construction of a landfill cover.
        - Chapter 62-780.680(2) and 62-780.680(3)- provides the criteria and requirements for use of institutional and engineering controls in a risk based closure. Some portions of site may be restricted or capped.
    - Note that Section 13.2 incorrectly references tables "12 and 13" as the ARARs tables.
      Agreed.
- Please provide the referenced Appendices. None were provided with the draft AROD for review.
  Attached.

Florida Department of Environmental Protection

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Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

August 21, 2017

U.S. EPA, Region IV
Superfund Division
Attn: Mr. Peter Thorpe
61 Forsyth Street, SW
Atlanta, GA 30303

Subject: EPA-DEP Responses to DEP Comments, Draft Record of Decision, June 2017
American Creosote Works Superfund Site
Pensacola, Escambia County, Florida

Dear Mr. Thorpe:

Thank you for the August 14, 2017 EPA responses to DEP comments (RTCs) on the draft Amended Record of Decision (AROD). This is to acknowledge EPA's RTCs and document DEP's understanding of those responses. DEP looks forward to receipt of the revised AROD including Appendices and Figures in response to our comments and recommended clarifying AROD edits also provided to you on August 17th, to confirm that DEP comments have been addressed. We appreciate EPA's consideration and look forward to design and implementation of the site remedy.

We have retained the same format, with EPA's responses in yellow following each original DEP comment and DEP's subsequent response identified in blue *italics*. We request that EPA include this August 21, 2017 correspondence as well as the original and more lengthy DEP review comments dated August 4, 2017 (attached) in an Appendice in the final AROD, entitled "State Correspondence".

DEP AROD review comments and EPA-DEP RTCs are as follows:

DEP supports the technologies selected in the draft AROD to address DNAPL, soil and groundwater contamination at the ACW site.

- Section 12.0- Selected Remedy
  - DEP recommends that Section 12 focus on a summary of the selected alternative for each CMZ. The text in this Section discussing the rationale for and comparison to other alternatives (not selected) is confusing and would seem more appropriate in Section 10, Comparative Analysis.
    Agreed Thank you.

- There appear to be some inconsistencies between the remedial components outlined in Section 12.0 and those phases or actions identified in Part 1: Declaration, particularly CMZ-4A.

  Agreed Thank you.

- CMZ-4A: In Section 4.6.2 of the Feasibility Study (FS), the proposed CMZ-4A Alternative #2 for contaminated vadose zone soils in the 0-3 ft bls interval is to excavate all those soils in CMZ-2A *and overlying CMZ-3* (estimated 61,794 cy) and place those soils inside the CMZ-1 containment system for long term isolation. Conversely, the selected remedy for CMZ-4A (based on Alternative #2 in Sections 9.5.2 and 12.2.5 of the draft AROD and including Figure 10) indicates that all CMZ-4A vadose zone soils (0-3 ft bls)- *except vadose zone soils overlying CMZ-3* - will be excavated and placed inside CMZ-1. The AROD states that *CMZ-4A vadose zone soils overlying CMZ-3 will be placed in an* ***encapsulated cell within CMZ-3****. The entire onsite facility area (excluding CMZ-1) will be covered with a 2 ft thick permeable cover consisting of backfill and hydroseeded.*
  - DEP was not able to locate previous discussion or evaluation of the use of an encapsulated cell in CMZ-4A. Please confirm or correct the above inconsistency.
  - We assume that the intended purpose of the cell is to mitigate direct contact and potential sources to groundwater. Please provide construction information (proposed cell material and dimensions) for the encapsulated cell in the AROD consistent with that intent.
  - Please clarify if on facility soil excavation, encapsulated cell construction, and redisposition of soils into the cell was considered in buildup of costs and sequencing of activities.
  - Currently, proposed soil cleanup target levels (SCTLs) for onsite vadose zone soils are based on Commercial SCTLs, without consideration of potential leachability. It is likely that both vadose zone soils as well as NAPL are contributing to existing groundwater contamination. Based on the FS, DEP understood that all vadose soil (water table estimated at 3 ft bls, fluctuating at 3-5 ft bls) would be excavated and contained inside CMZ-1. Please clarify how the proposed AROD revisions to CMZ-4A Alternative #2 will ensure that onsite vadose soils remaining outside of the CMZ-1 containment unit will not continue to be a contaminant source to groundwater.

These changes were made with the purpose to mitigate direct contact and potential sources to groundwater. An additional benefit was to level out the heights of the two caps so they were more level with each other. Without these changes the CMZ-1 cap would be significantly higher than the CMZ-2A/3 cap.

All CMZ-4A (this includes the upper 3 feet of CMZ2A) soils with the exception of soils that overlay CMZ-3 would be placed inside the CMZ-1 Alternative #2 Barrier Wall and capped for long-term isolation. CMZ-4A

soils overlying CMZ-3 will be placed within an encapsulated cell within CMZ-3. The entire CMZ-2A/3 area will be encapsulated.
Thank you for that clarification. We support this approach. Encapsulation as described will also address leachable soils remaining onsite, outside of CMZ-1.
As per DEP recommended clarifying language in AROD Section 8.1, Cleanup Levels, "Leachable soils will be mitigated by containing all contaminated soils within an effective containment cell- either in the CMZ-1 containment unit or in the CMZ-3 encapsulation cell.

- in Sections 4.0 and 12.0 of draft ROD, *where* the 35,000 cy of onsite stockpiled soils and debris will be relocated and secured on facility as part of the remedy.
  They will go in CMZ-2A/3. This was changed in the ROD. Thank you
- Please state in Sections 4.0 and 12.0 that soils from Pine and Gimble St that exceed LDRs will be relocated in CMZ-1 as part of the remedy, if that is the case.
  They will go in CMZ-1. This was changed in the ROD. Thank you.
- CMZ-2A: Please clarify the CMZ-2A remedial goals in Section 12.0. The selected remedy states that the goal of SEE in this area is to recover and treat mobile and residual DNAPL with a remedial goal of subsurface soils "free of residual DNAPL". It is unclear what criteria will be used to confirm that remedial goal has been met. As noted in previous DEP comments, documentation of performance and effectiveness of CMZ-1 containment unit and the 100' clay will require downgradient monitoring in CMZ-2A. Given the contiguous nature of CMZ-1 and CMZ-2, remediation of CMZ-2 should be such that releases from the CMZ-1 containment cell at concentrations above groundwater cleanup target levels (GCTLs) can be recognized. As such, DEP has recommended active remediation of CMZ-2A to GCTLs.
  A sentence will be added to the ROD stating "CMZ-2A will be remediated to a level that will be able to detect leakage from CMZ-1's containment remedy. This level will be determined during the Remedial Design. "
  Thank you. Effective performance monitoring downgradient of the CMZ-1 containment system is an important component of confirming the effectiveness of the containment alternative.

- CMZ-2B: DEP recommends that post active remedial monitoring in this area include monitoring of groundwater contaminant levels *below the shallow clay* to evaluate the effectiveness of the source remedy and model predictions that DNAPL stringers below the clay do not require active remediation for the groundwater to meet remedial action objectives (RAOs) and groundwater cleanup levels.
  This was described in Section 12.0. Agreed. *Thank you.*
- CMZ-5:

- Please clarify in Part 1: Declaration that the CMZ-5 groundwater remedy represents an interim remedy, consistent with Section 12.0. The Declaration states that AROD represents the final remedy.
  The Declaration was changed.
  Thank you. As noted in this exerpt from the 2016 Feasibility Study (FS) - The site-specific goal of this FS is to recommend a final remedy to address the site-related creosote NAPL, polycyclic aromatic hydrocarbons (PAHs), pentachlorophenol (PCP), and dioxin contamination in the soil and sediment at the Site (OU3/OU2), as well as recommend an interim remedy to address the dissolved semi-volatile organic compound (SVOC) and PCP groundwater plume (OU2) at the Site.

- Please clarify in Section 12.0 that the CMZ-5 Alt #3 remedy includes a ISCO/ISEB treatment barrier *offsite along the Pensacola Bay Shoreline to depths of 40 to 80 ft bls* on the eastern end of the Site that will be implemented as part of this CMZ-5 remedy to address PCP. We understand that the need for additional treatment to address the remaining groundwater contaminant plume (SVOCs including naphthalene) will be based on the initial Five Year Review.
  Any additional groundwater actions will be accessed during the first Five Year Review of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated.
  Thank you. Our review of the red-line revised AROD confirms that there will be an offsite insitu treatment barrier along the Bay shoreline on the east end of the site as part of CMZ-5.

- Please clarify in Section 12.0 that evaluation of sufficient contaminant abatement in the initial 5 year timeframe will consider not only a documented decline in groundwater contaminant concentrations throughout the plume including SVOCs and PCP, but will also evaluate the continued likelihood of impacts to *surface water* via groundwater contaminant discharge. As discussed in prior DEP review comments, this evaluation may include surface water sampling of the Bay, updated groundwater modeling based on more recent data, and confirmation of a shallow clay extending into the Bay that would mitigate such discharge to surface water. Data for site related contaminants would be compared to groundwater and surface water criteria in Chapters 62-777 and 62-302, F.A.C.
  During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated. This sitewide ROD is an interim remedy for groundwater. The final groundwater ROD will include GCTL and surface water criteria as clean up numbers.

This language was added to the ROD: "Any additional groundwater actions will be accessed during the first Five Year Review of the remedy. During the first Five Year Review, the protection of the surface water of Pensacola Bay will also be evaluated. If signicant decreasing trends are present at the first Five Year Review a final groundwater ROD could be written at that time." *Thank you for the clarification.*

- Please clarify in the Section 12.0 that the proposed insitu groundwater treatment alternatives for CMZ-3 and CMZ-5 will also be implemented prior to the FYR evaluation of the effectiveness of the interim groundwater remedy.
  Agreed. Thank you.

- Please clarify in Section 12.0 that **Institutional Controls (IC)** are an integral component of the selected remedy, and discuss the purpose of the ICs and the anticipated IC instruments.
  - ICs should include *onsite restrictive covenant(s)* to 1) restrict land use to a commercial or park scenario, 2) prohibit activities that would compromise the effectiveness and integrity of the remedy including the cap and 2 ft of clean fill onsite, outside of the CMZ-1 containment area, and 3) require management of any contaminated soils that might be brought to the surface as contaminated media. (Note that zoning restrictions, fencing, easements, and public notices/advisories and signage cited as example in the FS and AROD as ICs are not considered adequate controls.)
  - ICs should also include *groundwater use controls* to mitigate exposure to contaminated groundwater in the interim until groundwater meets groundwater cleanup target levels for unrestricted use. Groundwater use ICs should include restrictions associated with the existing designation of the site vicinity as a *"delineated area" under 62-524, F.A.C.* Please clarify if there is an *Memorandum of Agreement* in place between EPA and the Water Management District to further enhance the effectiveness of the delineated area IC.
  - In Part 1: Declaration of the AROD, the document states that "the site will have ICs for industrial/commercial uses only, which also includes recreational". These are two distinct types of land uses and exposure scenarios, with more stringent criteria for recreational land use. As discussed elsewhere in DEP comments, ICs- as well as engineering controls- must be such that the resulting remedy is protective of both scenarios.
    There is currently no MOA in place between EPA and the Water Management District. The two parties are close to getting it finalized and put into place. FDEP will be notified once that has been done.

Language was added to the ROD describing the type of ICs needed.
Thank you. As noted in DEP's recommended clarifying language in Section 12.4, Estimated Outcomes of the Selected Remedy: ***"Future land use at the Site property is anticipated to be industrial /commercial. The CMZ-1 containment area would remain undeveloped. The remainder of the Site property may also be used for recreation (park) with appropriate ICs and engineering controls consisting of the cap or 2 foot soil cover over the entire area which would prevent exposure to underlying contaminated soils."***

The above statement documents the resolution of the issue of different SCTLs for commercial/industrial versus recreational land use scenarios.

- Section 12.4 incorrectly references Tables 4 & 5 rather than Tables 11 & 12 as containing the final cleanup levels.
  Agreed.

- Section 7.0- Summary of Site Risks
  - Section 7.1.5- Uncertainties
    - Please see the attached UF discussion regarding technical concerns with the approach used in development of the 37 ng/kg dioxin ASCTL (March 2017 Geosyntec PRA).
    - Please see the attached UF discussion regarding the UF development of the site specific relative bioavailability calculated from an oral bioaccessibility study using ACW soils, and the resulting site specific direct exposure ASCTLs for dioxin under residential, commercial/industrial and recreational land use scenarios using a deterministic risk assessment approach
    - Please update the placeholders in Section 7.1.5 of the AROD to reflect the DEP recommended site specific relative bioavailability (0.59) and resulting site specific ASCTLs for dioxin derived by UF.
      Noted and the place holders have been removed.
      Thank you for incorporating the DEP site specific bioavailability study results in the AROD.

  - Section 7.2- Summary of Ecological Risk Assessment-
    - Section 7.2.3 concludes that while the maximum concentrations of chemicals detected in shallow groundwater exceed Florida Marine SWQC for Class 3 Marine Surface water (Fish Consumption, Recreation, Propagation and Maintenance of Healthy Well-balanced Population of Fish and Wildlife), the impact of the shallow aquifer in the Bay is likely to be minimal due to low water volumes and tidal mixing. In addition, it was noted in the draft AROD that sampling of surface water, pore water and sediment in Pensacola Bay by USACE indicated that detected concentrations are *generally* below ecological concern. DEP requests a

more detailed discussion in this Section of the frequency and extent of these exceedances to demonstrate the basis for the conclusion that concentrations are below ecological concern. There was an EPA review and evaluation of data contained in the June 2008 Phase II RD Activity report that may be useful in this regard (see Brett Thomas email, dated 9/23/2013).

More language was added to the ROD to describe EPA's position. Some language was added from Brett Thomas' e-mail as suggested.

Thank you. DEP understands that EPA will bolster the AROD conclusion that there is no unacceptable risk to ecological receptors associated with sediments and surface water in the aquatic areas by including additional information from the 2010 SESD evaluation of site related sediment, pore water and surface water quality data.

- Please briefly discuss the 2016 EPA removal of contaminated soil/sediment from the PYC ditch. Please clarify in Section 7.0 that the intent of that removal and backfilling of the ditch to an elevation consistent with the adjacent upland was to address human health and ecological risk posed by contaminants in the former PYC ditch sediment. Please clarify if this remedial objective has been accomplished.

  This sentence was added to the ROD "All human health and ecological risk posed by PYC ditch was eliminated by the removal and backfilling of the ditch during July 2016"in Section 7.0. Thank you for that clarification.

- Section 7.0- Contaminants of Concern (COCs)
  - *Soils*- Site related soil COCs are identified in Table 1 based on the 2014 HHRA. The proposed soil COCs consist of BaP-TEQ, PCP, 2- methylnaphthalene and 2,3,7,8- Dioxin-TEQ. Review of AROD Tables 3-7 indicate that these contaminants were selected based on concentrations exceeding a 10-4 cancer risk or HI of 1 under an on facility industrial or recreation land use scenario and/or an offsite residential land use scenario. Based on EPA policy, such exceedances would trigger a CERCLA remedial action and application of State ARARs. A comparison of the maximum concentration of each soil contaminant presented in the FS to Chapter 62-777, F.A.C. default SCTLs, indicates that *carbazole and naphthalene* should also be identified as on facility soil COCs and included in Table 11, Cleanup Levels for Soil COCs.

    Please review table 9.1A and 9.1B in the 2014 HHRA. Those are the tables were EPA looks at the accumulated risk for a COPC and decides if it becomes a COC or not. Carbazole and Naphthalene do not have enough risk associated with them to become COCs.

    As noted by DEP on the red-lined AROD, we request the following clarifying statement as a footnote to AROD Table 11, Cleanup Levels for Soil COCs: ***"While naphthalene concentrations onsite exceed the State Commercial -SCTL of 300 mg/kg, naphthalene was screened out as a COC by the risk assessment. Regardless, the Site remedy includes engineering controls (caps or 2 ft thick***

soil covers) throughout the Site property, which will effectively address these naphthalene exceedances."

Carbazole exceedances are in the saturated zone so SCTL would not apply.

- *Groundwater*- Table 2 identifies groundwater COCs based on a comparison of the *mean* groundwater concentration to the proposed screening value. Use of the mean is not consistent with Chapter 62-780 or EPA guidance. Additionally, many of the proposed screening values in Table 2 exceed the GCTLs promulgated in Chapter 62-777. Never the less, a comparison of groundwater contaminant levels to the GCTLs does not change the list of COCs, which appears comprehensive.
  Please see UF corrections to groundwater screening values based on Chapter 62-777, F.A.C.
  Noted. Thank you. Please note DEP GCTL corrections highlighted on red-line AROD on Table 12.

- Section 8.0- Cleanup Levels-
  - *Soil cleanup levels*- Table 11 reflects Chapter 62-777 residential or commercial/industrial default SCTLs. If a Park or recreational land use scenario is anticipated on the former facility property, recreational based ASCTLs should also be identified in the AROD consistent with that anticipated land use. As noted in the 2014 FS/Risk Assessment review comments, DEP recommends an exposure frequency of 200 d/y for 14 years for the non-ditch recreational scenario. These input values have been used by DEP for park visitation in Florida at other sites. Using a 10-6 risk management level and default assumptions, the recreational dioxin soil criterion, for example, would be **17 ng/kg**. If the site specific relative bioavailability at ACW is considered, the site specific recreational ASCTL for dioxin would be **28 ng/kg** (see attached UF correspondence).
    In lieu of identifying recreational SCTLs for all COCs in the AROD, the remedy could require an engineering control over the entire on facility property (such as 2 ft thickness of clean fill, low permeability cap or pavement, or combination of such controls) to effectively mitigate direct contact under a recreational land use scenario. Appropriate restrictions would be documented in a restrictive covenant (discussed above).

    The remedy includes engineering controls over the entire facility and the appropriate IC in the form of a restrictive covenant will be put in place on the property. *Thank you.*

  - *On facility Soils*- The presence of leachable vadose zone soils should be discussed in the AROD. How the remedy will address these leachable soils and the basis for making that determination should be clearly stated in the AROD. As noted in previous DEP comments, *leachability criteria* for all soil

contaminants, particularly those with corresponding GCTL exceedances, should be included as remedial goals in the ROD. In lieu of site specific leachability criteria, Chapter 62-777, F.A.C. default leachability SCTLs would apply. Conversely, if all on facility vadose zone soils are to be excavated and placed within the CMZ-1 containment unit (or otherwise effectively encapsulated to address the leachable mass), then identification of numeric soil leachability criteria may not be required in the AROD.

The water table is at 3 feet. All surficial soil across the facility will be excavated and encapsulated under CMZ-1 except the soil from CMZ-3. All surficial soil from CMZ-3 will be excavated and encapsulated under the CMZ-2A/3 area.
Thank you for that clarification.

- *Offsite Soils (CMZ-4B)*
  EPA has proposed offsite soil remediation based on the *Conceptual Site Model (CSM)* presented in Section 5 of the AROD, exposure units (EUs) as shown in Figures 5 and 6, and application of the EPA's remedial action trigger policy using the more stringent of an HI of 1 or 10-4 cancer risk. The dioxin trigger based on an HI of 1 will determine where remedial action of offsite soils will occur, as outlined in the following excerpt from Section 5.1 of the AROD (italics added):

  "All off-facility contamination has been divided into two exposure units based on how the contamination was transported off facility. EPA's hazard index (HI) of 1 for dioxin is 50 parts per trillion (ppt). Action is triggered in each exposure unit based on residential use and EPA's HI of 1. RA is triggered in each exposure unit. When that RA is triggered, Florida's SCTLs are applicable within each exposure unit. The cleanup number for each exposure unit will be Florida's SCTL, which 7 ppt for dioxin. There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD). "
  DEP has the following concerns with this approach to offsite soil contamination.

  - Use of a remedial action trigger that is less stringent that a 10-6 cancer risk and HI of 1 is not consistent with State ARARs and would result in elimination of properties with contamination that requires remediation to meet the State's promulgated levels of protection.
  - As noted in previous DEP review comments on the FS, congener analysis and risk assessment, it appears that exclusion of properties from Remedial Action based on the congener fingerprinting data is premature and underestimates the extent of site related soil contamination and related risk. It appears that the EUs presented in Figures 5 and 6 of the AROD represent EPA's anticipated areas of offsite soil remediation. DEP strongly recommends additional soil sampling during the RD and use of a *weight of evidence approach* that considers not only the congener analysis but also concentration gradients to

determine the location and extent of offsite, site related soil contamination.

- Review of the Figures 5 and 6 and related dioxin data maps in the FS indicates that there is an absence of data to support the proposed limits of remediation and that additional delineation outside of the proposed EUs will need to be conducted during the RD or as part of confirmatory sampling during the Remedial Action to ensure that the remedy is protective, consistent with the State 10-6 risk management level.
- In Section 5.0, the CSM proposes 2 major mechanisms for transport of contamination from on facility to offsite properties- vehicular traffic and overland flow. Overland flow included surface runoff/migration from the facility south to the Bay including via the PYC ditch as well as runoff west, north and east of the facility property. The FS indicates that trucks loaded with treated poles would leave the main entrance of South J Street, driving down Pine or Cypress Streets resulting in deposition of contaminants along the vehicular traffic routes. The distribution of offsite dioxin contaminated soils would seem consistent with these migration pathways. However, it does not appear that the proposed exposure units fully consider offsite contaminant trends and the documented presence of dioxin contamination in all downgradient areas that are likely site related. These areas include:
  1) South of Cypress between J and I Streets (dioxin)
  2) North and South of Cypress between H and G Streets (dioxin; PAH to north)
  3) Northwest of F Street and Cypress intersection (dioxin)
  4) Immediately east of F Street between Pine and Gimble (dioxin)
  5) South of Gimble between F and G Streets (dioxin)
  6) South of Main Street between Barrancas Ave and I Street (dioxin)
  7) North and South of Sonya between J & K Streets, outside of the proposed EUs (PAHs)
  8) South of SE ditch at F Street (PAHs)
- The proposed areas of remediation do not consider the BAP-TEQ SCTL exceedances documented in the 1997 offsite soil sampling. While this data was based on composite samples, the data did indicate likely exceedances, particularly in the vicinity of the PYC ditch contaminant migration pathway, where DNAPL has been documented. Offsite BAP-TEQ soil concentrations were observed as high as 850 ug/kg (above the 100 ug/kg default residential SCTL). Additional soil sampling for carcinogenic PAHs is recommended during the RD to confirm that site related BAP-TEQ exceedances are not present offsite (see areas above).
- Please note that while the FS and AROD assume offsite soil remediation to 2 ft bls, soil exceeding the Chapter 62-777 F.A.C. default residential SCTL or appropriate site specific ASCTL throughout the vadose zone must be addressed to allow unrestricted residential use.

Recommendation- DEP recently completed an oral bioaccessibility study at the ACW site to evaluate site specific relative bioavailability of dioxin in soils and to support development of site specific ASCTL(s) for dioxin based on Florida's risk management criteria of 10-6 and HI of 1. Using 12 soil samples from the ACW site, the assessment confirmed a mean bioaccessibility of 0.59 which was used as the site specific relative bioavailability for dioxin in soil. Based on a deterministic risk calculation, the site specific health based ASCTL under a residential land use scenario would be **15 ng/kg, dioxin-TEQ**. DEP recommends that this site specific soil criterion be used to inform the offsite dioxin delineation and confirm the areas to be addressed by the offsite soil remedy.

EPA has confidence in the two residential exposure units. They are based on the CSM and the dioxin congener analysis. Additional soil sampling outside of these exposure units can be performed if there is data that suggests that it might be site related to ACW in the remedial design. The sentence "There will be no further dioxin delineation outside of the exposure units during the Remedial Design (RD)." *was removed from the ROD.*

EPA's new trigger for BAP is 11,000 ug/kg (10-4) or 18,000 ug/kg (HI=1). This change is based on the recent update to the benzo(a) pyrene toxicity assessment in IRIS (link). There are no concentrations in the two residential exposure units that trigger action with a concentration exceeding either one of those numbers. The vast majority of the BAP contamination is located with the existing exposure units. The majority of BAP will be excavated with the dioxin impacted soil in the exposure units. The small amount that will be left behind will not pose a significant threat.

https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=136

Soil was sampled in intervals from 0-6 inches, 6-12 inches and 12- 24 inches below the surface. The soil will continue to be sampled and remediated until we get to the triggered remediation goal. The soil below 24 inches not longer has the same potential exposure route for the soil in a residential scenario.

DEP concurs with the proposed remedial alternatives and technologies comprising the ACW site remedy. We appreciate EPA's use of the larger offsite exposure units and suggest that we use this approach to expand on the offsite areas to be addressed by the Superfund remedy and to minimize the discrepancy between the EPA's "trigger" and State requirements.

DEP does not, however, support the strict application of the EPA trigger policy to define the extent of soil remediation of dioxin soil contamination on offsite residential properties at ACW. Strict use of the 10-4 or Hazard Index (HI) risk trigger is not consistent with State ARARs and Chapter 62-777, F.A.C. soil cleanup target levels. As proposed, soils not exceeding the trigger of 50 ppt dioxin, would not be addressed and would result in site related dioxin contaminated soils left on offsite properties at levels above the State risk management levels of 10-6 and HI of 1, following the completion of EPA's remedial work.

We share EPA's desire to move forward with a site remedy. We hope that EPA will continue to work with DEP during design and remedy implementation to ensure that all offsite properties

exceeding State ARARs are addressed. Where this will not occur, we propose to enter into an SSC for this fund lead site that outlines the responsibilities of the agencies and recognizes any contributions Florida would need to make for the remedy to achieve ARARs for the entire site.

A review of the historic Bap-TEQ levels in offsite soils at ACW indicates that the offsite exposure units proposed in the AROD will address those soils exceeding the 1.0 mg/kg residential alternative soil cleanup target level, as documented in the August 1, 2017 University of Florida correspondence, "Review of benzo(a)pyrene ASCTLs in letters dated February 10 and May 11, 2017".

- *Groundwater Preliminary Remedial Goals (PRGs) (Table 12) -*
  - Table 12 identifies up to 4 different PRGs for each COC such that remedial goals are not clear. DEP understands that the proposed CMZ-5 alternative represents an *interim* groundwater remedy. As stated in the draft AROD, further evaluation of the need for additional groundwater remedial action and the effectiveness of the source and interim groundwater remedy in addressing contaminated groundwater will be conducted in a 5 year time frame after implementation of the CMZ-1, 2A and 2B source remedies. DEP recommends that a single PRG be applied to each COC and identified as the groundwater cleanup goal in the ROD to facilitate that evaluation. Consistent with CERCLA, where more stringent, the promulgated State standard or criterion (GCTL) under Chapters 62-550 and 62-777, F.A.C. would be relevant and appropriate for each contaminant and should be reflected in this AROD as the final PRGs.
    The final groundwater ROD will have GCTLs as the cleanup goals. Thank you.
  - Please correct the DEP GCTLs cited in Table 12 for the following- 2-Methylphenol (35 ug/l), 4-Methylphenol (3.5 ug/l) and 2,4-Dimethylphenol (140 ug/l).
    Agreed. Thank you.

- *Surface water-*
  - Section 8.1, Section 12.0- No summary table of surface water COCs and corresponding surface water quality criteria (SWQC) for marine surface water have been included in the AROD. In lieu of such a table, please clarify in the text that Chapters 62-302 Class II SWQC and 62-777 Surface water CTLs for site related COCs are relevant and appropriate when evaluating the effectiveness of the remedy in protecting marine surface waters from migration of contaminated groundwater into Pensacola Bay/ Bayou Chico, and to confirm that the AROD remedial action objectives (RAOs) have been met.

One of the ROD's RAO is "Provide protection of marine surface waters from migration of contaminated groundwater into Pensacola Bay/Bayou Chico." The status of the groundwater cleanup will be evaluated during the first Five Year

Review. Additional groundwater actions will be taken if significant progress has not been made at that point. If significant progress has been made, then it is possible the final groundwater ROD will be written at that time with the final appropriate groundwater remedy. *Thank you. DEP supports that approach.*

- State Acceptance- Part I: Declaration, Section 10.8 and Appendix C
  - Please remove the statement in Part 1: Declaration that "the State of Florida concurs with the Selected Remedy". Please remove the reference in Section 10.8 to "FDEP concurrence letter included as Appendix C". DEP does not normally provide formal concurrence with a Superfund site remedy prior to receipt of the final executed ROD or AROD. The DEP concurrence letter is not included as an attachment to the ROD or AROD.
    Agreed. *Thank you.*

- ARARs- Tables 13 and 14
  - Action Specific ARARs- The following should be considered for ACW
    - Chapter 62-780.222, F.A.C. - requires warning signs at hazardous waste sites.
    - Chapter 62-701.340, 62-701.400 and 62-701.600, F.A.C. - provides requirements for final cover design and construction of a landfill cover.
    - Chapter 62-780.680(2) and 62-780.680(3)- provides the criteria and requirements for use of institutional and engineering controls in a risk based closure. Some portions of site may be restricted or capped.
      ? *EPA has included the above rule references in other RODs for other Superfund sites where applicable or relevant and appropriate.*
  - Note that Section 13.2 incorrectly references tables "12 and 13" as the ARARs tables.
    Agreed.
- Please provide the referenced Appendices. None were provided with the draft AROD for review.
  Attached. *Thank you.*

Please let us know if you have any questions.

Sincerely,

Kelsey A Helton

Kelsey Helton
Waste Cleanup Program

Attachment- DEP August 4, 2017 Review Comments on Draft AROD