

**Final Record of Decision Amendment
Operable Unit 2
(Sites 11, 12, 25, 26, 27, and 30)**

**Naval Air Station Pensacola
Pensacola, Florida**

Revision No. 02



**U.S. Naval Facilities
Engineering Command
Southeast**

September 2015

Prepared by



**Contract No. N62470-12-D-7004
Task Order No. JM22**



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Acronyms and Abbreviations

ABB	ABB Environmental Services
AGVIQ	AGVIQ, LLC
AGVIQ-CH2M HILL	AGVIQ-CH2M HILL Constructors, Inc. Joint Venture IIIa
ACM	asbestos-containing material
amsl	above mean sea level
ARAR	Applicable or Relevant and Appropriate Requirement
AWS	Aleut World Solutions, LLC
BEQ	benzo(a)pyrene equivalent
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulation
COC	contaminant of concern
COPC	contaminant of potential concern
CTL	Cleanup Target Levels
DCA	dichloroethane
DCE	dichloroethene
DCGL	Derived Concentration Guideline Limit
DRMO	Defense Reutilization and Marketing Office
E&E	Ecology & Environment, Inc.
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FS	Feasibility Study
FSA	Feasibility Study Addendum
G&M	Geraghty & Miller
GCL	geosynthetic clay liner
GCTL	Groundwater cleanup target level
GS _I	Groundwater Surface Water Interface
HHRA	human health risk assessment
IAS	Initial Assessment Study
ILCR	incremental lifetime cancer risk
IWTP	Industrial Wastewater Treatment Plant
LGW	Leachability to Groundwater
LUC	Land Use Control
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MCL	Maximum Contaminant Level
MNA	monitored natural attenuation
mrem/yr	millirems per year
NAS	Naval Air Station
NAVFAC SE	Naval Facilities Engineering Command Southeast
NCP	National Oil and Hazardous Substances Pollution Contingency Plan

NEESA	Naval Environmental and Engineering Support Activity
NPL	National Priorities List
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
pCi/g	picoCuries per gram
PP	Proposed Plan
Ra-226	radium-226
RAA	remedial action alternative
RAB	Restoration Advisory Board
RASO	Radiological Affairs Support Office
RAO	Remedial Action Objective
RESRAD	Regulatory Tool for Determining the Allowable Residual Radioactivity in Site Cleanup
RI	Remedial Investigation
ROD	Record of Decision
SCTL	soil cleanup target levels
SARA	Superfund Amendments and Reauthorization Act
SWPPP	Stormwater Pollution Prevention Plan
TBC	to-be-considered
TCE	trichloroethene
TEDE	Total Effective Dose Equivalent
TRPH	total recoverable petroleum hydrocarbons
TtNUS	Tetra Tech, NUS, Inc.
VC	vinyl chloride
VOC	volatile organic compound
yd ³	cubic yards

1.0 Declaration of the Record of Decision Amendment

1.1 Site Name and Location

Operable Unit (OU) 2 is located within the boundaries of Naval Air Station (NAS) Pensacola, in Pensacola, Escambia County, Florida. OU 2 consists of six sites, only three of which (Sites 11, 12 and 27) are the subject of this Record of Decision (ROD) Amendment for OU 2. All six sites are identified as follows:

- Site 11 - North Chevalier Field Disposal Area
- Site 12 - Scrap Bins,
- Site 25 - Radium Spill Area
- Site 26 - Supply Department Outside Storage Area
- Site 27 - Radium Dial Shop Sewer
- Site 30 - Complex of Industrial Buildings and Industrial Wastewater Treatment Plant (IWTP) Sewer Line

Site 11 is a former landfill where municipal and industrial wastes were disposed of and burned from the late 1930s to the mid-1940s.

Site 12 is also known as the Defense Reutilization and Marketing Office (DRMO) Recyclable Materials Center. It is a storage yard for scrap materials including metals of all types, aircraft, scrap tires, used furniture, and electronics.

Site 27 extends through the concrete foundation of former Building 709, which originally included a small radium dial shop with a connection to the sanitary sewer. The building was demolished and the former foundation slab is currently a parking lot.

1.2 Identification of Lead and Support Agencies

The U.S. Department of the Navy ([Navy] represented by and through the Naval Facilities Engineering Command Southeast [NAVFAC SE]) is the lead agency for remedial investigations and actions at OU 2, with support from the U.S. Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (FDEP).

1.3 Statement of Basis and Purpose

The purpose of this document is to amend the previous September 29, 2008 ROD for OU 2 (TtNUS, 2008a) by doing the following: (1) adding asbestos as a contaminant of concern (COC) for soils at Site 11; (2) adding Radium 226 (Ra-226) as a COC for soils at Sites 12 and 27, and, (3) modifying the soils remedy previously selected for Site 11 which had consisted of limited soils excavation with offsite disposal and land use controls (LUCs). That remedy is being modified by adding the placement, where needed, of at least two feet of soil cover and certain additional land use controls (LUCs) intended to ensure soil cover integrity in the

future. No modification(s) to the monitored natural attenuation (MNA) remedy previously chosen for OU2 impacted groundwater are to be effected by this ROD Amendment.

No modifications to the 2008 ROD remedy for Sites 25, 26, and 30 have been proposed; therefore, these sites will not be discussed in the remainder of this ROD Amendment.

The Navy and EPA with the concurrence of the State of Florida, believe amending the 2008 ROD for OU2 in the above respects is warranted for the following reasons:

- During completion of work preparatory towards implementing the previously selected remedy for Site 11, asbestos containing materials (ACM) were discovered near the surface at several locations within that Site. Given the general poor condition of the materials encountered, the associated asbestos presents an unacceptable risk to human health warranting its addition as a soil COC at Site 11.
- During preparations for implementing the previously selected remedy for Site 11, waste materials were discovered present at less than 2 feet below ground surface in certain areas of the Site. In order to ensure future protection of human health and the environment taking into account site specific circumstances, the addition of a remedial component calling for the placement of soils across Site 11 as needed to ensure at least two feet of soil cover and the addition of certain LUCs to ensure the maintenance of such a cover are warranted additions to the remedial action components previously chosen for that Site.
- As a result of past activities at Sites 12 and 27, radium-226 (Ra-226) was historically released to the soil at these sites at concentrations that presented unacceptable human health risks. Although removal actions completed by the Navy at Sites 12 and 27 in 2011 and 2012 successfully removed those soils with Ra-226 concentrations exceeding the applicable cleanup goal, Ra-226 was never formally documented as a COC for these Sites. Thus, this ROD Amendment does so.

The changes being made to the previously selected soils remedy for Site 11 constitute "fundamental" remedy changes requiring development of this ROD Amendment. The modifications selected to the soil remedy for Site 11 were chosen after a comparison of remedial alternatives was performed using remedy selection criteria established pursuant to the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations, Part 300 et. seq.). This ROD Amendment was prepared utilizing the EPA guidance *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Document* (EPA, 1999) and EPA's Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01 (EPA, 1988).

1.4 Assessment of the Site

The soil remedy for Site 11 selected in the September 2008 ROD, as amended by this ROD Amendment, is necessary to protect public health, welfare and the environment from actual or threatened releases of hazardous substances at that Site. No changes are being made to the 2008 OU2-wide groundwater remedy (MNA with LUCs). The Groundwater Surface Water Interface (GSI) Investigation detailed in the 2008 ROD for OU 2 is concurrently being

implemented to confirm that groundwater contamination possibly posing unacceptable risk is not currently migrating beyond the Site 11 boundaries. Although this Amendment adds post-2008 ROD discovered Ra-226 as a COC at Sites 12 and 27, the addition of that COC does not warrant any change to the previously selected (and already implemented) soil excavation and offsite disposal (with LUCs) remedies for those Sites. Based upon prior groundwater investigations conducted at OU 2, there is also no basis for adding Ra-226 as a groundwater COC at those sites.

1.5 Description of the Selected Remedy

This ROD Amendment presents the final remedy for soil at OU 2, Site 11. It is supported by the data and analyses contained in the Remedial Investigation (RI) and RI Addendum, Baseline Risk Assessment (BRA), Human Health Risk Assessment (HHRA), and Feasibility Study (FS) and FS Addendum (FSA) previously completed for OU 2.

The major components of the Site 11 soils remedy selected via the 2008 OU2 ROD were as follows:

- Excavation and offsite disposal of soils exceeding FDEP Industrial Direct Exposure and Leachability to groundwater soil cleanup target levels (SCTLs) from within the landfill's boundary.
- LUCs to prohibit residential land use or intrusive activities within the Site 11 boundary.
- MNA and use prohibition LUC for site groundwater.

The amended soils remedy for Site 11 adds the following additional remedial components while retaining the above components from the 2008 ROD:

- Enhancement of the existing soil cover to ensure that at least 2 feet of soil cover exists over wastes within the landfill footprint to prevent direct exposure to the newly-identified COC of asbestos and other landfill contents present near the surface at Site 11.
- LUCs to prohibit residential use or intrusive activities, to avoid potential future exposure to landfill contents including asbestos and to ensure the integrity of the added soil cover through regular maintenance and site inspections.

1.6 Statutory Determinations

The selected amended remedy is protective of human health and the environment, complies with federal and State requirements that are applicable or relevant and appropriate to the Site 11 remedial action, is cost-effective and utilizes permanent solutions and alternative treatment technologies to the extent practicable. Because this amended remedy will result in hazardous substances and contaminants remaining on site in excess of levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within 5 years after the initiation of the remedial action, and every 5 years thereafter, for the foreseeable future. The five-year reviews will be conducted to ensure that the remedy is, or will be, protective of human health and the environment.

This ROD Amendment will become part of the Administrative Record File (per NCP Section 300.825[a][2]). The ROD Amendment and the technical and public information

documents used by the Navy to prepare the ROD Amendment are available at the following Information Repository:

**John C. Pace Library
University of West Florida
11000 University Parkway
Pensacola, Florida 32514
Phone: 850-474-2462**

Hours:


**Mon. - Thurs. • 8:00 am - 9:00 pm
Friday • 8:00 am - 5:00 pm
Saturday • Closed
Sunday • 1 pm - 9 pm**

1.7 Data Certification Checklist

The information specified in the Data Certification Checklist contained in the 2008 ROD for OU 2 is included in the Decision Summary Sections of the 2008 ROD and in this ROD Amendment along with Table 1-1 of this ROD Amendment.

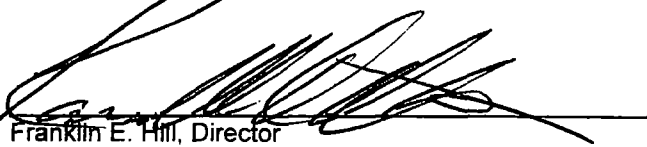
1.8 Authorizing Signatures

This Record of Decision Amendment documents the selected amended remedy for soils at OU 2 Site 11 and the identification of certain additional contaminants of concern at OU 2 Sites 11, 12 and 27. This amended remedy was selected by the U.S. Navy and EPA with the concurrence of the State of Florida.



K.W. Hoskins, Captain, U.S. Navy
Commanding Officer, NAS Pensacola

2 OCT 15
Date



Franklin E. Hill, Director
Superfund Division
USEPA Region IV

11/12/15
Date

TABLE 1-1
 Data Certification Checklist
 Operable Unit 2
Record of Decision Amendment
Naval Air Station Pensacola
Pensacola, Florida

Data	Reference Section
Baseline risk represented by the COCs	Section 2.2.2 (pages 2-13 through 2-16) and Section 2.2.4 (pages 2-16 through 2-18)
Disposition of source materials constituting principal threat	Section 2.2.1 (page 2-13) and Section 2.2.2 (pages 2-13 through 2-18)
Estimated capital, annual operating and maintenance (O&M), and total present worth costs	Section 2.4.2.5 (page 2-31)
Key factors that lead to the amendment of the remedy	Sections 2.2.1 and 2.2.2 (pages 2-13 through 2-16)

2.0 Record of Decision Amendment Summary

2.1 Site History and Background

OU 2 is a 68-acre area located on the eastern side of NAS Pensacola, in Pensacola, Escambia County, Florida. The area includes six individual sites:

- Site 11 - North Chevalier Field Disposal Area
- Site 12 - Scrap Bins
- Site 25 - Radium Spill Area
- Site 26 - Supply Department Outside Storage Area
- Site 27 - Radium Dial Shop Sewer
- Site 30 - Complex of Industrial Buildings and IWTP Sewer Line

Figure 2-1 shows the location of OU 2 sites within NAS Pensacola.

This ROD Amendment contains amendments to the 2008 ROD soil remedy for Site 11, identification of asbestos as an additional soil COC for Site 11 and identification of Ra-226 as an additional soil COC for Sites 12 and 27.

No modifications to the 2008 ROD remedy for Sites 25, 26, and 30 have been proposed; therefore, these sites will not be discussed in the remainder of this ROD Amendment.

2.1.1 OU 2 Site Descriptions

Descriptions of Sites 11, 12, and 27 are provided below.

2.1.1.1 Site 11 - North Chevalier Field Disposal Area

Site 11, located on the northeastern side of OU 2, is a former landfill where municipal and industrial wastes were disposed of and burned from the late 1930s to the mid-1940s. During operations, approximately 24 cubic yards (yd³) of material from various locations across NAS Pensacola were disposed of daily at the landfill.

Based on historical aerial photographs dating back to the early 1950s and historical drawings, the construction and expansion of the Chevalier Field landing strips just south of the current location of Site 11, coincided with backfilling of the areas around the southern end of the Yacht Basin (in what is now the footprint of Site 11) during the 1930s, which may have resulted in the expansion of uplands into portions of Bayou Grande. Materials observed buried at Site 11 during previous site investigations (timbers, porcelain, metal fragments, concrete blocks, construction rubble and debris) are consistent with the Base activities (major construction and renovation) during the 1930s and 1940s when wastes were reportedly placed and burned in the landfill. Although it is unclear exactly when the waste placement and burning operations ceased at this landfill area during the 1940s, historical aerial photographs show consistent vegetative cover over the landfill area as early as 1951, suggesting no additional clearing for waste burial occurred after this time.

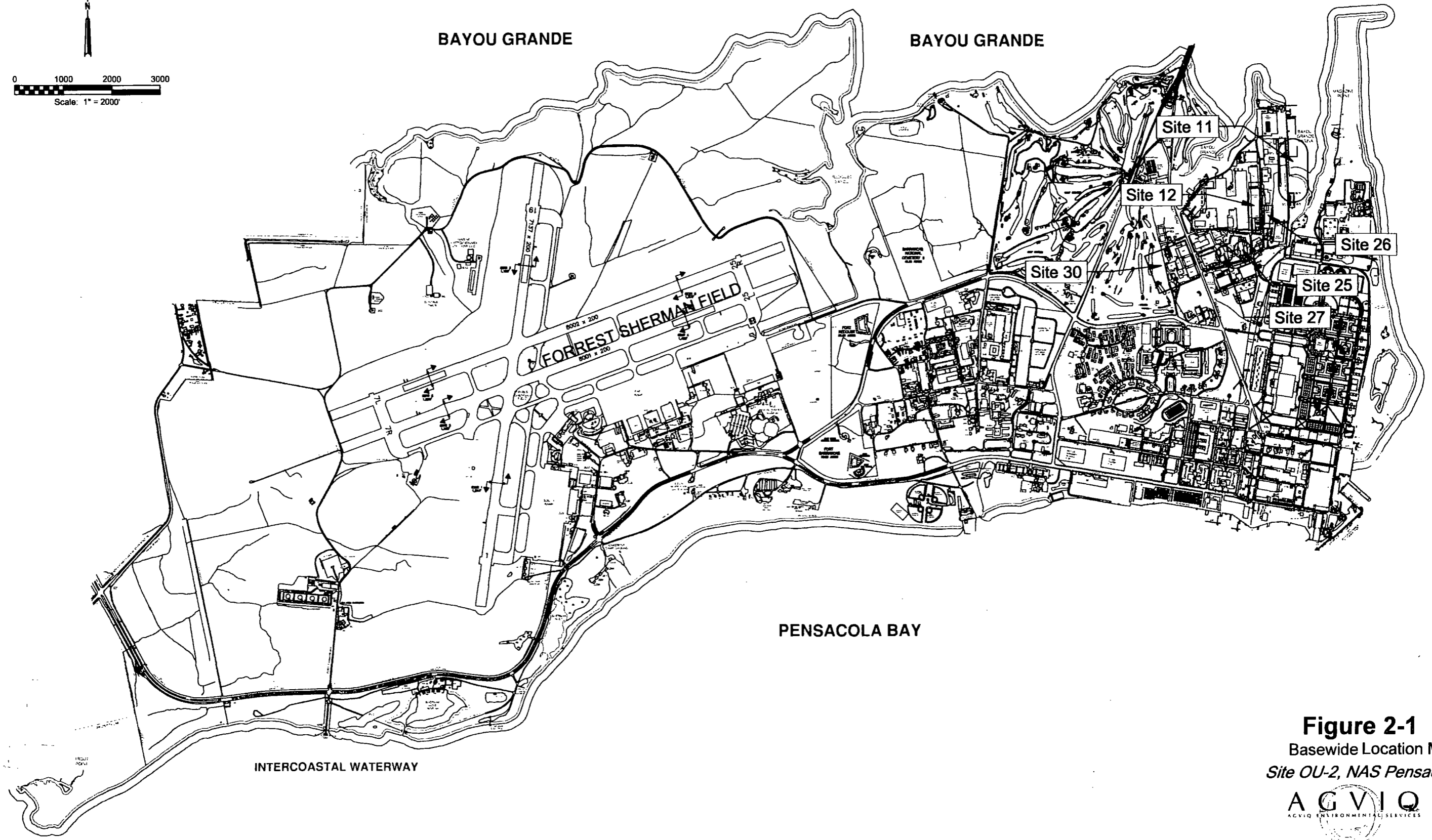
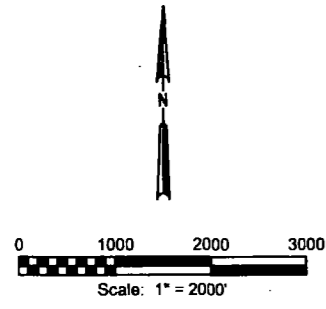


Figure 2-1
 Basewide Location Map
 Site OU-2, NAS Pensacola





LEGEND

- 2010 RD - Proposed Soil Hotspot Excavation Boundary
- Site 11 Boundary
- Wetlands
- 100 YR Floodplain
- Building and Number

Figure 2-2
 Site Features
 Site 11, OU-2, NAS Pensacola



740

685

684

STORAGE YARD

WAREHOUSE ROAD

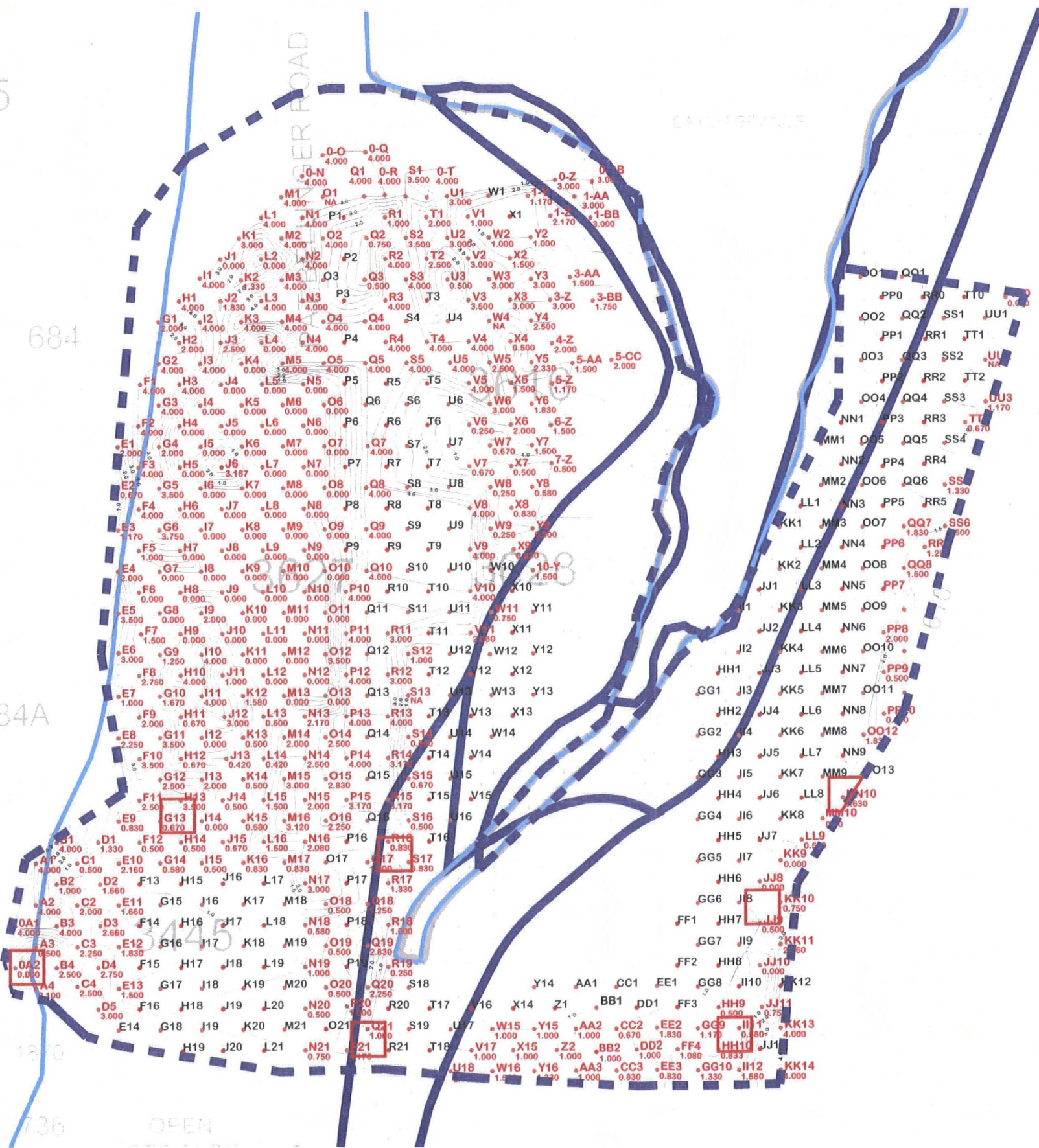
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455

3821

1810

OPEN



LEGEND

- Node Point Location
- Center Point
- 2010 RD Proposed Excavation Boundary
- Site 11 Boundary
- 100 YR Floodplain
- Existing Ground Cover or Building
- Wetlands
- Building and Number

Figure 2-3 Existing Soil Cover Thickness Contour Map

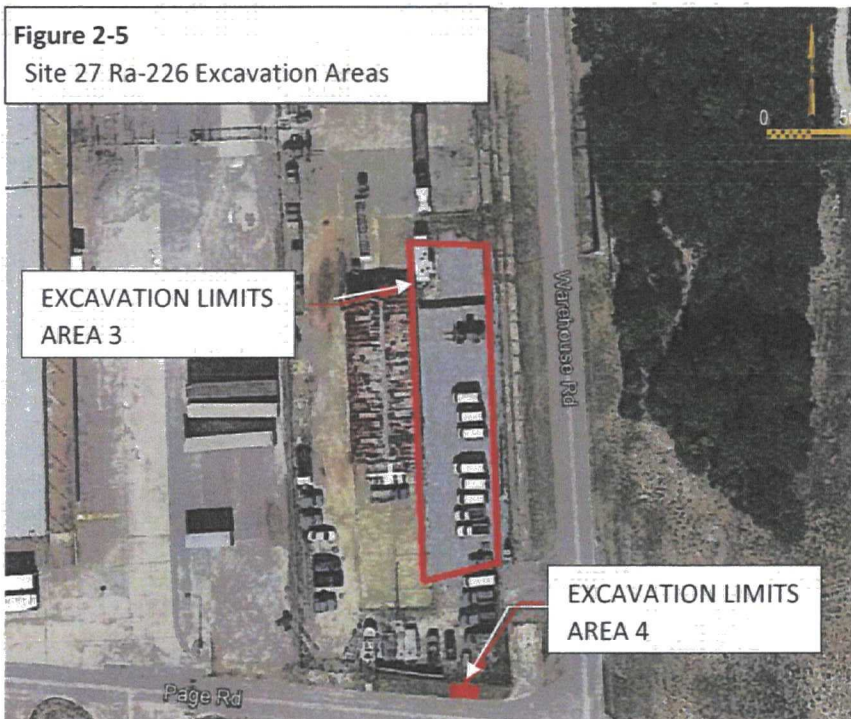
Site 11, OU 2
NAS Pensacola



Figure 2-4
Site 12 Ra-226 Excavation



Figure 2-5
Site 27 Ra-226 Excavation Areas



Surface elevation at the site is approximately 5 to 8 feet above mean sea level (amsl). The site is generally flat, sloping gradually to an extension of Bayou Grande along the eastern side of the site. Pat Bellinger Road runs north-south through the center of the site. Fabricated Buildings 3616, 3627, 3628, and 3445 are located within the site boundary, and used for storage. Concrete and asphalt pads surround the buildings, and a fenced area north and south of Building 3445 is used for outside storage of boats, trucks, and heavy equipment. The majority of Site 11 is covered with vegetation, with the exception of the asphalt and concrete pads and buildings noted above. The boundary for Site 11 is based on information provided in the *Initial Assessment Study of Naval Air Station Pensacola, Pensacola, Florida* prepared by the Naval Environmental and Engineering Support Activity (NEESA) (1983). Figure 2-2 shows the site features of Site 11.

Based on waste material encountered during trench investigations conducted as part of the RI, landfill material to the west and southwest of the Yacht Basin is predominantly municipal waste and consists of a heterogeneous mixture of materials including household refuse and commercial waste. Landfill material on the southeast side of the Yacht Basin is predominantly construction debris. The asbestos-containing material (ACM) discovered in 2010 while preparing to excavate three areas within this southeastern portion of the site in accordance with the 2008 ROD, is consistent with disposal of construction material in the 1930s and 1940s.

In 2013, AGVIQ-CH2MHILL Constructors Inc., Joint Venture IIIA (AGVIQ-CH2MHILL) conducted investigations of the existing soil cover thickness within Site 11. The investigations included hand-augering at 25-foot grid nodes and center points of the grids placed over the entire upland portion of Site 11 and some select locations within the wetlands (encompassing approximately 13 acres) (as shown on Figure 2-3). During this investigation, auger refusal in surface and subsurface soils was encountered and the causes for refusal noted in field logs. Auger refusal notes indicate the presence of glass, asphalt, pieces of porcelain, vitrified clay pipe, terracotta tiles, bricks, and other building debris material at multiple locations within the investigated areas within Site 11. This information additionally indicates the predominance of municipal-type waste present in this landfill area.

2.1.1.2 Site 12 – Scrap Bins

Site 12 – Scrap Bins, is also known as the Defense Reutilization and Marketing Office (DRMO) Recyclable Materials Center. Most of the site is enclosed by a chain-link fence. It is a storage yard for scrap materials including metals of all types, aircraft, scrap tires, used furniture, and electronics. From the early 1930s to the 1940s, garbage was stored near Building 455 in an area known as “Pig Sty Hill,” when approximately 16 yd³ of decayable waste were reportedly stored at the site per day before being hauled off for livestock feed.

2.1.1.3 Site 27 – Radium Dial Shop Sewer

Site 27 extends through the concrete foundation of former Building 709, which originally included a small radium dial shop with a connection to the sanitary sewer. The building was demolished and the former foundation slab is currently a parking lot. The building foundation is 2 to 4 feet above the surrounding area. Outside the foundation, the ground surface over the sewer is unpaved. The site is approximately 150 feet west of Building 780 and is bounded by Farrar and Murray Roads on the south and west, respectively. An

adjacent parking lot north of the building foundation is asphalt paved, and a gravel and shell parking lot is northeast of the foundation. All roads within the site are paved with either concrete or asphalt.

2.1.2 Previous Investigations

The following section provides a summary of investigations performed at Sites 11, 12 and 27 at OU 2.

1976 Radiation Survey/Removal - The Radiological Affairs Support Office (RASO) conducted an investigation of radium contamination in the drain lines at the demolished Building 709 (Site 27) in 1976. Portions of the drain pipe, linoleum floor, walls, and wood flooring within the dial plating shop were identified as radioactive. The drain pipe was excavated to a depth of 18 inches. No soil or concrete was removed. The remaining area was capped and abandoned.

1983 Initial Assessment Study - NEESA completed an Initial Assessment Study (IAS) for NAS Pensacola in 1983 that included review of historical documents and aerial photographs, interviews, and site inspections. Based on the IAS, a confirmation study of suspected contamination was recommended for seven sites, including Sites 11 and 27 (NEESA, 1983).

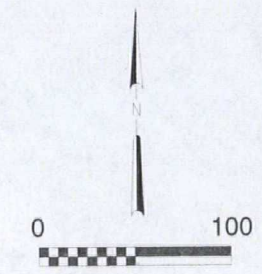
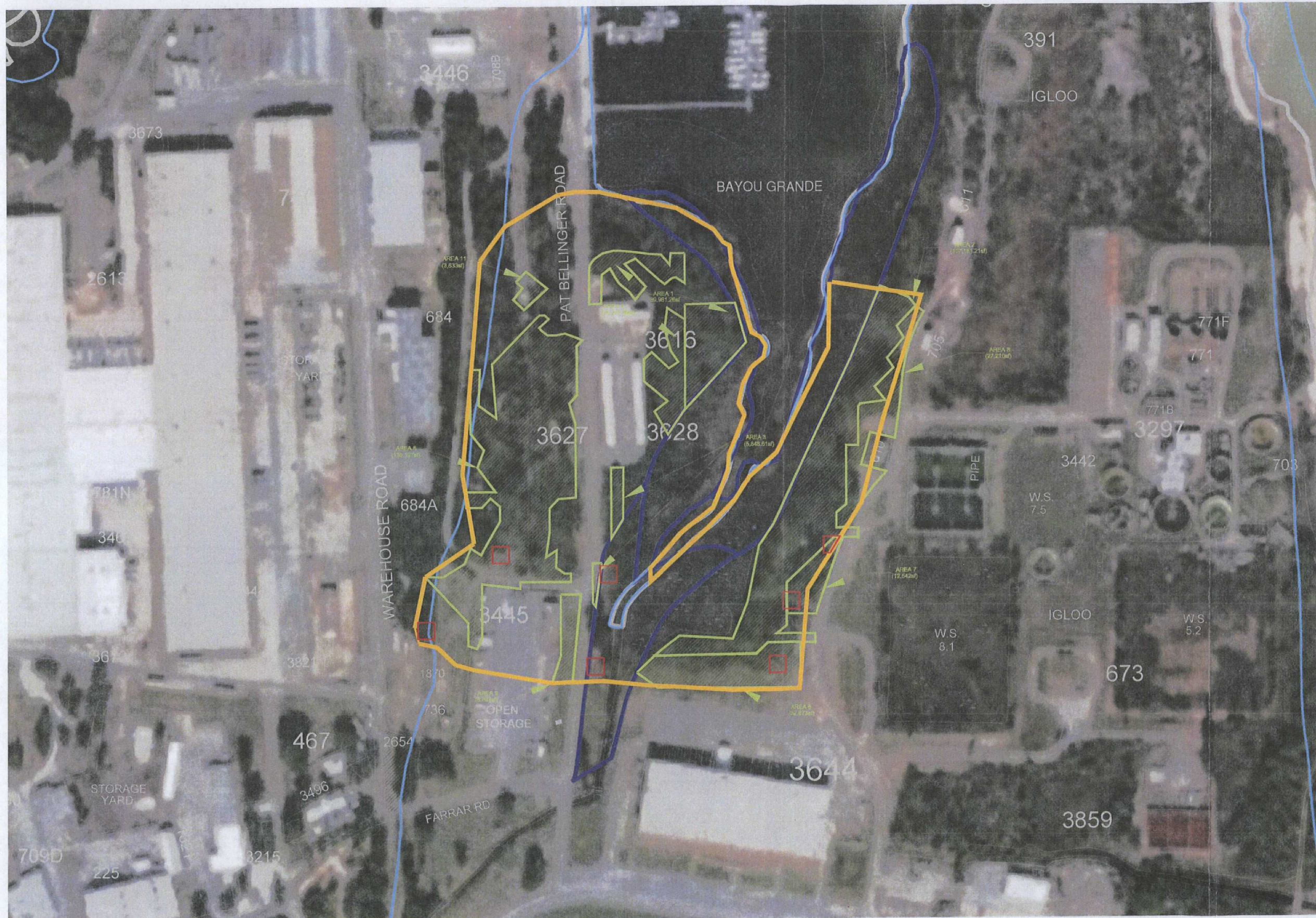
1986 Verification Study/Characterization Study - Monitoring wells and piezometers were installed throughout NAS Pensacola based on the IAS recommendations as part of a verification study. Volatile organic compounds (VOCs) were detected in groundwater sampled at Site 11, and the installation of additional wells was recommended. Two zones of groundwater contamination were identified based on the detection of lead, mercury, and VOCs in groundwater sampled at Site 11 as part of a Characterization Study. Gross alpha radiation below drinking water standards and chlorinated hydrocarbons were detected in groundwater at Site 27. Additional investigation was recommended. (Geraghty & Miller [G&M], 1984; G&M, 1986).

1991 Site Investigation - Site investigations were conducted by Radian Corporation/ABB Environmental Services (ABB) to evaluate VOC and radioactive contamination in soil at Sites 25 and 27. All parameters were at or near background levels (ABB, 1991).

1991 - 1992 Contamination Assessment - Contamination Assessments were conducted at Sites 11, 12, 25, and 27 in 1991 and 1992 to identify principal areas and primary chemicals of potential concern.

Metals, total recoverable petroleum hydrocarbons (TRPH), VOCs, polynuclear aromatic hydrocarbons (PAHs), and phenol were present in both unsaturated soils and in groundwater at Site 11. Floating petroleum product was observed in some site wells. Contamination was attributed to past waste disposal activities at the site (Ecology and Environment, Inc. [E&E], 1991a).

Metals, TRPH, VOCs, PAHs, phenols, and polychlorinated biphenyls (PCBs) were present in sediment, soil, and groundwater at Site 12. A potential source of radiation was documented in the southeast area of the site. Further investigation was recommended (E&E, 1991b).

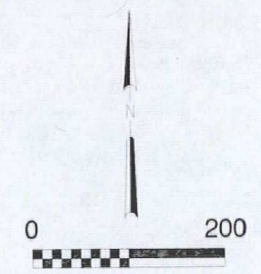
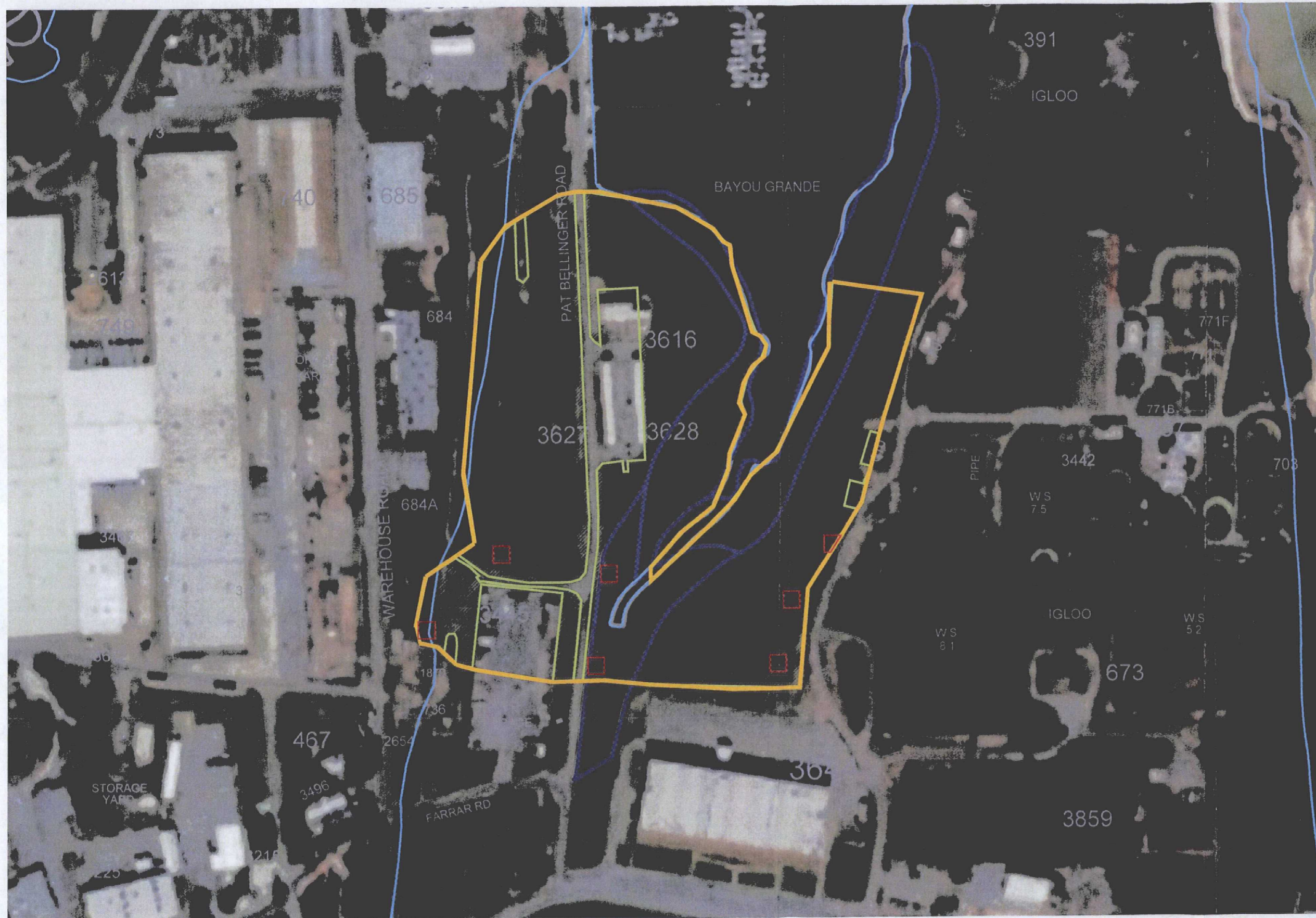


LEGEND

- 2010 RD - Proposed Soil Hotspot Excavation Boundary
- Site 11 Boundary
- 100 YR Floodplain
- Proposed Soil Cover Areas
Total Area = 463,699 sf
- Wetlands
- Building and Number

Figure 2-6
Proposed Native Soil Cover Areas
Site 11, OU-2, NAS Pensacola





- LEGEND**
- 2010 RD - Proposed Soil Hotspot Excavation Boundary
 - Site 11 Boundary
 - 100 YR Floodplain
 - Proposed Soil Cap with GCL
Total Area = 827,598 sf
 - Wetlands
 - Building and Number
3445

Figure 2-7
Proposed Area of Soil Cap with GCL
Site 11, OU 2, NAS Pensacola



At Site 27, metals were observed in soil near the drain and sewer lines at the former Building 709 location, and metals and Ra-226 were detected where surface spills may have occurred south of the building. VOCs, PAHs, arsenic, lead, phenols, and xylene were detected in groundwater on the north side of the building (E&E, 1992b).

1992 Site Inspection Report - Soil samples were analyzed for metals and limited semivolatile organic compounds (SVOCs) in investigations focused on areas adjacent to Site 27. The inspection results indicated that soil in the areas sampled would be classified as nonhazardous if removed for disposal.

1997 Remedial Investigation/Remedial Investigation Addendum - The RI for OU 2 completed in 1997 (Ensafe, 1997) included surface and subsurface soil sampling and groundwater sampling. Soil at Sites 12 and 27 were also screened and sampled for Ra-226. An RI Addendum (Ensafe, 2005a) was conducted in 2004 to provide additional soil and groundwater data in support of an FS at OU 2 (Ensafe, 2005b).

At Site 11, the source of contamination was identified to be the former landfill, and trenching revealed blackened debris at the water table composed of oily material with finely corroded bits of metal and other debris. Aroclor 1260, benzo(a)pyrene equivalents (BEQs), arsenic, beryllium, cadmium, chromium, and iron were identified as contaminants of potential concern (COPCs) in soil, and 1,2-dichloroethene (DCE), aldrin, chloroform, 1,2-dichloroethane (DCA), dieldrin, 1,1,2,2-tetrachloroethane, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride (VC) were identified as COPCs in groundwater at Site 11.

At Site 12, soil contaminants included primary/secondary metals, PCBs, and SVOCs. The source of contamination of the metals contamination was identified to be scrap metals storage. Past storage of old transformers, and residual fuels and oils from scrapped aircraft were the proposed sources for PCBs and SVOCs, respectively. Preliminary screening for Ra-226 identified two locations at the north-central portion of the site and a 15-foot by 50-foot area near the southeastern corner of the site as having potential radiological contamination. While Ra-226 was detected in five surface soil samples collected from these areas, no Ra-226 was detected in the remaining soil, vertically or horizontally, outside of the original sample locations. Aroclor 1260, BEQs, arsenic, cadmium, and iron were identified as COPCs in soil, and Aroclor 1260, chloroform, 1,1-DCE, dieldrin, heptachlor epoxide, and PCE were identified as COPCs in groundwater at Site 12. No free product was identified in any wells sampled during the RI.

At Site 27, radiological contamination was identified only in soil in a small area south of former Building 709. The source was thought to be a spill adjacent to an old stairway of the former building. No significant radium contamination from Ra-226 exceeding the FDEP drinking water standard of 5 picoCuries per liter [pCi/l] was observed in shallow, intermediate, or deep groundwater samples obtained across the site. BEQs, dieldrin, and metals (aluminum, arsenic, cadmium, chromium, iron, and mercury) were identified as COPCs in soil, and 1,4-dichlorobenzene, 1,1-DCE, 1,2-DCA, dieldrin, chloroform, PCE, and TCE were identified as COPCs in groundwater. Groundwater sampling conducted during the RI within and upgradient of Site 25 to verify radiological impact indicated no detections above the FDEP drinking water standard of 5 pCi/L.

2005 Feasibility Study - Data from the RI (Ensafe, 1997) and RI Addendum (Ensafe, 2005a) for sites at OU 2 were used to identify areas of risk to potential receptors that required mitigation through remedial action. The following remedial action objectives (RAOs) for soil and groundwater at OU 2 were established in the 2005 FS (Ensafe, 2005b) and included in the 2008 ROD:

- Protect human health by eliminating or preventing exposure to contamination in surface soil from COCs that exceed Florida residential and commercial/industrial SCTLs.
- Eliminate a continuing contamination source to groundwater by eliminating COCs in subsurface soil at concentrations that exceed Florida SCTLs for leachability.
- Reduce human health risk from exposure to groundwater by reducing groundwater contamination at OU 2 to meet Florida GCTLs.

In order to implement the RAOs, several soil and groundwater technologies were screened, and the following remedial action alternatives (RAAs) for soil and groundwater were evaluated for implementability, effectiveness, and cost in the 2008 ROD:

- *Alternative S-1:* No Action
- *Alternative S-2:* LUCs
- *Alternative S-3:* Soil and Asphalt Capping, and LUCs
- *Alternative S-4:* Phytoremediation Covers, Asphalt Capping, and LUCs
- *Alternative S-5:* Excavation and Offsite Disposal and LUCs
- *Alternative GW-1:* No Action
- *Alternative GW-2:* LUCs and Monitoring
- *Alternative GW-3:* MNA and LUCs
- *Alternative GW-4:* Riparian Corridors and LUCs
- *Alternative GW-5:* Permeable Reactive Barrier, Riparian Corridors, and LUCs
- *Alternative GW-6:* Groundwater Pumping and Discharge to Federally Owned Treatment Works
- *Alternative GW-7:* Groundwater Pumping, Treatment, and Discharge to Wetlands

2.1.3 Selected Remedy Presented in 2008 ROD

Alternative S-5 (Excavation and Offsite Disposal and LUCs) and alternative GW-3 (MNA and LUCs) were selected in the ROD as the remedy to eliminate unacceptable exposures to contaminants in soil and groundwater respectively at OU 2 (TtNUS, 2008a). The ROD identified select areas for removal and to establish LUC boundaries within Sites 11, 12, 25, 26, 27, and 30. Additionally, annual groundwater monitoring within an established monitoring well network coupled with LUCs to prevent potable use of groundwater was selected as the groundwater remedy for OU 2.

Public notice of the availability of the 2008 Proposed Plan was placed in the *Pensacola News Journal* on May 11, 2008. A 45-day comment period was held from May 12 to June 25, 2008. No comments were received during the public comment period.

2.2 Basis for the ROD Amendment

2.2.1 Discovery of ACM at Site 11

The remedy selected for Site 11 in the 2008 OU 2 ROD was selected to meet the RAOs for soil and groundwater based on COCs identified in the RI (Ensafe, 1997) and the RI Addendum (Ensafe, 2005a). The 2008 ROD soil remedy for Site 11 includes removal of surface soil (0 to 2 feet below ground surface [bgs]) from seven areas (totaling approximately 811 yd³) and offsite disposal of the excavated soil. The locations of these removal areas at Site 11 are shown on Figure 2-2. Details of the remedy implementation were included in the Final Remedial Design for Operable Unit 2 (TtNUS, 2010) (RD).

During 2010, AGVIQ-CH2M HILL began preparations to implement the soil remedy of surface soil excavation identified in the 2008 ROD. While performing utility locate activities at the seven soil excavation areas within Site 11, tile, brick/mortar, and fibers suspected to be ACM were observed at the surface and within the top few inches of surface soil at three of these seven excavation areas identified for excavation. Samples of the material were sent to an offsite laboratory for asbestos analysis. The suspect tile and fibers were found to contain chrysotile and amosite forms of asbestos. The ACM is considered to be in poor condition from weathering in the environment, and if it is not currently friable, would become friable through excavation and construction activities as well as from additional weathering. Based on this finding, asbestos is a newly-identified COC for soil at Site 11.

A field effort conducted in 2013 to determine the thickness of the existing soil cover at Site 11 indicated that the landfill cover is less than 2 feet thick at multiple locations (as shown in Figure 2-3). No readings for radiological constituents were detected above background levels based on radiological safety screening conducted for worker protection during this field effort. Delineation and removal of ACM within the landfill would require excavation of the landfill contents, which in addition to being cost-prohibitive, would present a health hazard to the workers executing the task and would adversely impact the surrounding environment and is therefore not planned at Site 11.

While the 2008 ROD soil remedy is being implemented at Site 11, it is not sufficient to address direct exposure to asbestos and other landfill contents found present near the ground surface at several areas within Site 11. Therefore, a modification to the 2008 ROD is required to identify asbestos as a COC at Site 11 and to amend the soil remedy to address exposure to asbestos and other landfill contents present near the ground surface at several locations within Site 11.

2.2.2 Identification of Ra-226 as a COC at Sites 11 and 27

Based on the potential of radiological impact from past site activities, a radiological scoping survey was performed by AWS (AWS, 2012) at Sites 12 and 27 under the direction of the Navy's RASO during 2009. Final status surveys were conducted during implementation of a soil removal action at these sites during 2010 and 2011. Although Sites 12, 25, and 27 were screened for Ra-226 during RI activities (Ensafe, 1997), this constituent was not included as a COC for these sites in the ROD (TtNUS, 2008a).

The radiological surveys conducted at Site 25 during 2009 and 2010 indicated that it was not radiologically impacted from past site activities and, in accordance with the Multi-Agency

Radiation Survey and Site Investigation Manual (MARSSIM) (EPA, 2000), it was recommended that the site be radiologically released for unrestricted use (AWS, 2012).

Based on radiological surveys conducted at Sites 12 and 27, RASO recommended excavation of soils with Ra-226 contamination above cleanup goals. In 2010 and 2011 a soil removal action was completed at Sites 12 and 27 to meet the following cleanup goals:

- Site-specific derived concentration guideline limit (DCGL) for Ra-226 of 1.61 pCi/g
- EPA-recommended Total Effective Dose Equivalent (TEDE) of 15 millirems per year (mrem/yr) (since revised by EPA during 2014 to 12 mrem/yr)
- EPA-recommended cancer risk range of 10^{-4} to 10^{-6}
- EPA-recommended cleanup goal of 5 pCi/g above background per 40 CFR 192 (which equates to a goal of 6 pCi/g)

Excavations were completed to a depth of 2 to 6 feet bgs at Site 12 and 2 to 3 feet bgs at Site 27, and a total of approximately 1,550 tons of Ra-226 impacted soil were transported offsite for disposal. Figures 2-4 and 2-5 show excavation boundaries for Ra-226-contaminated soil removals at Sites 12 and 27, respectively. After conclusion of these soil removals, the calculated TEDE were 2.53 mrem/year and 1.78 mrem/year for the excavated areas at Sites 12 and 27, respectively, and the cancer risk was calculated at 2.5×10^{-6} and 6.6×10^{-6} for the excavated areas at Sites 12 and 27 respectively, below EPA-recommended criteria. Further, confirmation sample results from the excavated areas at Sites 12 and 27 did not exceed the DCGL or natural background radiation levels (AWS, 2012). The confirmation sample results also showed that Ra-226 concentrations did not exceed the EPA-recommended cleanup goal of 5 pCi/g above background per 40 CFR 192 (which equates to a goal of 6 pCi/g).

Six monitoring wells were sampled for verification of Ra-226 impact to groundwater at Sites 12 and 27. One of the six monitoring wells was outside Sites 12 and 27, and was sampled to provide a background reading for Ra-226. The remaining wells comprised of wells screened in the shallow and intermediate zones and were either within or downgradient of the excavation areas at Sites 12 and 27. Analytical results from these wells showed Ra-226 concentrations to be below the EPA and FDEP drinking water standard of 5 pCi/l for combined Ra-226/Ra-228 (AWS, 2012).

Based on these findings, no additional remedial action related to Ra-226 was required for the survey units at Sites 12 and 27, and they were recommended for radiological release for unrestricted use. The term "radiologically released for unrestricted use" is a MARSSIM term used to refer to sites where Ra-226 contamination has been removed below RASO and EPA cleanup goals for unrestricted use. The 2008 ROD includes LUCs to prevent unrestricted land use at all sites within OU 2 and these restrictions will apply to Sites 12 and 27 also. Further investigation at a future date along the drain lines underneath the parking lot area at Site 27 was recommended. (AWS, 2012). These recommendations have received concurrence from FDEP and EPA.

The 2008 ROD soil remedy of excavation and offsite disposal with LUCs was implemented for the remedial activities at Sites 12 and 27 as described above. The remedial actions at Sites 12 and 27 described above together with the inclusion of Ra-226 as a soil COC at these two sites need to be documented, and this documentation forms an additional basis for this ROD Amendment.

2.2.3 ROD Amendment Document Support

Documents in the Administrative Record file that identify asbestos as a COC include the Integrated Cultural Resources Management Plan, Section 1 - NAS Pensacola Historic Context (HHM, 2007) and the *Final Feasibility Study Addendum for Operable OU 2* (AGVIQ-CH2M HILL, 2015a) (FSA) and the *Final Revised Proposed Plan for OU 2* (AGVIQ-CH2M HILL, 2015b) (Revised PP).

Documents identifying Ra-226 as a COC at OU 2 include the *Scoping Survey Report, Sites 12, 25 and 27, Naval Air Station Pensacola*, (AWS, 2009), *Final Status Survey Report, Naval Air Station Pensacola*, (AWS, 2012), the FSA and the Revised PP.

The FSA and Revised PP also document the technical basis and rationale behind the selection of the additional soil remedy components for Site 11 included in this ROD Amendment.

The Revised Proposed Plan was mailed out to recipients on the NAS Pensacola Public Affairs Office's notification list prior to the public comment period, on April 14, 2015. Five copies of the Revised Proposed Plan were also placed at the John C. Pace Library at the University of West Florida in Pensacola, Florida. A public notice of the availability of the Revised Proposed Plan was placed in the weekly classified section of the *Pensacola News Journal* for the week of April 13, 2015. The 30-day comment period was facilitated from April 15 to May 15, 2015. No comments were received from the public during this 30-day comment period.

2.2.4 Summary of Site Risks

As part of site investigation activities for the RI completed in 1997 for OU 2, the Navy completed a human health risk assessment (HHRA) and screening-level ecological risk assessment to evaluate potential current and future effects of the chemicals detected at all sites within OU 2 on human health and the environment. These were documented in the 1997 RI Report, the 2008 Proposed Plan and ROD.

2.2.4.1 Human Health Risks

The HHRA took into account various Florida soil and groundwater criteria per Chapter 62-777 Florida Administrative Code (F.A.C.) to evaluate exposure to COPCs and to establish preliminary remediation goals as part of the CERCLA RI/FS process in accordance with NCP requirements.

The soil criteria include SCTLs for direct contact (i.e., ingestion, dermal contact, and inhalation), SCTLs for leachability to groundwater, and background levels for metals.

Using criteria developed according to Chapter 62-777, F.A.C., it was determined that potential unacceptable risks were associated with exposure to BEQs, Aroclor-1260, and

metals (arsenic, cadmium, and chromium) for current and future industrial workers and trespassers and hypothetical future residents.

Based on the risk evaluation of COC concentrations in surface soil, seven locations within the southern portion of Site 11 were selected for removal to reduce risk of leaching (from cadmium and chromium) to groundwater, and to reduce risks from direct exposure to BEQs under an industrial scenario. To implement the soil remedy previously selected in the 2008 ROD as retained in the current amended remedy proposal, the Navy plans to undertake such "hot-spot" soils removals as part of the remedial action for OU 2.

The RI risk assessment did not identify asbestos as a COC because the presence of ACM in soil at Site 11 was not discovered until soil removal preparatory activities were undertaken in 2010, after the RI, FS, and ROD for OU 2 had already been completed. Subsequent to the discovery of the ACM, the NAS Pensacola Partnering Team discussed the potential for ACM to be distributed throughout the landfill and could not rule out that potential without investigation of the entire landfill. Additionally, measurements of existing soil cover thickness at Site 11 conducted during 2013 indicated that landfill contents are present close to the ground surface in several areas with less than 2 feet of soil cover.

2.2.4.2 Ecological Risks

The primary objective of the screening-level ecological risk assessment was to evaluate whether the terrestrial ecosystem was potentially at risk when exposed to chemicals at Site 11. The screening-level ecological risk assessment was completed for only surface soil at OU 2. The three-step screening process is discussed below.

Step 1 – Problem Formulation

In this step, the screening level ecological risk assessment evaluated whether ecological receptors are able to exist and grow in similar ways to the surrounding area. Actual or potential exposures of ecological receptors were determined by identifying the most likely pathways of contaminant release and transport. A complete exposure pathway has three components: (1) a source of chemicals that can be released to the environment, (2) a route of contaminant transport through an environmental medium, and (3) an exposure or contact point for an ecological receptor. The complete exposure pathways and routes of entry into biota at Site 11 consist of:

- Direct contact with surface soil by invertebrates and plants.
- Ingestion of surface soil by invertebrates.

Step 2 – Risk Analysis

In this step, possible harmful effects from being exposed to the individual COPCs were evaluated. This step included estimating or measuring the amount of each COPC in soil and then evaluating ecological receptor exposure to these chemical concentrations.

Step 3 – Risk Characterization

In this step, the results of the risk analysis were analyzed to determine the likelihood of harmful effects to ecological receptors at Site 11. The Navy is conducting supplemental investigations including a groundwater-to-surface water interface study and wetlands

investigations downgradient of Site 11 to verify residual impacts to sediments and surface water from previous activities and contaminants in the landfill.

2.3 Description of Remedial Alternatives

This section summarizes the remedy components selected in the 2008 ROD and describes the amended remedy components of two additional remedial alternatives discussed in the FSA and summarized in the Revised PP.

The selected remedy for soil as presented in the 2008 ROD was Alternative S-5: Hotspot Excavation and Offsite Disposal and LUCs. The remedy was selected because this alternative was determined to best satisfy the nine criteria used for comparative analysis of alternatives. Surface soils exceeding FDEP industrial direct exposure SCTLs and leachability to groundwater (LGW) SCTLs were to be excavated and disposed of offsite, while direct exposure to surface soils with contaminant concentrations exceeding direct exposure residential SCTLs were to be addressed by implementation of LUCs that prevent residential land use including, but not limited to, any form of housing; childcare facilities; any kind of school including preschools, elementary schools, secondary schools, or playgrounds; and adult convalescent or nursing care facilities. For further information on the remedial alternatives evaluated for soil, see the FS (Ensafe, 2005b), 2008 PP (TtNUS, 2008b), and 2008 ROD (TtNUS, 2008a).

However, based on the findings of ACM and exposed landfill contents in surface soils at Site 11, this alternative no longer fully meets the threshold criteria for the protection of human health and the environment or compliance with ARARs pertaining to direct exposure after the 2008 ROD was approved. Therefore, the Navy, FDEP and EPA have agreed that this alternative requires enhancement with additional remedy components to meet the threshold criteria and ARARs and form a viable soil remedy for Site 11.

Two sets of remedy components were considered for evaluation in the FSA. The first set of remedy components was identified as Alternative S-6 which includes excavation and offsite disposal of soils (retained from the 2008 ROD), capping using a native soil cover and LUCs. The second set of remedy components was identified as Alternative S-7 which includes excavation and offsite disposal of soils (retained from the 2008 ROD), capping using a single-barrier geosynthetic clay liner (GCL) and LUCs. ARARs pertaining to these remedial components were also included in the FSA.

Alternative S-6 retains the components of the soil remedy selected in the 2008 ROD (excavation and offsite disposal of soils with LUCs), adds the new remedy component of enhancement of the existing soil cover to ensure a 2-foot native soil cap (including 6 inches of topsoil to facilitate vegetative growth) across the Site 11 footprint and expands the LUC component to ensure the integrity of the soil cover through regular maintenance and site inspections.

Figure 2-6 shows the footprint of the native soil cover enhancement based on existing soil cover thickness.

The following additional RAOs are now included for adoption in light of the identification of asbestos as a soil COC at Site 11, the presence of landfill contents near the surface at Site 11, and the identification of Ra-226 as a soil COC at Sites 12 and 27.

- Prevent human exposure to asbestos in surface soils and eliminate contamination in surface and subsurface soils from Radium-226 that exceed pertinent Federal and State ARARs.
- Within the boundaries of the Site 11 landfill, prevent human and ecological exposure(s) to buried wastes.

2.3.2 Expected Outcomes

The ROD Amendment will preserve the 2008 ROD expected outcomes relative to the soil removals, land use (industrial), the cleanup levels (SCTLs for soil and GCTLs for groundwater) and LUCs for soil and groundwater. Additional expected outcomes will include:

- Prevention of exposure to asbestos and landfill contents present near the surface at soil via implementation of additional remedy components at Site 11 as described in Section 2.4.1,
- Enhancement of LUCs as described in Section 2.4.1,
- Inclusion of measures to satisfy ARARs pertaining to the presence of asbestos in soil at Site 11, and inclusion of ARARs and requirements to address potential future remedial actions for Ra-226 within OU 2 as described in Section 2.4.1.

The resulting amended remedy and inclusion of additional soil COCs are more robust than the previous remedy and list of COCs included in the 2008 ROD and are also more suitable for current site conditions at Sites 11, 12 and 27 within OU 2.

2.4 Summary of Comparative Analysis of Original and Amended Remedy

The EPA guidance document *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Document* (EPA, 1999) recommends that ROD Amendments include a comparative analysis of the original selected remedy with the amended remedy using the nine criteria stipulated in the NCP (40 CFR §300.430) and OSWER Directive Number 9355.3-1.

The following sections provide the comparative analysis between the original remedial alternative for soil from the 2008 ROD (Alternative S-5: Excavation and Offsite Disposal with LUCs) with the selected amended remedial alternative (Alternative S-6: Excavation and Offsite Disposal with Native Soil Cover and LUCs) for seven of the nine criteria mentioned above. The two remaining criteria (State and Community Acceptance) were assessed during the public comment period of the Revised Proposed Plan. No adverse comments on the amended Site 11 remedy as proposed therein were received from the local community. FDEP on behalf of the State of Florida has indicated its support for amending that remedy.

As indicated in Section 2.3, Alternative S-7 (excavation, offsite disposal of soils and single-barrier GCL cap with LUCs) was compared with Alternative S-6 in the FSA but was not identified in the Revised PP as the preferred soil remedy for Site 11. However, for reference, information pertaining to Alternative S-7 (excavation, offsite disposal of soils and single-barrier GCL cap with LUCs) has been included in the following sections.

2.4.1 Threshold Criteria

2.4.1.1 Overall Protection of Human Health and the Environment

Alternative S-5 (excavation, offsite disposal of soils with LUCs) would provide adequate protection of human health and the environment in selected areas only by removing soils in those areas with contaminant concentrations above the FDEP industrial direct exposure and leachability SCTLs, but not elsewhere within Site 11 where landfill contents are present near the surface. LUCs would not ensure protectiveness against potential for exposure to asbestos and landfill contents outside of the selected excavation areas where the existing cover is less than 2 feet thick.

Alternative S-6 (excavation, offsite disposal of soils and native soil cover with LUCs) will provide adequate protection of human health and the environment by removing soils with contaminant concentrations above the FDEP industrial direct exposure and leachability SCTLs per the original remedy, and by the additional elimination of potential human and ecological exposure to asbestos and other landfill contents through the placement of the native soil cover. Under this alternative, more robust LUCs will be implemented and maintained to ensure future cap integrity and to prohibit unrestricted land uses at the site.

Alternative S-7 (excavation, offsite disposal of soils and single-barrier GCL cap with LUCs) would also be protective of human health by removing soils with contaminant concentrations above the FDEP industrial direct exposure and leachability SCTLs per the original remedy, and by the additional elimination of potential human and ecological exposure to asbestos and other landfill contents through the placement of the single-barrier GCL cap. Under this alternative, LUCs would prevent potential future exposure to asbestos and other landfill contents through maintenance and site inspections to ensure cap integrity.

It is worth noting that one of the technical justifications for employing the use of more impermeable GCL caps at former landfill sites would be to reduce future infiltration of stormwater through the landfill's wastes. For Site 11, however, various factors negate both the practicality and potential protectiveness of employing such a measure. First, to truly be effective as an impermeable cap the footprint of the single-barrier GCL cap would need to extend into existing wetlands since some landfill contents have been identified to be present beneath wetland areas/vegetation. Therefore, to implement Alternative S-7, at least portions of the wetland areas and tidal pools on either side of the Yacht Basin would need to be covered with the GCL cap. Prior to cap placement all vegetation present both upland and in the affected wetland areas would need to be cleared to place the sub base, GCL, and topsoil layers. Thus, the existing sensitive ecosystem would be significantly impacted. In addition, it is not expected that overall protectiveness would be furthered by creating an impermeable surface environment. Any such condition would effectively reduce demonstrated aerobic activity and thereby also potentially increase the mobilization of inorganics to shallow groundwater over time. Additionally, during maintenance, any roots from vegetation that

penetrate the GCL would need to be removed regularly to preserve the impermeability of the GCL.

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

Section 121(d) of CERCLA, as amended, specifies, in part, that remedial actions for cleanup of hazardous substances must comply with requirements and standards under federal or more stringent state environmental laws and regulations that are applicable or relevant and appropriate (i.e., ARARs) to the hazardous substances or particular circumstances at a site or obtain a waiver. See also 40 C.F.R. § 300.430(f)(1)(ii)(B). ARARs include only federal and state environmental or facility siting laws/regulations and do not include occupational safety or worker protection requirements. Compliance with OSHA standards is required by 40 C.F.R. § 300.150 and therefore the CERCLA requirement for compliance with or waiver of ARARs does not apply to OSHA standards.

For purposes of ease of identification, the EPA has created three categories of ARARs: Chemical-Specific, Action-Specific and Location-Specific.

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. Chemical-Specific ARARs are used to establish remediation levels for restoration of groundwater and surface water that are current or potential sources of drinking water.

Action-specific ARARs are usually technology-based or activity-based requirements or limitations that control actions taken at hazardous waste sites. 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.

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).

Under 40 C.F.R. § 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 C.F.R. § 300.515(d). Accordingly, EPA and the State of Florida have identified the ARARs pertaining to the various potential actions pertaining to each of the remedial alternatives evaluated for soil at Site 11 along with the previously-selected groundwater remedy of MNA with LUCs.

Alternative S-5 (excavation, offsite disposal of soils with LUCs) would comply with all federal and state ARARs pertaining to the soil removals and associated LUCs only. Soil contaminated with COCs exceeding industrial direct exposure SCTLs and LGW SCTLs would be removed, and excavations backfilled with a minimum of 1.5 feet of clean backfill and 6 inches of topsoil. Additionally, LUCs would be implemented to prevent residential land use and potable use of groundwater, however, these LUCs alone are currently not extensive enough to eliminate the direct exposure to asbestos and other landfill contents at other locations within Site 11 where soil removals would not be conducted under this alternative. Strict controls will be implemented to ensure worker safety and prevent potential exposure to airborne asbestos and other wastes posing a potential direct exposure hazard to human health at three excavation locations where ACM has been previously

encountered during preliminary planning activities. Additionally, Federal and State ARARs pertaining to hazardous waste management will be followed.

Alternative S-6 will comply with all federal and state ARARs. Soil contaminated with COCs exceeding industrial direct exposure SCTLs and LGW SCTLs will be removed and ACM and landfill contents will be covered by a minimum of 1.5 feet of clean backfill and 6 inches of topsoil. Additionally, LUCs will be implemented to prevent residential land use, prevent potable use of groundwater, and to eliminate the direct exposure to asbestos and other landfill contents; regular maintenance and inspection will be conducted to ensure the integrity of the soil cover. During emplacement of the soil cover, activities will comply with the National Emission Standards for Hazardous Air Pollutants (NESHAP) asbestos air emission controls. Strict controls will be implemented to ensure worker safety and prevent potential exposure to airborne asbestos and other wastes posing a potential direct exposure hazard to human health.

Since Alternative S-6 will disturb greater than 1 acre of land, the remedial action will comply with the ARARs associated with the National Pollutant Discharge Elimination System (NPDES) Storm Water Program, specifically the substantive requirements of the 2012 NPDES General Permit for Discharges from Construction Activities. Accordingly, a Stormwater Pollution Prevention Plan (SWPPP) that addresses these requirements will be prepared and implemented. Additionally, Federal and State ARARs pertaining to hazardous waste management and emplacement of engineering controls will be followed. Should implementation of the soil cover affect wildlife habitat, the action will comply with the Endangered Species Act requirement to conserve endangered or threatened species and their habitat, unless otherwise authorized by the United States Fish and Wildlife Service (USFWS).

Alternative S-7 (excavation, offsite disposal of soils and single-barrier GCL cap with LUCs) would comply with all federal and state ARARs. Contaminated soil with COCs exceeding industrial direct exposure SCTLs and LGW SCTLs would be removed, and ACM in soil and landfill contents would be covered by a minimum of 2 feet of clean backfill, a GCL liner, and 0.5 foot of topsoil for vegetative cover. Additionally, LUCs will be implemented to prevent residential land use, prevent potable use of groundwater; and regular maintenance and inspection will be conducted to ensure the integrity of the soil covers. During emplacement of the single-barrier cap with GCL, activities would likewise need to comply with the NESHAP asbestos air emission controls. Strict controls would be implemented to ensure worker safety and prevent potential exposure to airborne asbestos and other wastes posing a direct exposure hazard to human health.

Since emplacement of the single-barrier clay cap with GCL at Site 11 would include disturbing wetlands within the site boundary, the substantive requirements of the USACE Nationwide Permit 38 and FDEP ERP Program will need to be complied with for this alternative. Should proposed capping within a wetlands area affect wildlife habitat, the action will comply with the Endangered Species Act requirement to conserve endangered or threatened species and their habitat, unless otherwise authorized by the USFWS. Because the proposed soil cover will disturb greater than 1 acre of land, the proposed action will comply with the ARARs associated with the NPDES Storm Water Program, specifically the substantive requirements of the 2012 NPDES General Permit for Discharges from Construction Activities. Accordingly, a SWPPP that addresses these requirements will be

prepared and implemented. Additionally, Federal and State ARARs pertaining to hazardous waste management and emplacement of engineering controls would need to be satisfied.

Five-Year Review Requirement: Because hazardous substances will remain at the site above levels that allow for unlimited exposure and unrestricted use, the Navy will review the final remedial action no less than every five (5) years, per CERCLA Section 121(c) and the NCP at 40 CFR § 300.430f(4)(ii). 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 Navy, EPA and FDEP.

2.4.2 Primary Balancing Criteria

2.4.2.1 Long-Term Effectiveness and Permanence

Alternative S-5 (excavation, offsite disposal of soils with LUCs) would permanently eliminate COCs above the FDEP industrial direct exposure and leachability SCTLs in site surface soils in the areas selected for excavation. However, where the landfill cover is not maintained at a minimum thickness of 2 feet, there is no protection against exposure to landfill contents, including asbestos and other landfill contents.

Alternative S-6 (excavation, offsite disposal of soils and native soil cover with LUCs) will be effective in the long term. Excavation and offsite disposal of surface soils with contaminant concentrations above FDEP industrial direct exposure and leachability SCTLs will permanently eliminate these contaminant sources. Enhancement of LUCs for Alternative S-6 will require continued maintenance to ensure that damage by erosion, vegetative perturbation, and geotechnical stability do not reduce the effectiveness. The effect of these limiting factors can be minimized through proper design, construction, and maintenance program implementation. Revegetation of the cover surface with native plants and trees significantly minimizes cover erosion over the long-term.

Under the Alternative S-7 scenario, because of the direct impact from periodic storm surges in Bayou Grande from storms and hurricanes, areas of the single-barrier cap along the shoreline will be submerged under the storm surge and could suffer significant erosion (because of the lack of wetland vegetative growth possible over a GCL cap) potentially requiring extensive future repairs on a regular basis. Until repaired, cap effectiveness would likely be compromised. Also, preservation of the GCL cap will require suppression of the growth of vegetative material with deep root systems that could otherwise minimize erosion of areas adjacent to the shoreline.

2.4.2.2 Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative S-5 (excavation, offsite disposal of soils with LUCs) does not involve treatment of contaminated soils, but is largely a control technology that would reduce the toxicity, mobility and volume of waste in only a limited area (but not over the entire site) due to the small footprint of the soil removals compared to the large area of the landfill at Site 11.

Alternative S-6 (excavation, offsite disposal of soils and native soil cover with LUCs) does not involve treatment of contaminated soils but is largely a control technology. It will reduce the total volume and toxicity of waste to be left-in-place through the selected soil removal and will also reduce waste mobility due to the soil cover placement.

Alternative S-7 (excavation, offsite disposal of soils and single-barrier GCL cap with LUCs) does not involve contaminated soils, but is largely a control technology that would not reduce the volume, mobility, and toxicity of waste through treatment, but would reduce waste volume through soil removal and the mobility of waste materials through cap emplacement. However, as previously noted, the expected reduction of aerobic conditions due to prevention of oxygen-rich stormwater infiltration into the subsurface could lead to increased inorganics mobility to shallow groundwater over time, which would be of concern.

2.4.2.3 Short-Term Effectiveness

Alternative S-5 (excavation, offsite disposal of soils with LUCs) would provide immediate effectiveness by eliminating potential human and ecological exposures to contaminated surface soils but only in the selected excavation areas and not elsewhere within Site 11 where the landfill cover does not have a minimum thickness of 2 feet. To limit potential for exposure to asbestos and landfill contents present near the surface to onsite workers during excavation of selected areas, proper personal protective equipment (PPE), and engineering controls would be required.

Alternative S-6 (excavation, offsite disposal of soils and native soil cover with LUCs) will be immediately effective at reducing direct exposure due to the combination of the removal of soils with COC concentrations above FDEP industrial direct exposure and leachability SCTLs and placement of a native soil cover to eliminate exposure to asbestos and other landfill contents. Because the surface soil over much of the site will not be disturbed during placement, limited engineering controls are required. To limit potential for exposure to asbestos and landfill contents present near the surface to onsite workers during construction, proper personal protective equipment (PPE), and engineering controls will be required.

Alternative S-7 (excavation, offsite disposal of soils and single-barrier GCL cap with LUCs) would be immediately effective at reducing direct exposure through the removal of soils with COC concentrations above FDEP industrial direct exposure and leachability SCTLs and placement of a single-barrier GCL cap to eliminate exposure to asbestos and other landfill contents. Upgrades to PPE, and stringent safety and engineering controls would be required during construction to minimize disturbance of soil potentially containing asbestos and prevent exposure to onsite workers during placement.

2.4.2.4 Implementability

Alternative S-5 (excavation, offsite disposal of soils with LUCs) would be implemented using well-established technologies with conventional equipment and standard construction methods.

Alternative S-6 (excavation, offsite disposal of soils and native soil cover with LUCs) will be implemented using well-established technologies with conventional equipment and standard construction methods. This alternative will require confirmation that the cover is of appropriate thickness during development of the full-scale design, and will require periodic post-implementation inspections. Services and materials required for the native soil cover are available locally thus allowing flexibility and logistical ease for staging and import of soil cover material. Native soil covers require routine maintenance to minimize cap erosion. Enhancement of native soil cover across the site will preserve the native vegetation

and sensitive ecosystems by placing fill material in upland areas and around existing large trees. Existing wetland vegetation and topsoil will be preserved under Alternative S-6 and thus will preclude exposure to underlying landfill contents. Because contamination is left onsite, the soil cover enhancement alternative includes implementation of LUCs to preclude unlimited use and unrestricted exposure (UU/UE).

Alternative S-7 (excavation, offsite disposal of soils and single-barrier GCL cap with LUCs) could be implemented using well-established technologies with conventional equipment and standard construction methods. However, since as previously noted the footprint of the single-barrier GCL cap would need to be more extensive in areal coverage than the native soil cover, it would require more extensive clearing of upland and wetland vegetation including removal of the tree stumps and root balls, placement, compaction, and grading of a sub base layer of soil; placement of a GCL over the sub base based on a detailed design; and placement of a final layer of topsoil to facilitate vegetative cover. Implementability would also be more complex than Alternative S-6 because existing surface features such as concrete areas, building foundations, paved roads, and parking areas would have to be effectively incorporated into the design in order to provide a smooth, unobstructed sub-base for the single-barrier GCL cap. The single-barrier GCL cap would need to be continuous (without gaps) with adequate overlap of the GCL panels, strict control of the timing of bentonite hydration and protection of hydrated GCL during placement of topsoil. Additionally, a smooth layer on top of the clay cap would be required for unimpeded drainage of storm water. Because contamination is left onsite, the single-barrier GCL cap alternative includes implementation of LUCs to preclude UU/UE.

Surface features currently present at Site 11, such as dense stands of trees, existing structures, asphalt, and concrete areas, would need to be effectively incorporated into the design in order to provide a smooth, unobstructed sub-base for the GCL cap. The GCL cap would need to be continuous (without gaps) and a continuous drainage layer on top of the clay cap would be required for unimpeded drainage of stormwater.

2.4.2.5 Cost

Alternative S-5

Alternative S-5 (excavation, offsite disposal of soils with LUCs) includes the following assumptions:

- Removal and offsite disposal of contaminated surface soils in seven areas identified in the 2008 ROD and the 2010 RD, estimated to total up to approximately 811 yd³.

The estimated total capital cost for the excavation and offsite disposal of soils is \$373,935.

Alternative S-6

Alternative S-6 (excavation, offsite disposal of soils and native soil cover with LUCs) includes the following assumptions:

- Removal and offsite disposal of contaminated surface soils in seven areas identified in the 2008 ROD and the 2010 RD, estimated to total up to approximately 811 yd³.
- Placement of approximately 39,500 yd³ of fill in areas shown on Figure 2-6 to include 6 inches of topsoil with hydroseeding in disturbed upland areas for native revegetation and selected planting along wetland areas to preserve and enhance existing wetland

vegetative cover. These revegetative actions are expected to preclude alteration of future land use for industrial use at Site 11.

- Air monitoring for asbestos during initial placement of the fill material
- Maintenance of the cover required as part of the LUCs

The estimated total capital cost for the excavation and offsite disposal of soils with COCs exceeding the FDEP industrial direct exposure and leachability SCTLs is \$373,935.

The estimated total capital cost for placement of the native soil cover and associated LUCs is \$1,608,052. The present worth cost for operation and maintenance (O&M) for this alternative is \$210,859, with a total present worth cost of \$1,818,911.

Alternative S-7

Alternative S-7 (excavation, offsite disposal of soils, and single-barrier GCL cap with LUCs) includes the following assumptions for the included remedy components:

- Removal and offsite disposal of contaminated surface soils in seven areas identified in the 2008 ROD and the 2010 RD, estimated to total up to approximately 811 yd³
- Placement of approximately 73,542 yd³ of sub base (average thickness of 2 feet) in upland and wetland areas, GCL placement over 827,569 SF in fill areas shown on Figure 2-3 and 12,291 yd³ of topsoil over the GCL (6 inches thick) to ensure revegetation of the cap surface
- Air monitoring and dust suppression for asbestos during initial placement of the sub base fill material
- Maintenance of the cover required as part of the LUCs

The estimated total capital cost for the excavation and offsite disposal of soils with COCs exceeding the FDEP industrial direct exposure and leachability SCTLs is \$373,935. The estimated total capital cost for placement of the single-barrier GCL cap and associated LUCs at Site 11 is \$3,769,147. The present worth cost for O&M for this alternative is \$263,574, with a total present worth cost of \$4,032,721.

Table 2-1 summarizes the comparison between Alternative S-5, Alternative S-6, and Alternative S-7.

2.4.3 Support Agency Comments

Based on the findings of ACM and exposed landfill contents in surface soils at Site 11, the soil remedy for Site 11 selected in the 2008 ROD no longer completely meets threshold criteria for protection of human health or compliance with ARARs pertaining to direct exposure. FDEP and EPA have agreed that this alternative requires enhancement with additional remedy components to form a viable remedy for Site 11. The FSA and the Revised PP which provide the rationale for the amended remedial alternatives evaluation and selection have been reviewed and approved by FDEP and EPA during 2015.

Support agency comments on the Draft ROD Amendment are included in Appendix A of this ROD Amendment.

TABLE 2-1
Comparative Analysis of Original and Amended Remedial Alternatives for Soil at Site 11, OU 2
OU2, NAS Pensacola

Evaluation Criteria	Alternative S-5: Excavation and Offsite Disposal of Soils and LUCs	Alternative S-6: Excavation, Offsite Disposal of Soils and Native Soil Cover with LUCs	Alternative S-7: Excavation, Offsite Disposal of Soils and Single-Barrier GCL Cap with LUCs
Threshold Criteria			
Overall Protection of Human Health and the Environment	Excavation and offsite disposal of soils with COC concentrations above the FDEP industrial direct exposure and leachability SCTLs in select locations would contribute towards protectiveness of both human health and environment by eliminating contaminant sources in surface soil in those areas only but not elsewhere within Site 11 where landfill contents are present near the surface. LUCs would not ensure protectiveness against the potential for exposure to asbestos and landfill contents outside of the selected excavation areas where the existing cover is less than 2 feet thick.	Excavation and offsite disposal of soils with COC concentrations above the FDEP industrial direct exposure and leachability SCTLs will contribute towards protectiveness of both human health and environment by eliminating contaminant sources in surface soil. Placement of native soil cover followed by implementation of LUCs will further ensure protectiveness by preventing the potential for exposure to asbestos and landfill contents and by controlling erosion to prevent spreading of contamination to unimpacted locations and media.	Excavation and offsite disposal of soils with COC concentrations above the FDEP industrial direct exposure and leachability SCTLs would contribute towards protectiveness of both human health and environment by eliminating contaminant sources in surface soil. Placement of a GCL cap followed by implementation of LUCs would be protective of human health by preventing the potential for future human exposures to asbestos and other landfill contents. While potentially more effective as a pure containment technology, the associated need to significantly eliminate existing upland vegetation and sensitive wetland ecological systems argue against it being an overall environmentally more protective remedial alternative. Potential to also cause greater mobility of site inorganics to shallow groundwater also must be factored in.
Compliance with ARARs	Would not be compliant with federal and State ARARs for direct exposure to landfill wastes and asbestos present near the surface at Site 11.	Will be compliant with all federal and State ARARs including, but not limited to, NPDES stormwater (FDEP Generic Permit), Endangered Species Act and FDEP groundwater and soil cleanup standards.	Would be compliant with all federal and State ARARs. Those ARARs would, however, be more extensive given associated impacts to site wetland areas. Because of known impacts to wetlands, additional ARARs would include, but not be limited to, those associated with the substantive provisions of the FDEP ERP Program and USACE's Nationwide Permit 38.
Balancing Criteria			
Long-Term Effectiveness and Permanence	Excavation and offsite disposal of soils with COC concentrations above the FDEP industrial direct exposure and leachability SCTLs would permanently eliminate COCs in site surface soils in the selected areas of excavation. However, where the landfill cover is not maintained at a minimum thickness of 2 feet, there is no protection against exposure to landfill contents, including ACM.	Excavation and offsite disposal of soils with COC concentrations above the FDEP industrial direct exposure and leachability SCTLs will permanently eliminate COCs in site surface soils. Native soil if properly maintained will be effective in the long-term to prevent potential exposure to asbestos and other landfill contents. <i>Although native soil covers may be damaged by erosion, geotechnical instability, and vegetative perturbation, these can be minimized through proper design and construction and a well-implemented maintenance program. Revegetation of the cover surface with native plants and trees significantly minimizes cover erosion over the long-term.</i>	Excavation and offsite disposal of soils with COC concentrations above the FDEP industrial direct exposure and leachability SCTLs would permanently eliminate the sources of these COCs in site surface soils. Single-barrier GCL caps would be effective in the long-term to prevent future potential exposure to asbestos and other landfill contents. <i>Although the single-barrier GCL cap may be damaged by erosion, geotechnical instability, and vegetative perturbation, these can be minimized through stringent design and construction and a well-implemented maintenance program. Because portions of the cap would be submerged, it is more likely that due to the direct impact from periodic storm surges in Bayou Grande, large areas of the cap along the shoreline will be submerged under the storm surge and will undergo significant erosion requiring extensive periodic repairs on a regular basis. Until repaired, cap effectiveness would likely be compromised. Preservation of the cap would also require disallowing vegetative material with deep root systems that could otherwise minimize erosion of areas adjacent to the shoreline.</i>
Reduction of Toxicity, Mobility, or Volume through Treatment	This alternative does not contemplate treatment but rather would utilize control technologies. However, the excavation and offsite disposal of contaminated surface soils would reduce COC toxicity, mobility, and volume of waste.	This alternative does not contemplate treatment but rather will utilize control technologies. However, the excavation and offsite disposal of contaminated surface soils would reduce COC toxicity, mobility, and volume of waste.	This alternative does not contemplate treatment but rather would utilize control technologies. However, the excavation and offsite disposal of contaminated surface soils would reduce COC toxicity, mobility, and volume of waste.

TABLE 2-1
Comparative Analysis of Original and Amended Remedial Alternatives for Soil at Site 11, OU 2
OU2, NAS Pensacola

Evaluation Criteria	Alternative S-5: Excavation and Offsite Disposal of Soils and LUCs	Alternative S-6: Excavation, Offsite Disposal of Soils and Native Soil Cover with LUCs	Alternative S-7: Excavation, Offsite Disposal of Soils and Single-Barrier GCL Cap with LUCs
Short-Term Effectiveness	Excavation and offsite disposal of soils would provide immediate effectiveness by eliminating potential human and ecological exposures to contaminated surface soils only in the selected excavation areas but not elsewhere within Site 11 where the landfill cover does not have a minimum thickness of 2 feet.	Excavation and offsite disposal of soils will provide immediate effectiveness by eliminating potential human and ecological exposures to contaminated surface soils. Once in place, the native soil cover will provide immediate effectiveness at reducing direct exposure however it will not prevent infiltration. Monitoring to prevent potential exposure to on-site workers will be required during construction.	Excavation and offsite disposal of soils would provide immediate effectiveness by eliminating potential human and ecological exposures to contaminated surface soils. Once in place, the single barrier GCL cap would provide immediate effectiveness at reducing direct exposure. Monitoring to prevent potential exposure to onsite workers would be required during construction.
Implementability	Excavation and offsite disposal of surface soils is technically and administratively feasible in limited areas.	Excavation and offsite disposal of soils followed by placement of a soil cover are technically feasible. The Site 11 landfill is amenable to available capping materials. Soil cover will require periodic inspection. Local sources of native soil are readily available allowing flexibility and logistical ease for staging and import of soil cover material. Less extensive areal coverage will be required for enhancement of native soil cover than placement of competent GCL across the site, and native vegetation and sensitive ecosystems can be preserved by placing fill material in upland areas and around existing large trees. Existing wetland vegetation and topsoil preclude exposure to underlying landfill contents in wetland areas.	Excavation and offsite disposal of soils followed by placement of the single-barrier GCL cap are technically feasible. GCL is readily available. The area required to be covered to successfully implement the low permeability liner is substantially greater than that required in enhancing the 2-foot native cover and covers the entire landfill footprint including the wetland areas. The GCL would require transportation to and staging at the site for proper placement. Placement of the single-barrier GCL cap would be more complex than native soil cover placement due to the additional effort associated with subgrade preparation, placement and sealing of overlapping GCL panels, control and timing of the bentonite hydration and protection of hydrated GCL during placement of topsoil.
Cost	Estimated capital cost for excavation and offsite disposal of soils is \$373,935.	Estimated capital cost for excavation and offsite disposal of soils is \$373,935. Estimated capital cost for native soil cover is \$1,608,052 and the present value for 30 years is \$1,818,911.	First year cost for excavation and offsite disposal of soils is \$373,935. Estimated capital cost for the single-barrier GCL cap is \$3,769,147 and the present value for 30 years is \$4,032,721. The cost of implementation for the realized benefit compared to the use of native soil cover is significantly high and makes this alternative unfavorable for Site 11.
Modifying Criteria			
Support Agency Acceptance	The NAS Pensacola Partnering Team, which includes members from EPA and FDEP, agreed that excavation and disposal of soil was appropriate during the 2008 ROD reviews, prior to the identification of asbestos as a COC and the discovery of inadequate cover over the landfill contents. With the discovery of asbestos and other landfill contents, support agencies no longer accept this alternative as adequate to meet threshold criteria and ARARs because of its failure to meet threshold criteria from potential for exposure to asbestos and other landfill contents discovered near the surface at Site 11.	The NAS Pensacola Partnering Team, which includes members from EPA and FDEP, agreed that this capping remedy as an addition to the previously selected soil remedy of excavation and offsite disposal, following the discovery of asbestos in soil and lack of adequate cover over landfill contents at the site, is a suitable remedy for soils at Site 11.	The NAS Pensacola Partnering Team, which includes members from EPA and FDEP, agreed that this capping remedy as an addition to the previously selected soil remedy of excavation and offsite disposal is not suitable based on cost, adverse environmental impacts during construction, higher maintenance effort, and costs without commensurate environmental benefit.
Community Acceptance	No public comments were received during the public comment period on the Revised PP. Feedback received from Restoration Advisory Board (RAB) members during the RAB meeting indicate agreement that this alternative is no longer suitable as a viable soil remedy for Site 11 because of its failure to meet threshold criteria.	No public comments were received during the public comment period on the Revised PP. Feedback received from RAB members during the RAB meeting indicate agreement that this alternative is a suitable soil remedy for Site 11.	No public comments were received during the public comment period on the Revised PP. Feedback received from RAB members during the RAB meeting indicate that this alternative is not a suitable as a viable soil remedy for Site 11.

2.5 Selected Amended Remedy for Site 11

As indicated in Section 2.3, no comments were received from the public on the Revised PP which identified Alternative S-6 as the preferred remedy. Therefore, the Navy, EPA and FDEP have selected Alternative S-6 - Excavation and Offsite Disposal of Soils, Native Soil Cover with supplemented LUCs as the Amended Remedy Alternative for Site 11 soils along with the previously selected groundwater remedy consisting of monitored natural attenuation and LUCs to preclude groundwater usage.

This selection is based upon a balance of the nine CERCLA remedy selection criteria previously discussed, and is expected to achieve substantial and long-term risk reduction. The selected alternative is expected to allow the property to be used for the reasonably anticipated future land use, which is non-residential. The selected alternative would comply with ARARs, have short-term and long-term effectiveness, and be readily implementable. The selected alternative is also considered cost effective.

The Navy would design and construct the native soil cover to ensure minimum thickness, develop and execute a maintenance program, and develop, monitor, and enforce LUCs for Site 11 (including conducting periodic LUC inspections) according to the ROD Amendment and modifications to the LUC RD.

The Navy expects the selected alternative to satisfy the following statutory requirements of CERCLA Section 121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost effective; and (4) utilize permanent solutions to the maximum extent practical.

The Navy and EPA, with FDEP concurrence, have chosen the selected alternative to address contaminated soil and landfill contents at Site 11.

Previous soil removal actions conducted by the Navy at Sites 12 and 27 within OU 2 to remove Ra-226 contamination utilized a cleanup goal more stringent than the EPA-recommended goal (from 40 CFR 192) of 5 pCi/g above background, which equates to a final cleanup goal of 6 pCi/g for Site 27. Therefore, no further action is required pertaining to the previous removals at Sites 12 and 27.

The EPA guidance document *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Document* (EPA, 1999) recommends describing whether the amended remedy involves active treatment components (such as thermal treatment of wastes, etc.) or containment components (such as landfills, caps, hydraulic barriers, etc.), any institutional controls (such as LUCs), Operations and Maintenance (O&M) activities required to maintain integrity of remedy (e.g., cap maintenance) and monitoring requirements for soil and groundwater remedies. The following sections describe the above components as they pertain to the selected soil remedy of Alternative S-6 - Excavation and Offsite Disposal of Soils, Native Soil Cover with supplemented LUCs and the previously selected groundwater remedy (consisting of monitored natural attenuation and LUCs to preclude groundwater usage), which is being retained for Site 11 and other sites within OU 2.

2.5.1 Treatment Components

The 2008 ROD soil remedy (Alternative S5: Excavation and Offsite Disposal with LUCs) did not include a treatment component.

Although the 2005 FS (Ensafe, 2005b) provided an evaluation of the excavation and post-excavation offsite treatment of impacted soil (i.e., outside the landfill) the remedial alternative of excavation of the entire landfill contents was not carried forward due to the difficulty in implementing excavations adjacent to the surface waters of Bayou Grande, and due to the limited benefits of removing the low-level contaminant concentrations remaining at the site compared to the costs associated with its implementation.

With the discovery of ACM and identification of asbestos as a COC at Site 11, excavation of landfill contents continues to be an unsuitable option. The costs for excavation, extensive dust control, dust monitoring, worker protection, segregation, and temporary storage of landfill debris material, as well as for characterization of contents required for disposal, transportation, and offsite disposal of landfill contents. Additionally, excavation of landfill material would require extensive engineering controls to prevent surface waters of Bayou Grande from entering excavation areas; costs would be incurred for backfilling excavations with clean fill; and the presence of ACM, among other contaminants, would increase the logistical, cost, and safety burdens that would be encountered in excavation, stockpiling, transportation, and disposal of landfill contents. Finally, even with extensive dust control and worker protection measures, the risk of exposure to asbestos to remedial action workers during soil removal and handling activities on a large-scale excavation remains high.

2.5.2 Soil Capping Components

The 2008 ROD soil remedy (Alternative S5: Excavation and Offsite Disposal with LUCs) did not include a capping component.

Site historical usage and sampling data collected to date at Site 11 establish that site conditions are similar to various municipal landfills undergoing the CERCLA process across the country. EPA's 1996 directive, *Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills* (1996) indicates that presumptive remedy of waste containment applicable to such landfills (as described in the 1993 EPA directive *Presumptive Remedy for CERCLA Municipal Landfill Sites* [EPA, 1993]) should also be applied to military landfills in situations similar to those at Site 11. Conditions at Site 11 are also suitable for use of 1991 EPA guidance document, *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites* (EPA, 1991) which provides detailed descriptions of technologies applicable to municipal CERCLA landfills. That guidance states that for similar municipal landfills, it is expected that:

- Engineering controls such as containment will be used for waste that poses a relatively low long-term threat or where treatment is impractical.
- Institutional controls such as deed restrictions will be used to supplement engineering controls, as appropriate, to prevent exposure to hazardous wastes. Groundwater will be returned to beneficial uses whenever practical, within a reasonable time, given the particular circumstances of the site.

Based on guidance provided in the above-mentioned EPA documents, the FSA evaluated technically feasible remedial alternatives for Site 11 to prevent exposure to surface soil COCs

(including asbestos) and provided the rationale for selecting a soil capping alternative for Site 11. As indicated in Section 2.3, an two types of soil caps, native soil cover and single barrier clay cap (using a geosynthetic clay liner [GCL]), were evaluated for Site 11 in the FSA utilizing the EPA presumptive containment remedy guidance. Data included in the 1997 RI, the 2005 RI Addendum and the 2005 FS, and ongoing groundwater long-term monitoring results were considered during the remedial alternatives evaluation of the FSA. These alternatives were selected because of their suitability to address protection against direct exposure to asbestos and other landfill contents at Site 11.

As indicated earlier in Section 2.3, the Revised PP which was provided to the public for review and comments indicated that Alternative S-6: Excavation, Offsite Disposal, and Native Soil Cover with LUCs is the most viable soil remedial alternative for Site 11 based on the comparative analysis of the remedial alternatives. This alternative includes the following components:

- Removal and offsite disposal of contaminated surface soil hot spots identified in the 2008 ROD and the 2010 RD, (to include any ACM that is encountered) estimated to total up to approximately 811 yd³.
- Placement of approximately 39,500 yd³ of fill in areas shown on Figure 2-6 to include 6 inches of topsoil with hydroseeding in disturbed upland areas for native revegetation and selected planting along wetland areas to preserve and enhance existing wetland vegetative cover. These revegetative actions are expected to preclude alteration of future land use for industrial use at Site 11.
- Air monitoring for asbestos during soil removals and during initial placement of the fill material
- Maintenance of the cover required as part of the LUCs described in the section below.

2.5.3 Land Use Control Components

The following LUC components will be implemented by the Navy per the 2008 ROD (TtNUS, 2008b) and this ROD Amendment, and guidance from the document *EPA OSWER Directive 9355.6-12 Sample Federal Facility Land Use Control ROD Checklist with Sample Language* (EPA, 2013), as part of the selected soil remedy of Alternative S-6 and the previously-selected groundwater remedy of MNA with LUCs:

- Land Use Controls: Land Use Controls (LUCs) consisting of both Engineering Controls (ECs) and Institutional Controls (ICs) will be implemented to preclude unacceptable future human health and/or ecological risks from exposure(s) to chemicals of concern (COCs) at the Site. The LUCs will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and unlimited exposure. Consistent with the RAOs developed during the RI, FS and FSA, the specific performance objectives for the LUCs to be implemented at Site 11 are as follows:
 - To prohibit unauthorized excavation, construction or intrusive activities;
 - To prohibit residential development of the Site. Prohibited uses shall include, but are not limited to any form of housing, child-care facilities, pre-schools, elementary and secondary schools, or playgrounds; and adult convalescent or nursing care facilities; and

- To prohibit the extraction or any use of the groundwater beneath Site 11 including, but not limited to, drinking, washing, cooking, cleaning, and turf irrigation, without prior written approval from the Navy, EPA, and FDEP.

The following generally describes those LUCs that will be implemented at Site 11 in order to achieve the aforementioned LUC performance objectives:

- Engineering Controls:
 - The Navy will maintain the integrity of any existing or future monitoring or remediation system(s) including groundwater monitoring wells to prevent unrestricted land use and preclude use of groundwater for potable purposes.
 - A sign will be posted on the landward side of Site 11 advising that any excavation, construction, or intrusive activity within the landfill is prohibited unless authorized in advance by the NAS Pensacola Public Works Department (PWD).
- Institutional Controls:
 - The Site 11 location and LUC boundaries, prohibitions against unauthorized excavation, construction or intrusive activities, residential development and groundwater extraction or use, and the requirement for NAS Pensacola PWD approval of any site excavation, construction, or intrusive activity will be annotated in NAS Pensacola's Master Plan.
 - The Site 11 location and LUC boundaries, prohibitions against unauthorized excavation, construction or intrusive activities, residential development and groundwater extraction or use, and the requirement for NAS Pensacola PWD approval of any site excavation, construction or intrusive activity will be annotated in the installation's geographical information system, (GIS).

The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs. Although the Navy may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity. The LUC Remedial Design will be revised within 90 days of the ROD signature and submitted to EPA and FDEP for review and approval that contains implementation and maintenance actions for the updated LUCs. The Final RACR will be prepared and submitted by the Navy per the approved Site Management Plan (SMP) schedule to EPA and FDEP for review and approval.

The LUCs included in the 2008 ROD will continue to be implemented at Site 11 and will be expanded to include periodic inspections and maintenance to preserve the soil cover, minimize soil cover erosion, and implement additional construction as necessary to prevent erosion of the soil cover. Implementation and maintenance of LUCs will also include restriction of property use to non-residential purpose and preclude residential land use. Annual inspections will be conducted to verify continued implementation of the LUCs.

A 3-inch bituminous concrete layer. Specifications for bituminous concrete pavement are provided in the RAD (Section 32 10 00).

2.6 Statutory Determinations

Remedial actions undertaken at National Priority List (NPL) sites must meet the statutory requirements of Section 121 of CERCLA and be protective of human health and the environment, comply with ARARs of both federal and more stringent state environmental laws and regulations unless a waiver is justified, be cost-effective, and utilize to the maximum extent practicable, permanent solutions and alternative treatment or resource recovery technologies. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity and /or mobility of hazardous waste as the principal element.

The amended remedy for Site 11 (which preserves the remedial components selected in the 2008 ROD remedy) is consistent with the NCP and satisfies CERCLA §121. The selected amended remedy provides protection of human health and the environment, meets Federal and State ARARs, and is cost-effective as described in Sections 2.4.1 and 2.4.2. The selected remedy of soil cover and additional LUCs will prevent exposure to asbestos and other landfill wastes to hypothetical future workers and lifelong recreational users/trespassers.

2.6.1 ARARs Governing Amended Remedy

The ARARs carried in the 2008 ROD reflected requirements pertaining to the previously-selected remedy of excavation and offsite disposal (for soils), MNA (for groundwater) and LUCs (for soil and groundwater as listed in Section 2.3.3), but did not reflect requirements pertaining to the additional remedy component of capping of landfill wastes and enhanced LUCs being included as part of the amended remedy for Site 11. Additionally, asbestos and Ra-226 were not identified as soil COCs in the 2008 ROD and thereby did not include ARARs reflecting the requirements for these two COCs. The chemical-specific, action-specific and location-specific ARARs for the selected remedy for Sites 11, 12 and 27 are included in Tables 2-2, 2-3, and 2-4 respectively.

The Navy will avoid impacts to the wetlands by limiting heavy construction equipment activities to areas outside a buffer of at least 20 feet width from the surveyed wetland boundaries at Site 11. Within the 20 foot-wide zone along the wetland boundaries, the grade of the native soil and topsoil will be tapered to meet existing grade along the wetland boundary. Revegetation will be implemented in this zone with selected plantings to include pollinator species approved by the NAS Pensacola Base authorities. Appropriate soil erosion and sediment controls will be implemented as outlined in a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will be included in the Remedial Action Work Plan Addendum (RAWPA) for Site 11.

Although implementation of the native soil cover under Alternative S-6 will not affect wildlife habitat, the action will comply with the Endangered Species Act requirement to conserve endangered or threatened species and their habitat encountered within the construction areas.

With the discovery of ACM, the proposed action will comply with the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Asbestos. Additionally, excavation of ACM-impacted soil may invoke other NESHAP requirements for the control of asbestos emissions by adequate wetting and proper packaging and handling of ACM. The proposed action will comply with all (substantive and administrative) Occupational Safety and Health

Administration (OSHA) worker safety requirements during construction to prevent potential exposure to airborne asbestos, which is a potential hazard to human health at the site. While OSHA requirements are not ARARs, they are being followed to ensure worker protection per regulations under 40 CFR, Part 300 (the NCP), subpart 150.

Findings of Ra-226 in soil at Sites 12 and 27 at OU 2 prompted the Navy RASO to adopt a site-specific Derived Concentration Guideline Limit (DCGL) for Ra-226 for soil which was calculated using the Regulatory Tool for Determining the Allowable Residual Radioactivity in Site Cleanup (RESRAD) Version 6.4 Modeling Code (developed by U.S. Department of Energy's Argonne National Laboratory). This DCGL is used to evaluate doses from exposure to radioactively-open land areas and was used as to-be-considered (TBC) criteria for the assessment and remediation of Ra-226 at Sites 12 and 27. The calculated DCGL using RESRAD for soil for Ra-226 at OU 2 was 1.61 pCi/g (AWS, 2012). Additionally, the soil cleanup level for Ra-226 from 40 CFR 192 of 5 pCi/g above background is included as a Relevant and Appropriate ARAR as shown in Table 2-2.

2.7 Public Participation

In accordance with the requirements set out in NCP §300.435(c)(2)(ii) for public participation, the Navy presented the amended remedy for OU 2 in the Revised PP to the public for review and comment during the public comment period from April 15, 2015 to May 15, 2015. As part of this public outreach effort, the Navy distributed copies of the Revised PP and published information in the Pensacola News Journal on April 18, 2015 inviting the public to participate in a review of the amended remedy selection included in the Revised PP. Additionally, the Navy, FDEP and EPA previously facilitated a Restoration Advisory Board (RAB) meeting on November 18, 2014 during which the amended remedy for OU 2 as outlined in the ROD Amendment was presented to the RAB members, and their comments and feedback were incorporated into the ROD Amendment.

2.8 Documentation of Significant Changes

No comments were received from the public verbally or via email, fax or in writing on the amended remedy for OU 2 which was presented to the public in the Revised PP during the public comment period. The Revised PP identified Alternative S-6 (excavation, offsite disposal of soils and native soil cover with LUCs) as the Preferred Alternative for soil remediation at Site 11 within OU 2. No significant changes to the amended remedy presented in the Revised PP have been identified by the Navy or the regulatory agencies during reviews of the Draft and Draft Final versions of the ROD Amendment.

Regulatory feedback on the Draft ROD Amendment resulted in additional detailed language to be included on the background for ARARs in Section 2.4.1.2 and on engineering and institutional controls to be included in Section 2.5.3.

Regulatory feedback on the Draft ROD Amendment also resulted in moving the FDEP ARAR (F.A.C. 62-780.690[3]) from Table 2-3 (Action-Specific ARARs) to the text in Section 2.3. The requirement of this citation is included in the ROD Amendment to verify whether groundwater contamination posing unacceptable risk is currently migrating beyond the Site 11 boundaries and impacting adjacent sediments and surface water. In support of this verification, additional upland monitoring wells will be installed and monitored along the Site 11 boundary.

TABLE 2-2
 Chemical-Specific ARARs
 OU 2, NAS Pensacola

Media	Requirement	Prerequisite	Citation(s)						
Cleanup of soil	Specifies soil cleanup criteria applicable to rehabilitation of contaminated sites as identified below:	Rehabilitation (i.e., remediation) of contaminated soil - Relevant and Appropriate	Contaminated Site Cleanup Criteria, F.A.C. Chapter 62-777, Table II						
	<table border="1"> <thead> <tr> <th data-bbox="443 467 852 613" rowspan="2">Soil Contaminants of Concern (COCs)</th> <th data-bbox="852 467 972 613" rowspan="2">Units</th> <th colspan="2" data-bbox="972 467 1304 511">FDEP SCTLs</th> </tr> <tr> <th data-bbox="972 511 1110 613">Direct Exposure Industrial</th> <th data-bbox="1110 511 1304 613">Leachability to Groundwater</th> </tr> </thead> </table>			Soil Contaminants of Concern (COCs)	Units	FDEP SCTLs		Direct Exposure Industrial	Leachability to Groundwater
	Soil Contaminants of Concern (COCs)					Units	FDEP SCTLs		
				Direct Exposure Industrial	Leachability to Groundwater				
	Inorganics								
	Arsenic*			mg/kg	12	**			
	Beryllium			mg/kg	1400	63			
	Cadmium*			mg/kg	1,700	7.5			
	Chromium*			mg/kg	470	38			
	PCBs								
	Aroclor-1260*			mg/kg	2.6	17			
	Semivolatile Organic Compounds								
	Benzo(a)pyrene			mg/kg	0.7	8			
	<p>Notes: mg/kg - milligrams per kilogram</p> <p>*These COCs were already included in the 2008 ROD (TtNUS, 2008) but are cited again in this ROD Amendment to provide continuity.</p> <p>** Per F.A.C. Chapter 62-777, Table II, Leachability values may be derived using the SPLP Test to calculate site-specific SCTLs.</p>								

TABLE 2-2
Chemical-Specific ARARs
OU 2, NAS Pensacola

Media	Requirement	Prerequisite	Citation(s)
Cleanup criteria for soil with Ra-226	Use of cleanup level of 5 pCi/g above background per 40 CFR Part 192 as a remediation goal at CERCLA sites with radioactive contamination.	Rehabilitation (i.e., remediation) of contaminated soil - Relevant and Appropriate	40 CFR 192.12(a)(2)
Classification of groundwater	All groundwater of the state is classified according to the designated uses and includes the following: Class G-I – Potable water use, groundwater in single source aquifers which has total dissolved solids content of less than 3,000 mg/L. Class G-II – Potable water use, groundwater in single source aquifers which has total dissolved solids content of less than 10,000 mg/L, unless otherwise classified by the Florida Environmental Regulation Commission.	Groundwater within the state of Florida – Applicable	F.A.C. 62-520.410 Classification of Ground Water, Usage, Reclassification
Restoration of groundwater as a potential drinking water source	Specifies Groundwater Cleanup Target Levels (CTLs) for site rehabilitation. F.A.C. 62-777.170 Table I lists default criteria and Table 2-4 in this ROD Amendment provides the site-specific COC and corresponding CTLs from F.A.C. 62-777.170, Table I.	Rehabilitation (i.e., remediation) of site contaminated groundwater – Relevant and Appropriate	F.A.C. 62-780.150(5) F.A.C. 62-777.170(1)(a)
	All ground water (except for Class G-IV) shall meet the minimum criteria for ground water specified in F.A.C. 62-520.400(1)(a)-(f).	Groundwater within the state of Florida with designated beneficial use(s) of Class G-I or Class G-II – Relevant and Appropriate	F.A.C. 62-520.400 Minimum Criteria for Ground Water
	Class G-I and Class G-II ground water shall meet the primary drinking water standards listed in F.A.C. 62-550.310 for public water systems, except as otherwise specified.		F.A.C. 62-520.420(1) Standards for Class – G-I and Class G- II Ground Water

TABLE 2-3
 Action-Specific ARARs
 OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
General Construction Standards – Land-Disturbing Activities			
Control of stormwater 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 stormwater 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.	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
	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 <i>stormwater management system</i> as defined in F.A.C. 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 onsite. 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.		F.A.C. 62-25.025 (7)
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

TABLE 2-3
 Action-Specific ARARs
 OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
Solid Waste Landfill			
Solid waste landfill – final cover design	<p>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.</p> <p>a. If the barrier layer consists only of soil, it shall be at least 18 inches thick, installed in 6-inch thick lifts, and shall have a final, 18-inch thick layer of soil, or a 24-inch thick layer consisting of approximately 50 percent soil and 50 percent ground or chipped yard trash by volume, that will sustain vegetation to control erosion placed on top of the barrier layer.</p> <p>b. If the barrier layer consists only of a geosynthetic clay liner (GCL), a protective soil layer at least 24 inches thick shall be placed on top of the GCL with the upper 6 inches being able to sustain vegetative growth. In the alternative, the GCL may be covered with a 12-inch thick layer of soil that is then covered with a 15-inch thick layer consisting of approximately 50 percent soil and 50 percent ground or chipped yard trash by volume, with the upper 6 inches being able to sustain vegetative growth. The GCL shall be placed on a protective soil layer at least 6 inches thick. Material specifications and installation methods, which may include a drainage layer between the GCL and the protective soil layer over the GCL, shall be adequate to protect the barrier layer from root penetration, resist erosion, and remain stable on the final design slopes of the landfill.</p>	Closure of a solid waste landfill – Relevant and Appropriate	F.A.C. 62-701.600(3)(g)

TABLE 2-3
 Action-Specific ARARs
 OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
Landfill long-term care	Continue to monitor and maintain the integrity and effectiveness of the final cover as well as other appurtenances of the facility, control erosion, fill substances, comply with the groundwater monitoring plan, and maintain the stormwater system.	Long-term solid waste landfill post-closure care – Relevant and Appropriate	F.A.C. 62-701.620(1)
Groundwater Monitoring for Monitored Natural Attenuation (MNA) remedy ¹	A minimum of two monitoring wells is required: At least one well shall be located at the downgradient edge of the plume; and At least one well shall be located in the area(s) of highest groundwater contamination or directly adjacent to it if the area of highest groundwater contamination is inaccessible (for example, under a structure).	Groundwater monitoring as part of the remedy relying on natural attenuation – Relevant and Appropriate	F.A.C. 62-780.690(8)(a) Natural Attenuation with Monitoring
	The designated monitoring wells shall be sampled for analyses of applicable contaminants no more frequent than quarterly.	Groundwater monitoring as part of the remedy relying on natural attenuation – Relevant and Appropriate	F.A.C. 62-780.690(8)(b)
	Water-level measurements in all designated wells and piezometers shall be made within 24 hours of initiating each sampling event.	Groundwater monitoring as part of the remedy relying on natural attenuation – Relevant and Appropriate	F.A.C. 62-780.690(8)(c)

¹The designated number of wells, sampling time frames/frequency, and specific parameters for analyses will be provided in a Monitoring Plan that is included in a CERCLA post-ROD document prepared as part of the Remedial Design or Remedial Action, which is approved by the EPA and the FDEP.

TABLE 2-3

Action-Specific ARARs
OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
Waste Characterization – Primary Waste (e.g., excavated soils from well cuttings, purge water) and Secondary Wastes			
Characterization of solid waste (all primary and secondary wastes)	Must determine if solid waste is a hazardous waste using the following method: <ul style="list-style-type: none"> • 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
Characterization of solid waste (all primary and secondary wastes) - continued	Must determine whether the waste is (characteristic waste) identified in subpart C of 40 CFR part 261 by either: <ol style="list-style-type: none"> a. 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 b. Applying knowledge of the hazard characteristic of the waste in light of the materials or the processes used. 	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
	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)

TABLE 2-3
 Action-Specific ARARs
 OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
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. Note: This determination can be made concurrently with the hazardous waste determination required in 40 CFR 262.11.	Generation of hazardous waste for storage, treatment or disposal – Applicable	40 CFR 268.7(a) F.A.C. 62-730.183
	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

TABLE 2-3
 Action-Specific ARARs
 OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
Waste Storage – Primary Waste (e.g., excavated soil from well cuttings and purge water) and Secondary Wastes			
Temporary onsite storage of hazardous waste in containers	<p>A generator may accumulate hazardous waste at the facility provided that:</p> <ul style="list-style-type: none"> • 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 	<p>Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10 – Applicable</p>	<p>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</p>
	<ul style="list-style-type: none"> • Container may be marked with other words that identify the contents. 	<p>Accumulation of 55 gallons or less of RCRA hazardous waste or 1 quart of acutely hazardous waste listed in 261.33(e) at or near any point of generation – Applicable</p>	<p>40 CFR 262.34(c)(1) F.A.C. 62-730.160</p>
Use and management of hazardous waste in containers	<p>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.</p>	<p>Storage of RCRA hazardous waste in containers – Applicable</p>	<p>40 CFR 265.171 F.A.C. 62-730.180(2)</p>
	<p>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.</p>		<p>40 CFR 265.172 F.A.C. 62-730.180(2)</p>
	<p>Containers must be closed during storage, except when necessary to add/remove waste. Container must not be opened, handled and stored in a manner that may rupture the container or cause it to leak.</p>		<p>40 CFR 265.173(a) and (b) F.A.C. 62-730.180(2)</p>

TABLE 2-3
 Action-Specific ARARs
 OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
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)

TABLE 2-3
 Action-Specific ARARs
 OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
Storage and processing of non-hazardous waste	<p>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.</p> <p>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.</p> <p>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.</p>	Management and storage of solid waste – Applicable	F.A.C. 62 701.300(1)(a) and (b)
Waste Treatment and Disposal – Primary Waste (e.g., excavated soil from well cuttings, purge water) and Secondary Wastes			
Disposal of RCRA hazardous waste in a land-based unit	<p>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.</p> <p>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.</p>	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

TABLE 2-3
Action-Specific ARARs
OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
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 treatment system that is regulated under the CWA, that is CWA equivalent, or that is injected into a Class I nonhazardous injection well – Applicable	40 CFR 268.40(e)
Disposal of RCRA – hazardous waste soil in a land-based unit	Must be treated according to the alternative treatment standards of 40 CFR 268.49(c) or according to the UTSs specified in 40 CFR 268.48 applicable to the listed and/or characteristic waste contaminating the soil prior to land disposal	Land disposal, as defined in 40 CFR 268.2, of restricted hazardous soils – Applicable	40 CFR 268.49(b) F.A.C. 62-730.183
Waste Transportation – Primary and Secondary Wastes			
Transportation of hazardous waste <i>onsite</i>	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 <i>offsite</i>	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 offsite – Applicable	40 CFR 262.10(h); F.A.C. 62-730.160

TABLE 2-3
 Action-Specific ARARs
 OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
Transportation of <i>hazardous materials</i>	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 commerce," or causes to be transported or shipped, a hazardous material – Applicable	49 CFR 171.1(c)
Transportation of samples (i.e., contaminated soils and wastewaters)	<p>Are not subject to any requirements of 40 CFR Parts 261 through 268 or 270 when the sample is being:</p> <ul style="list-style-type: none"> • Transported to a laboratory for the purpose of testing; or • Transported back to the sample collector after testing; or • Stored by sample collector before transport to a laboratory for testing 	Samples of solid waste or a sample of water, soil for purpose of conducting testing to determine its characteristics or composition – Applicable	<p>40 CFR 261.4(d)(1)(i)–(iii)</p> <p>F.A.C. 62-730.030</p>
Monitoring Wells			
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	Well casing. Well liner 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)
	<ul style="list-style-type: none"> • Wells shall be constructed to meet the following criteria specified in F.A.C. 62-532.500(2)(a), (b), and (d) 		F.A.C. 62-532.500(2)

TABLE 2-3

Action-Specific ARARs
OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
Plugging and Abandonment of Groundwater Monitoring Wells	<ul style="list-style-type: none"> 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(4)
General Standards—Asbestos Handling and Disposal			
Activities potentially causing asbestos emissions	Discharge no visible emissions to the outside air during the collection, processing (including incineration), packaging and transporting of any asbestos-containing material generated by the source, or use one of the emission control and waste treatment methods specified in paragraphs (a)(1) through (4) of this section.	Owner or operator of any source covered under the provisions of § 61.145 <i>Standard for demolition and renovation</i> – Relevant and Appropriate	40 CFR 61.150(a)
Pre-transport of asbestos-containing waste material	Mark vehicles used to transport asbestos-containing waste material during the loading and unloading of waste so that the signs are visible. The markings must conform to the requirements of §§ 61.149(d)(1)(i), (ii), and (iii).	Owner or operator of any source covered under the provisions of § 61.145 <i>Standard for demolition and renovation</i> – Relevant and Appropriate	40 CFR § 61.150(c)

TABLE 2-3
Action-Specific ARARs
OU 2, NAS Pensacola

Action/Media	Requirement	Prerequisite	Citation(s)
Disposal of asbestos-containing waste material	<p>All asbestos-containing waste material shall be deposited as soon as practicable by the waste generator at:</p> <ul style="list-style-type: none"> • A waste disposal site operated in accordance with the provisions of § 61.154, or • An EPA-approved site that converts RACM and asbestos-containing waste material into non-asbestos (asbestos-free) material according to the provisions of § 61.155. • The requirements of paragraph (b) of this section do not apply to Category I non-friable ACM that is not RACM. 	<p>Owner or operator of any source covered under the provisions of § 61.145 <i>Standard for demolition and renovation</i> – Relevant and Appropriate</p>	<p>40 CFR § 61.150(b)(1)-(3)</p>
Standards for inactive asbestos waste disposal sites	<p>Must comply with one of the following:</p> <ul style="list-style-type: none"> • Either discharge no visible emissions to the outside air from an inactive disposal site subject to this paragraph; or • Cover the asbestos-containing waste material with at least 15 centimeters (6 inches) of compacted non-asbestos-containing material, and grow and maintain a cover of vegetation on the area to prevent exposure of the asbestos-containing waste material; or • Cover the asbestos-containing waste material with at least 60 centimeters (2 feet) of compacted non-asbestos-containing material, and maintain it to prevent exposure of the asbestos-containing waste 	<p>Closure of an area that received asbestos-containing waste materials – Relevant and Appropriate</p>	<p>40 CFR § 61.151(a)(1)-(3)</p>

TABLE 2-4
Location-Specific ARARs
OU 2, NAS Pensacola

Location	Requirement	Prerequisite	Citation(s)
Endangered species protected habitat	It is unlawful for any person to take an endangered species. Take is defined in 16 U.S.C. 1532 as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct".	Action that may result in a take of endangered or threatened species and critical habitat, specifically gopher tortoise habitat – Applicable	Endangered Species Act (16 U.S.C. 1538)
Migratory bird habitat	Protects almost all species of native migratory birds in the U.S. from unregulated take. No person may take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such bird except as may be permitted under the terms of a valid permit issued pursuant to the provisions of 50 CFR part 10 and part 13 of this chapter, or as permitted by regulations in this part, or part 20 of this subchapter (the hunting regulations).	Action that has potential impacts on, or is likely to result in a 'take' (as defined in 50 CFR 10.12) of migratory birds – Applicable	Migratory Bird Treaty Act, 16 USC 703(a) 50 CFR 21.11
Location encompassing aquatic ecosystem as defined in 40 C.F.R. 230.3(c)	No discharge of dredged or fill material into an aquatic ecosystem is permitted if there is a practicable alternative that would have less adverse impact.	Action that involves the discharge of dredged or fill material into waters of the United States, including jurisdictional wetlands – Applicable	Clean Water Act Regulations – Section 404(b) Guidelines 40 Part 230.10(a)
	No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps in accordance with 40 C.F.R. 230.70 et seq. have been taken that will minimize potential adverse impacts of the discharge on the aquatic ecosystem		Clean Water Act Regulations – Section 404(b) Guidelines 40 C.F.R. 230.10(d)
	Must comply with the substantive requirements of the NWP 38 General Conditions, as appropriate, any regional or case-specific conditions recommended by the Corps District Engineer, after consultation.	Onsite CERCLA action conducted by Federal agency that involves the discharge of dredged or fill material into waters of the United States, including jurisdictional wetlands – Relevant and Appropriate	Nation Wide Permit (38) <u>Cleanup of Hazardous and Toxic Waste</u> 33 C.F.R. 323.3(b)

TABLE 2-4
 Location-Specific ARARs
 OU 2, NAS Pensacola

Location	Requirement	Prerequisite	Citation(s)
Alteration of upland stormwater system	<p>Construction, alteration, and operation shall not:</p> <ol style="list-style-type: none"> 1. Adversely impound or obstruct existing water flow, cause adverse impacts to existing surface water storage and conveyance capabilities, or otherwise cause adverse water quantity or flooding impacts to receiving water and adjacent lands; 2. Cause an adverse impact to the minimum flows and levels established pursuant to Section 373.042, F.S.; 3. Cause adverse impacts to a Work of the District established pursuant to Section 373.086, F.S.; 4. Adversely impede navigation or create a navigational hazard; 5. Cause or contribute to a violation of state water quality standards. Turbidity, sedimentation, and erosion shall be controlled during and after construction to prevent violations of state water quality standards, including any antidegradation provisions of paragraphs 62-4.242(1)(a) and (b), subsections 62-4.242(2) and (3) and Rule 62-302.300, F.A.C., and any special standards for Outstanding Florida Waters and Outstanding National Resource Waters due to construction-related activities. 	Construction and maintenance of swales in accordance with Section 403.813(1)(j), F.S. – Relevant and Appropriate	F.A.C. 62-330.051 Exempt Activities, Section (7) Maintenance and Restoration, Paragraph (e)
	<p>Erosion and sediment control best management practices shall be installed and maintained in accordance with the guidelines and specifications described in the <i>State of Florida Erosion and Sediment Control Designer and Reviewer Manual</i> (Florida Department of Environmental Protection and Florida Department of Transportation, June 2007), incorporated by reference herein (https://www.flrules.org/Gateway/reference.asp?No=Ref-02530), and the <i>Florida Stormwater Erosion and Sedimentation Control Inspector's Manual</i> (Florida Department of Environmental Protection, Nonpoint Source Management Section, Tallahassee, Florida, July 2008), incorporated by reference herein (https://www.flrules.org/Gateway/reference.asp?No=Ref-02531).</p>	Construction and maintenance of swales in accordance with Section 403.813(1)(j), F.S. and F.A.C. 62-330.051 – To Be Considered	<p><i>State of Florida Erosion and Sediment Control Designer and Reviewer Manual</i></p> <p><i>Florida Stormwater Erosion and Sedimentation Control Inspector's Manual</i></p>

TABLE 2-4
 Location-Specific ARARs
 OU 2, NAS Pensacola

Location	Requirement	Prerequisite	Citation(s)
Presence of Wetlands	Shall take action to minimize the destruction, loss or degradation of wetlands and to preserve and enhance beneficial values of wetlands.	Federal actions that involve potential impacts to, or take place within, wetlands – To Be Considered	Executive Order 11990 Section 1.(a) <i>Protection of Wetlands</i>
Presence of Wetlands - continued	Shall avoid undertaking construction located in wetlands unless: (1) there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands which may result from such use.		Executive Order 11990, Section 2.(a) <i>Protection of Wetlands</i>
Presence of Floodplains designated as such on a map	Shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.	Federal actions that involve potential impacts to, or take place within, floodplains – To Be Considered	Executive Order 11988 Section 1. <i>Floodplain Management</i>
	Shall consider alternatives to avoid, to the extent possible, adverse effects and incompatible development in the floodplain. Design or modify its action in order to minimize potential harm to or within the floodplain.		Executive Order 11988 Section 2.(a)(2) <i>Floodplain Management</i>

TABLE 2-5

List of Groundwater COCs and Cleanup Goals for Sites 11, 12, and 27
 OU 2, NAS Pensacola

Contaminant of Concern	NAS Pensacola Groundwater Background	Groundwater Criteria
		Florida GCTL (MCL)
Volatile Organic Compounds		
1,1-Dichloroethane(1)	na	70
1,2-Dichloroethane*	na	3
1,1-Dichloroethene*	na	7
cis-1,2-Dichloroethene*	na	70
1,2-Dichloropropane*	na	5
1,4-Dichlorobenzene	na	75
1,1,1-Trichloroethane	na	200
1,1,2,2-Tetrachloroethane*	na	0.2
Benzene*	na	1
Chloroform*	na	70
Ethylbenzene	na	30
Tetrachloroethene*	na	3
Trichloroethene*	na	3
Vinyl chloride*	na	1
Xylene (total)	na	20
Semivolatile Organic Compounds		
Naphthalene	na	14
1-Methylnaphthalene*	na	28
2-Methylnaphthalene*	na	28
4-Methylphenol*	na	3.5
PCB		
Aroclor-1260*	--	0.22
Pesticides / Herbicides		
Aldrin*	na	0.002
Dieldrin*	na	0.002
Heptachlor epoxide*	na	0.2
Pentachlorophenol	na	1.0

TABLE 2-5
 List of Groundwater COCs and Cleanup Goals for Sites 11, 12, and 27
 OU 2, NAS Pensacola

Contaminant of Concern	NAS Pensacola Groundwater Background	Groundwater Criteria
		Florida GCTL (MCL)
Inorganics		
Arsenic*	nd	10
Barium*	nd	2000
Beryllium*	nd	4
Cadmium*	nd	5
Chromium*	32.5	100
Iron ⁽²⁾	--	300
Lead	nd	15
Manganese ⁽²⁾	21.5	50
Vanadium*	6.8	49
Radionuclides		
Radium-226 (pCi/L)	0.16**	5

Notes:

Values in micrograms per liter (µg/L)

na = not applicable for organic compounds

nd = analyte was not detected in the NAS Pensacola background groundwater samples (Ensafe/Allen & Hoshall, 1996)

pCi/L = picocuries per liter

¹ 1,1-Dichloroethane is being analyzed for monitoring natural attenuation processes.

² Iron and manganese are being analyzed for monitoring natural attenuation processes.

³ Lead was added at the request of the Florida Department of Environmental Protection.

* These COCs were included in the 2008 ROD but cited again in this ROD Amendment to provide continuity.

** Radium-226 concentration in background well sampled by RASO contractors (AWS, 2012) NAS Pensacola groundwater background data presented in the final Remedial Investigation for Site 1 (EnSafe, 1966).

Florida MCL or GCTL = Maximum Contaminant Levels per Florida Chapter 62-550, F.A.C. or Groundwater Cleanup Target Levels per Chapter 62-777, F.A.C.

3.0 References

AGVIQ-CH2M HILL. 2010. *Work Plan, Remedial Action for Operation Unit 2 (Sites 11, 12, 25, 26, 27, and 30), Soil Excavation and Long-Term Monitoring of Groundwater, Naval Air Station Pensacola, Pensacola, Florida.* August.

AGVIQ-CH2M HILL Constructors, Inc. 2015a. *Final Feasibility Study Addendum, Operable Unit 2 (Sites 11, 12, 25, 26 27, and 30), Naval Air Station Pensacola, Pensacola, Florida.* April.

AGVIQ-CH2M HILL Constructors, Inc. 2015b. *Final Revised Proposed Plan, Operable Unit 2 (Sites 11, 12, 25, 26, 27, and 30), Naval Air Station Pensacola, Pensacola, Florida.* May.

ABB Environmental Services. 1991. *Site Inspection Report, Cold Storage Facility, Naval Air Station Pensacola, Pensacola, Florida.*

Aleut World Solutions, LLC (AWS). 2009. *Scoping Survey Report, Sites 12, 25 and 27, Naval Air Station Pensacola, Pensacola, Florida.* June.

Aleut World Solutions, LLC (AWS). 2012. *Final Status Survey Report, Naval Air Station Pensacola, Pensacola, Florida.* May.

Ecology and Environment, Inc. (E&E). 1991a. *Interim Data Report, Contamination Assessment/Remediation Activities Investigation North Chevalier Disposal Area (Site 11), Naval Air Station Pensacola, Pensacola, Florida.*

Ecology and Environment, Inc. (E&E). 1991b. *Interim Data Report, Contamination Assessment/Remediation Activities Investigation Scrap Bins (Site 12), Naval Air Station Pensacola, Pensacola, Florida.*

Ecology and Environment, Inc. (E&E). 1992a. *Interim Data Report, Contamination Assessment/Remediation Activities Investigation –Radium Spill Area (Site 25), Naval Air Station Pensacola, Pensacola, Florida.*

Ecology and Environment, Inc. (E&E). 1992b. *Interim Data Report, Contamination Assessment/Remediation Activities Investigation –Radium Dial Shop (Site 27), Naval Air Station Pensacola, Pensacola, Florida.*

Ensafe. 1997. *Remedial Investigation Report, Operable Unit 2, Naval Air Station Pensacola, Pensacola, Florida.* October.

Ensafe. 2005a. *Remedial Investigation Addendum, Operable Unit 2, Naval Air Station Pensacola, Pensacola, Florida.* December.

Ensafe. 2005b. *Feasibility Study Report, Operable Unit 2, Naval Air Station Pensacola, Pensacola, Florida.* December.

Geraghty & Miller (G&M). 1984. *Verification Study, Assessment of Potential Groundwater Pollution at Naval Air Station Pensacola, Pensacola, Florida.*

- Geraghty & Miller (G&M). 1986. *Characterization Study, Assessment of Potential Groundwater Pollution at Naval Air Station Pensacola, Pensacola, Florida.*
- HHM, Inc. 2007. *Integrated Cultural Resources Management Plan, Section 1 – NAS Pensacola Historic Context.* December.
- Naval Environmental and Engineering Support Activity (NEESA). 1983. *Initial Assessment Study of Naval Air Station Pensacola, Pensacola, Florida.*
- Tetra Tech NUS, Inc. (TtNUS). 2008a. *Record of Decision for Operable Unit 2 (Sites 11, 12, 25, 26, 27, and 30), Naval Air Station Pensacola, Pensacola, Florida.* September.
- Tetra Tech NUS, Inc. (TtNUS). 2008b. *Proposed Plan for Operable Unit 2, Naval Air Station Pensacola, Pensacola, Florida.* May.
- Tetra Tech NUS, Inc. (TtNUS). 2010. *Remedial Design for Operable Unit 2 (Sites 11, 12, 25, 26, 27, and 30), Naval Air Station Pensacola, Pensacola, Florida.* March.
- U.S. Environmental Protection Agency (EPA). 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA.* EPA/540/G089/004. EPA Office of Solid Waste and Emergency Response, OSWER Directive 9355.3-01.
- U.S. Environmental Protection Agency (EPA). 1991. *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites.*
- U.S. Environmental Protection Agency (EPA). 1993. *Presumptive Remedy for CERCLA Municipal Landfill Sites.* EPA/540/F-93/035. Directive No. 9355.0-49FS. September.
- U.S. Environmental Protection Agency (EPA). 1996. *Application of the CERCLA Municipal Landfill Presumptive Remedy to Military Landfills.* EPA/540/F-96/020. Directive No. 9355.0-67FS. December.
- U.S. Environmental Protection Agency (EPA). 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Document*, EPA 540-R-98-031; OSWER 9200.1-23P, PB98-963241, (EPA, 1999).
- U.S. Environmental Protection Agency (EPA). 2000. *Multi-Agency Radiation Survey and Site Investigation Manual, Revision 1, updated June 2001.* EPA/402/R-97/016. August.
- U.S. Environmental Protection Agency (EPA). 2013. *Sample Federal Facility Land Use Control ROD Checklist with Suggested Language, OSWER Directive 9355.6-12.* January.

Appendix A
Responses to Comments from Regulatory Agencies

Responses to Comments Dated August 20, 2015 from Florida Department of Environmental Protection on the Redlined Version of the Draft Final ROD Amendment, OU 2, NAS Pensacola

Comment (1) Page 2-12, bottom paragraph, third sentence, in the part in parentheses, it says FDEP drinking water standard *in effect at the time of the RI*. I believe the 5 pCi/L standard is still in effect and the last part of the sentence can be removed.

Response: The text has been edited to remove the words "in effect at the time of the RI" from the sentence referred to in the comment.

Comment (2) Page 2-12, bottom paragraph, last sentence, the sentence ends "... indicated no detections above." Above what?

Response: The text has been edited to indicate that there were no indications above the FDEP drinking water standard of 5 pCi/l.

Comment (3) Page 2-19, Section 2.3, second paragraph, the sentence says that "... surface soils exceeding direct exposure residential SCTLs were *precluded from human contact* via implementation of LUCs." needs to be fixed. The site is to be managed to prevent residential or otherwise unacceptable exposures to the remaining contaminated soil, not to preclude human contact.

Response: This portion of the sentence referred to in the comment has been modified to read as follows:

"direct exposure to surface soils with contaminant concentrations exceeding direct exposure residential SCTLs were to be addressed by implementation of LUCs which prevent residential land use including, but not limited to, any form of housing; childcare facilities; any kind of school including preschools, elementary schools, secondary schools, or playgrounds; and adult convalescent or nursing care facilities." This language is derived from the 2008 ROD for OU 2.

Comment (4) Page 2-24, Section 2.4.1.1, once each in the first three paragraphs it mentions "contaminant concentrations above the FDEP direct exposure and leachability SCTLs". It needs to identify which FDEP direct exposure SCTLs is being discussed, residential or industrial.

Response: All locations within the text where "FDEP direct exposure SCTLs" are referred have been edited to indicate "FDEP industrial direct exposure SCTLs" where appropriate.

Comment (5) Page 2-27, Section 2.4.2.1, first two paragraphs, same comment as (4).

Response: Please see response to Comment (4).

Comment (6) Page 2-28, Section 2.4.2.2, all three paragraphs mention that the alternatives are "largely a control technology". What does that mean? As compared to what? Is control technology explained elsewhere in the ROD Amendment and I didn't find it?

Response: In the context of the discussion in this section, the text implied that the three remedial alternatives discussed were "engineering controls" rather than "treatment" of contaminated soils. The text in the three paragraphs under Section 2.4.2.2 have been modified to provide this clarification.

Responses to Comments dated August 20, 2015 from the U.S. Department of Environmental Protection on the Redlined Version of the Draft Final ROD Amendment, OU 2, NAS Pensacola

Comment (1) On page 43 of the pdf version, it is mentioned that a buffer of 20 feet from a designated wetland will be used as a standard for placement of the native soil covering. EPA would prefer that the area be given the cover and that the area be restored as wetland habitat. The material was originally placed as fill material and developed into wetland habitat. It would be expected to restore appropriately and hence the 20 foot buffer seems unnecessary. It may be best to implement activities near the wetland border during dry periods to limit effect to the wetland. The difference in water level may just give the buffer requested in the ROD.

Response: Comment acknowledged. The text has been edited to address this comment with the following text:

"Within the 20 foot-wide zone along the wetland boundaries, the grade of the native soil and topsoil will be tapered to meet existing grade along the wetland boundary. Revegetation will be implemented in this zone with selected plantings to include pollinator species approved by the NAS Pensacola Base authorities. Appropriate soil erosion and sediment controls will be implemented as outlined in a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will be included in the Remedial Action Work Plan Addendum (RAWPA) for Site 11."

Comment (2) EPA does not concur with the use of the iron background concentration value used in Table 2-5. The manner in which the concentration was derived has not been vetted thoroughly. Should the Navy develop a background concentration acceptable to all parties, it can be used without having it as part of the ROD. This being the case, EPA would prefer to have it removed from the chart.

Response: The iron background concentration value has been removed from Table 2-5 as a comparison criterion.