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NO FURTHER ACTION DECISION DOCUMENT SITE 21B RUBBLE LANDFILL BARIN NAS WHITING FIELD FL
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ABB ENVIRONMENTAL

(14)

NO FURTHER ACTION DECISION DOCUMENT

SITE 21B, RUBBLE LANDFILL

OUTLYING LANDING FIELD BARIN
FOLEY, ALABAMA

UNIT IDENTIFICATION CODE: N60508
CONTRACT NO. N62467-89-D-0317/031

JUNE 1995

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010

PRINTED ON RECYCLED PAPER

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OUTLYING LANDING FIELD BARIN
FOLEY, ALABAMA

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Contract No. N62467-89-D-0317/031

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JUNE 1995

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/031 are complete and accurate and comply with all requirements of this contract.

DATE: June 20, 1995

NAME AND TITLE OF CERTIFYING OFFICIAL: Rao V.R. Angara
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Gerald A. Walker, P.G.
Project Technical Lead

(DFAR 252.227-7036)

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
CPC	contaminant of potential concern
CRDL	contract required detection limits
DDE	dichlorodiphenyldichloroethane
DDT	dichlorodiphenyltrichloroethane
DOD	Department of Defense
ERA	Ecological Risk Assessment
GPR	ground penetrating radar
HHRA	Human Health Risk Assessment
HI	hazard index
HQ	hazard quotient
IR	Installation Restoration
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
μg/kg	microgram per kilogram
μg/ℓ	microgram per liter
mg/kg	milligram per kilogram
NACIP	Naval Assessment and Control of Installation and Pollutants
NAS	Naval Air Station
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priority List
OLF	Outlying Landing Field
PA	Preliminary Assessment
PCB	polychlorinated biphenyls
RAGS	Risk Assessment Guidance for Superfund
RfD	reference dose
RI	Remedial Investigation
RI/FS	Remedial Investigation and Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SOUTHNAV-FACENGCOM	Southern Division, Naval Facility Engineering Command
SVOC	semivolatile organic compound

GLOSSARY (Continued)

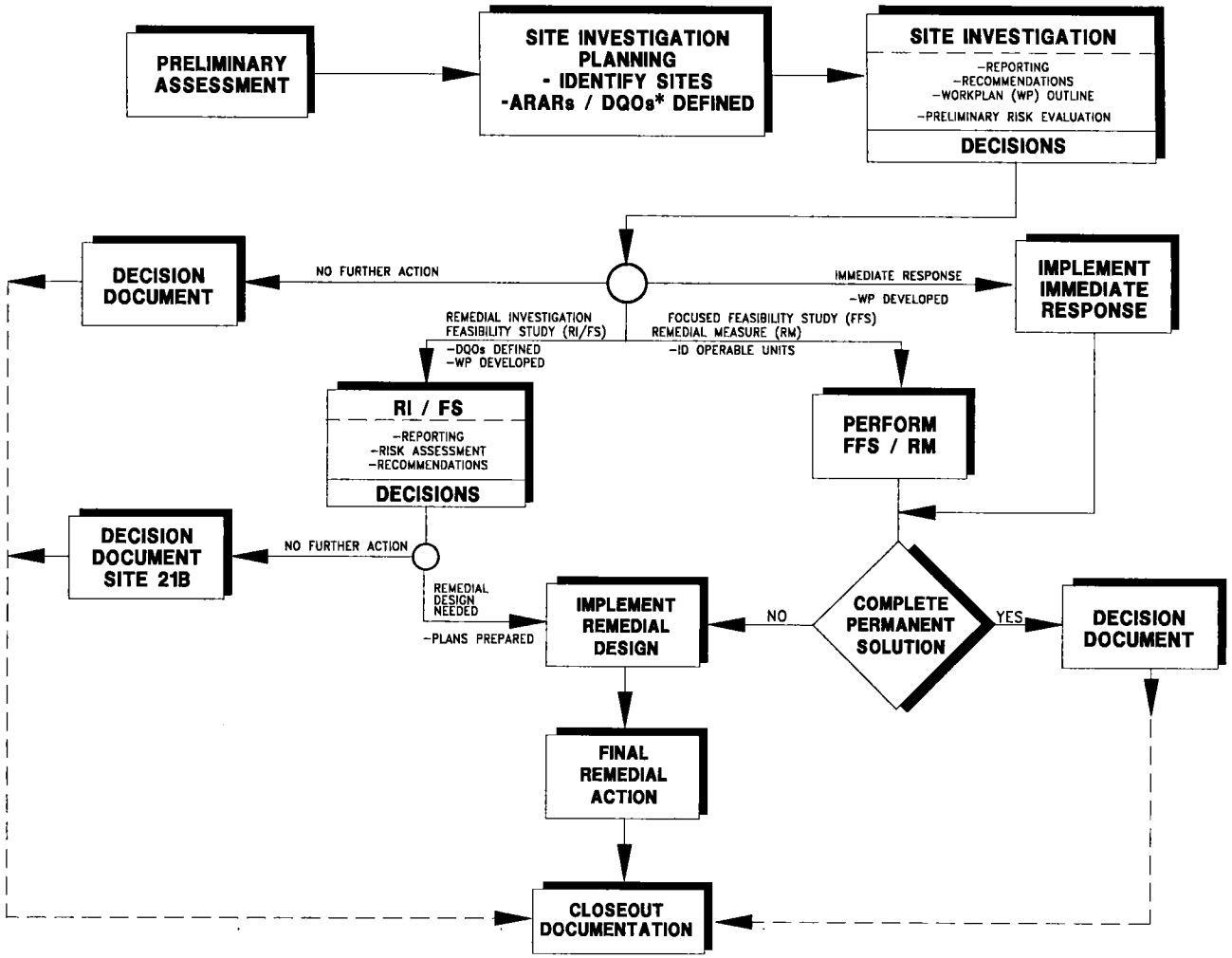
TAL	target analyte list
TC	terrain conductivity
TCL	target compound list
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

This No Further Action Decision Document has been prepared in conjunction with the Navy's Installation Restoration (IR) Program at Outlying Landing Field (OLF) Barin, Foley, Alabama. The IR Program at OLF Barin has been conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, amended by the 1986 Superfund Amendments and Reauthorization Act (SARA). As directed by Executive Order 12580 of January, 1987, the Department of Defense (DOD) conducts the IR Program to evaluate and remediate problems associated with releases and disposal of toxic and hazardous materials at DOD facilities. Figure 1-1 presents the order of implementation and interrelationships of the IR Program phases and the various decision points that exist within the IR Program process and the path taken for Site 21B.

OLF Barin is under the command of Naval Air Station (NAS) Whiting Field and is used as an outlying practice landing strip for Naval aircraft training. Additional detail regarding the installation activities can be found in Section 2 of this No Action Decision Document and in the following Remedial Investigation/Feasibility Study (RI/FS) documents: Technical Memorandum No. 1 (ABB-ES, 1994a), Technical Memorandum No. 2 (ABB-ES, 1994b), Technical Memorandum No. 3 (ABB-ES, 1994c), Technical Memorandum No. 4 (ABB-ES, 1994d), Technical Memorandum No.5 (ABB-ES, 1994e), Technical Memorandum Addendum (ABB-ES, 1995), and Human Health and Ecological Risk Assessment (ABB-ES, 1994f).

This No Further Action Decision Document focuses on the Remedial Investigation and Public Health and Ecological Risk Assessments conducted at Site 21B, Rubble Landfill, at OLF Barin. This document presents the selected action for Site 21B at OLF Barin. Although OLF Barin is not listed as a facility on the National Priority List (NPL), the decision document for Site 21B has been prepared in accordance with CERCLA guidance, as amended by SARA. This decision document is based on the administrative record for this site.



* ARARs – APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

DQOs – DATA QUALITY OBJECTIVES

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FIGURE 1-1
FLOW OF INSTALLATION RESTORATION PROGRAM TASKS

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2.0 BACKGROUND AND PHYSICAL SETTING

2.1 DESCRIPTION AND LAND USE. OLF Barin is located 40 miles southeast of Mobile, Alabama, in Baldwin County, Alabama. It is approximately 2 miles east of Foley Alabama, and 35 miles west of Pensacola, Florida (Figure 2-1). OLF Barin currently consists of approximately 490 acres, reduced from a maximum size of 1,000 acres. The major part of the facility is currently used for a single air field with two active aircraft landing strips. Figure 2-2 presents the current installation layout and location of identified RI sites.

OLF Barin, under the command of NAS Whiting Field, in Milton, Florida, is used as an outlying landing strip for airplane pilots training at NAS Whiting Field. A single onsite building is used for base operations and training. Several smaller buildings are used for equipment storage. The only current activity at OLF Barin is a small contingent of firefighters stationed at the facility to respond to aircraft accidents. The remaining undeveloped acreage consists primarily of maintained recreational areas, open grass lands, and pine tree plantations.

2.2 REGIONAL GEOLOGY AND HYDROGEOLOGY. The subsurface stratigraphy of coastal and offshore areas of Alabama is represented by a thick section of sedimentary rocks that range in age from Jurassic (200 to 140 million years before present time), to Holocene (0.01 million years before present to present time) (Chandler et al., 1985). Three recognized geologic units: (1) alluvium, low terrace, and coastal deposits; (2) the Citronelle Formation; and (3) the upper Miocene Series undifferentiated, contain the freshwater aquifer zones of the southern Baldwin County area. These freshwater units are recharged by yearly precipitation (averaging 64 inches per year), where they crop out at the surface in southern Baldwin County. Two of the geologic units, (1) the alluvial, low terrace, and coastal deposits and (2) the Citronelle Formation, crop out at the surface at OLF Barin Field. Detailed descriptions of these geologic units and aquifer zones, as well as site specific hydrogeologic data are provided in Technical Memorandum No. 2, Geologic and Hydrogeologic Assessment (ABB-ES, 1993b), and Technical Memorandum No. 4, Groundwater Assessment (ABB-ES, 1994b).

2.3 SITE 21B DESCRIPTION AND HISTORY. Site 21B, rubble landfill located in the northeast section of OLF Barin (Figure 2-2). The landfill is 3.1 acres in area and lies west of Sandy Creek. To the southeast, Site 21B borders a subsurface storm sewer and ditch for approximately 350 feet. The majority of the site appears to be an open upland area with occasional piles of surface rubble composed of slabs of concrete and asphalt. At the time of the RI, the surface area of Site 21B was covered with vegetation with the exception of a limited region of unvegetated surface debris along the north and northeastern edge. The vertical relief across the site, from the top of the fill to the floodplain of Sandy Creek, is approximately 15 feet (ABB-ES, 1993).

The soils of the undisturbed portions of the site are classified as Lakeland loamy fine sands. The subsurface geology is characterized by interbedded sand and silty sand layers, similar to those encountered throughout the facility. Groundwater flow across Site 21B is to the northeast toward Sandy Creek (ABB-ES, 1994b).

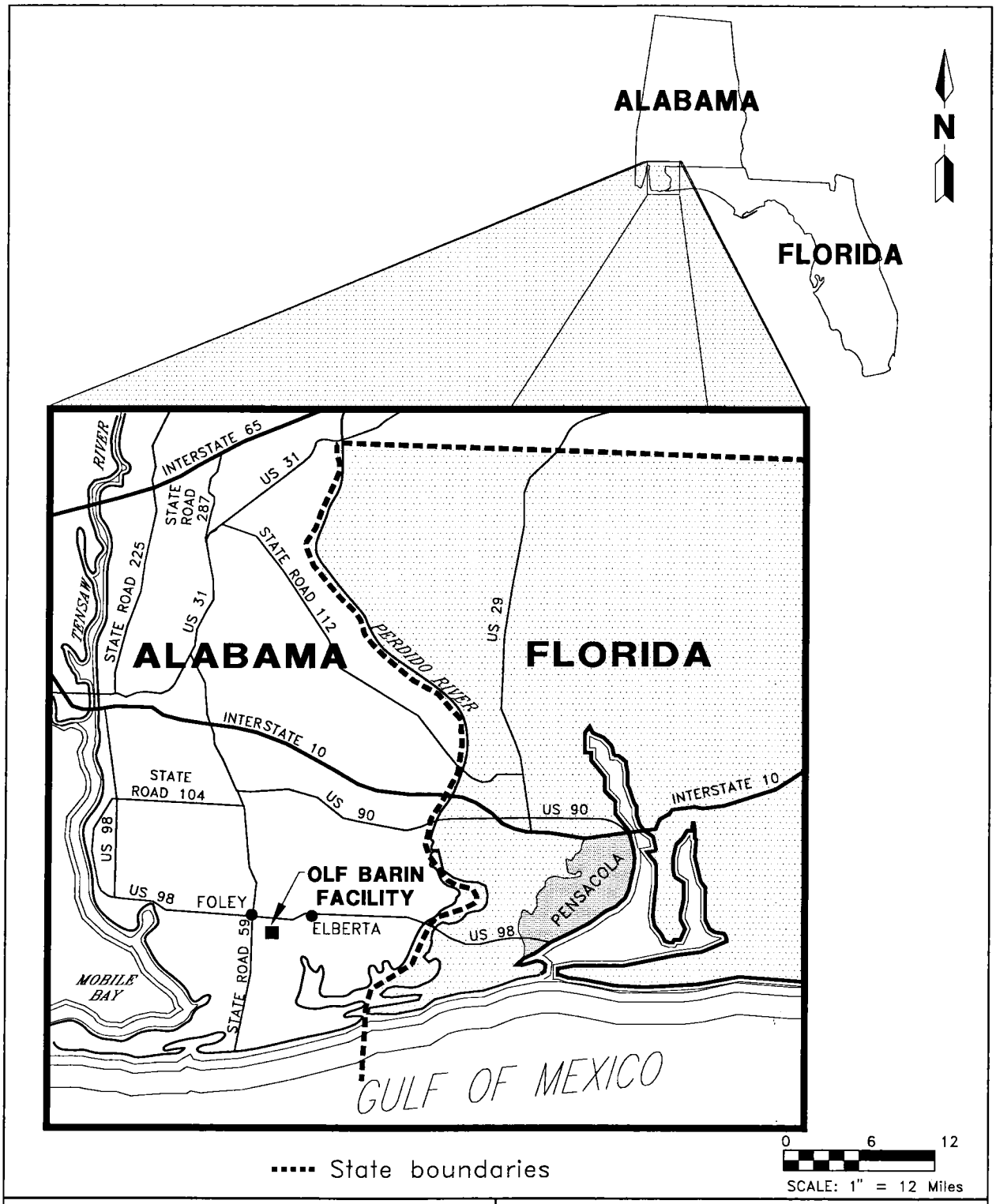

FIGURE 2-1
FACILITY LOCATION MAP

OLFBARIN/LOCATION/NP-WDW/03-28-95

SITE 21B
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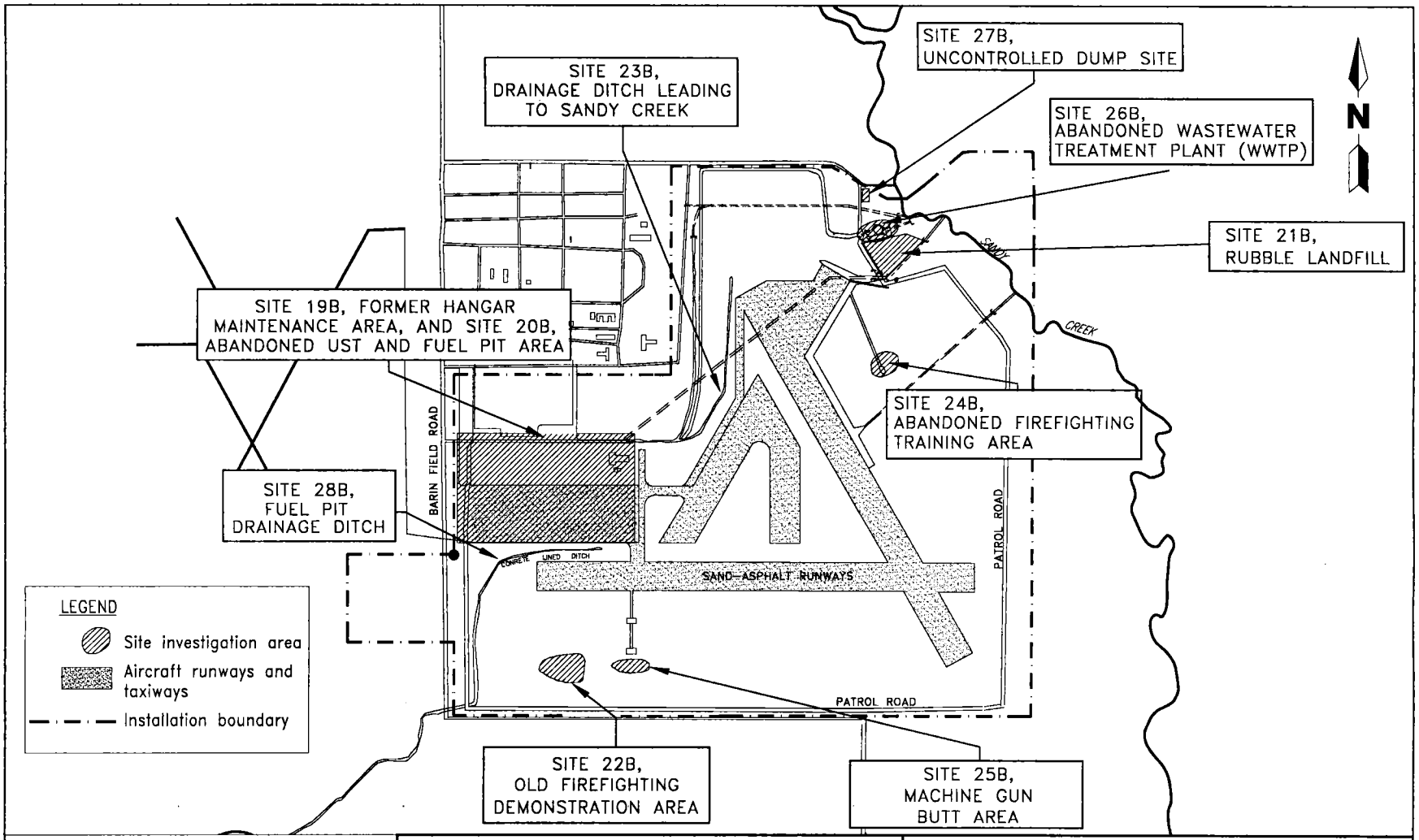
OLF BARIN
FOLEY, ALABAMA



0 750 1500

SCALE: 1" = 1500'

OLFBARIN\MEMO3\NP-WDW\05-23-95

FIGURE 2-2
INSTALLATION LAYOUT AND LOCATION OF REMEDIAL INVESTIGATION SITES

SITE 21B
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The Rubble Landfill was used as a disposal area for debris from aircraft hangers that were demolished in 1959. Based on the geophysical survey conducted at the site (ABB-ES, 1994c) all disposal of debris was at the surface and no burial activities were completed at the site. There is no current or historic evidence of hazardous material disposal at Site 21B (ABB-ES, 1993).

2.4 COMMUNITY PARTICIPATION. Throughout the site history there has been very little community involvement or concern for facility operations environmental programs. The public has been kept apprised of site activities through Technical Review Committee meetings, published fact sheets, and press releases.

The Navy conducted interviews with local officials and residents during March 1992 to assess community concerns. In October 1992, a press release was issued detailing the environmental program conducted at OLF Barin. The community relation plan for the facility was finalized in February 1993. Two separate fact sheets have been completed for the facility that summarize the progress of the IR program at the facility.

An Administrative Record has been maintained and is available for public review at the Foley Public Library.

3.0 RELATED INVESTIGATIONS

3.1 PRELIMINARY ASSESSMENT (PA). A PA was performed at OLF Barin by the Naval Energy and Environmental Support Activity (NEESA) in December, 1988 and published in February 1989 (NEESA, 1989). Based on historical data, the PA, and personnel interviews, five potentially contaminated sites and/or contaminant migration routes were initially identified and recommended for additional study at OLF Barin:

3.2 SITE INSPECTION (SI). As a result of the PA, ABB-ES was contracted by SOUTHNAVFACENGCOM to implement the next phase of the IR program, the SI. The purpose of the SI was to characterize the five sites identified in the PA. In addition to confirming the need for further investigations at the five original sites, the SI recommended that five additional sites should be included in future investigative activities.

3.3 REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS). Based on the results of the SI, an RI/FS program was implemented to more completely describe the nature and extent of contamination at all 10 of the identified sites. The Remedial Investigation (RI) field program was conducted from May 1993 through September 1993. RI activities included sediment and surface water sampling, monitoring well installation, groundwater sampling, aquifer characterization studies, geophysical investigations, surface soil sampling, soil borings, and subsurface soil sampling.

The following RI field activities were conducted at Site 21B:

- geophysical survey,
- test pitting exploration and subsurface soil sampling,
- surface soil sampling, and
- monitoring well installation and groundwater sampling.

3.3.1 Geophysical Survey The objective of the Site 21B geophysical investigation was to delineate the landfill boundaries and locate buried wastes. The geophysical investigation included: magnetometry terrain conductivity (TC), and ground penetrating radar (GPR) surveys.

During the magnetometry survey, seven anomalous areas were identified based on the vertical gradient contour data and four anomalous areas were identified based on the total field contour data. Based on the interpretation of the magnetometry data, it was determined that no buried ferrous debris exists at Site 21B, Rubble Landfill. All observed magnetic anomalies in the study area were directly attributable to either surface debris or known structures.

Based on the terrain conductivity data, it was concluded that no highly conductive wastes were landfilled at the site, except for debris that was observed at ground surface and contained ferrous materials.

Nine GPR profile transect lines were conducted across Site 21B. The profile denoted an area typified by chaotic reflections and diffractions which were identified as rubble consisting of concrete slabs and large sections of waste asphalt. The GPR survey combined with the magnetometer and TC surveys indicated

that the extent of the landfill was limited to the area of visible surface rubble. The GPR survey suggested that the rubble is approximately three feet thick across this area. The GPR data collected throughout the remainder of the site were generally indicative of native soils. Additional detail regarding the geophysical survey can be found in Technical Memorandum No. 2 (ABB-ES, 1994c).

3.3.2 Test Pitting and Subsurface Soil Sampling Based on the results of the geophysical survey, three test pits were excavated within the reported disposal area and at geophysical anomalies. One subsurface soil sample was collected from each test pit, and a duplicate sample was collected from 1 of the 3 test pits (Figure 3-1). Subsurface soil samples collected from the test pits were analyzed for target compound list (TCL) volatile organic compounds (VOCs), TCL semivolatile organic compounds (SVOCs), TCL pesticides and polychlorinated biphenyls (PCBs), and target analyte list (TAL) inorganic parameters. Additional detail regarding subsurface soil sampling methods at Site 21B and the location of background samples are presented in Technical Memorandum No. 3 Soil Assessment (ABB-ES, 1994c).

Table 3-1 presents a summary of the analytical results of the subsurface soil samples collected at Site 21B. No VOCs or SVOCs were detected in any of the test pit soil samples collected at Site 21B. The pesticide compound dieldrin was detected in one of the three test pit samples at a concentration of 5.1 μg/kg. The detected concentration of dieldrin was within the range of background concentrations of pesticides in soils at the facility.

Seventeen inorganic parameters were detected in the soil samples collected from the test pits. Ten of the inorganic parameters were detected at concentrations either equal or higher than concentrations reported in background samples collected at the facility. Those inorganic parameters detected (arsenic, cadmium, chromium, iron, mercury, and silver) were considered to be elevated above background concentrations at concentrations that exceeded 2 times the average background sample concentration.

3.3.3 Surface Soil Sampling Three surface soil samples were collected from the Sandy Creek floodplain area down slope from the rubble landfill. The sample locations are shown on Figure 3-1. These samples were collected to investigate the potential for overland flow of contaminants from the landfill to Sandy Creek. The soil samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL inorganics. Additional detail regarding surface soil sampling methods at Site 21B are provided in Technical Memorandum No. 3, Soil Assessment (ABB-ES, 1994a).

Table 3-2 presents a summary of the analytical results for the surface soil samples collected at Site 21B. One VOC and nine SVOCs were detected in surface soil samples collected at Site 21B. All of the reported organic analyte concentrations were qualified as estimated by the data validation process because the detected values were less than CRDLs.

Three pesticides (dieldrin, 4,4-DDE, and 4,4-DDT) were detected in surface soil samples collected from Site 21B. Concentrations of these pesticides were within the range of background pesticide concentrations in soils at the facility.

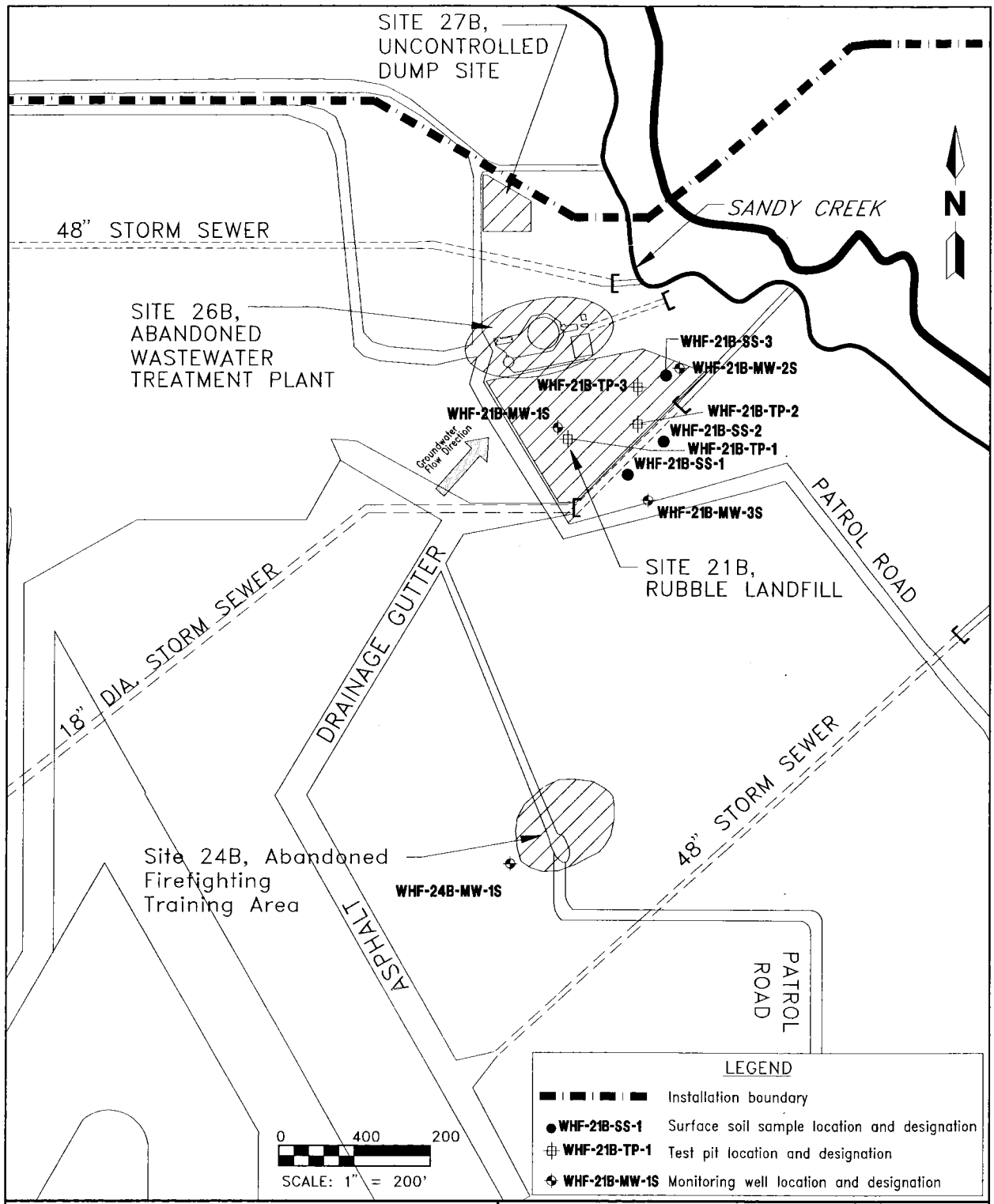

FIGURE 3-1
TEST PIT, SURFACE SOIL SAMPLE, AND MONITORING WELL LOCATIONS

OLFBARIN/SITE-21B/NP-WDW/03-28-95

SITE 21B
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Table 3-1
Summary Analytical Results for Test Pit Soil Samples Collected at Site 21B [1]

Site 21B No Further Action Decision Document
Outlying Landing Field Barin
Foley, Alabama

Sample Designation: Collect Date: Laboratory Sample No.:	WHF-21B-TP-1 10-Jun-93 90034001	WHF-21B-TP-1D 10-Jun-93 90034002	WHF-21B-TP-2 10-Jun-93 90036001	WHF-21B-TP-3 10-Jun-93 90036002	Average Background Concentration
Pesticide (μg/kg)					
Dieldrin	--	--	--	5.1	7.0
Inorganic Parameters (mg/kg)					
Aluminum	2,740	3,490	6,790	6,100	4,621
Arsenic	0.42 J	0.56 J	0.84 J	1.7 J	0.71
Barium	5.3 J	6.5 J	7.3 J	5.7 J	11.6
Beryllium	--	--	0.07 J	0.09 J	0.15
Cadmium	--	0.61 J	--	0.70 J	0.15
Calcium	114 J	--	533 J	260 J	332
Chromium	0.89 J	1.4 J	8	9.9	4.2
Copper	3.9 J	1 J	2 J	2.5 J	3.0
Iron	1,610	2,350	5,650	19,000	2,801
Lead	2	2.1	3.5	2	4.3
Magnesium	93.4 J	61.9 J	69.4 J	22.0 J	122.9
Manganese	39.7	43.7	39.4	2.6 J	140.5
Mercury	0.02 J	--	0.04 J	0.02 J	0.02
Silver	--	--	--	0.91 J	0.13
Vanadium	3.1 J	4.7 J	14	19.1	6.9
Zinc	--	0.52 J	2.4 J	2.7 J	8.1
Cyanide	--	0.32 J	--	--	0.025

[1] Additional detail regarding subsurface soil sampling can be found in Technical Memorandum No. 3, Soil Assessment (ABB-ES, 1994a).

Notes: -- = compound not detected above instrument detection limit.
J = estimated value.
μg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

Table 3-2
Summary Analytical Results for Surface Soil Samples Collected at Site 21B [1]

Site 21B No Further Action Decision Document
Outlying Landing Field Barin
Foley, Alabama

Sample Designation: Collect Date: Laboratory Sample No.:	WHF-21B-SS-1 20-May-93 90015013	WHF-21B-SS-1D 20-May-93 90015014	WHF-21B-SS-2 20-May-93 90015015	WHF-21B-SS-3 20-May-93 90015016	Average Background Concentrations
Volatile Organic Compound (μg/kg)					
Toluene	--	--	3 J	--	NA
Semivolatile Organic Compounds (μg/kg)					
Phenanthrene	--	37 J	--	--	NA
Fluoranthene	97 J	140 J	--	--	NA
Pyrene	71 J	100 J	--	--	NA
Benzo(a)anthracene	43 J	53 J	--	--	NA
Chrysene	57 J	66 J	--	--	NA
Benzo(b)fluoranthene	40 J	100 J	--	--	NA
Benzo(k)fluoranthene	66 J	--	--	--	NA
Benzo(a)pyrene	--	43 J	--	--	NA
Indeno(1,2,3-cd)pyrene	--	37 J	--	--	NA
Pesticides/PCBs (μg/kg)					
Dieldrin	--	1.2 J	1.5 J	2.1 J	7.0
4,4-DDE	--	--	--	1.1 J	1.8
4,4-DDT	--	1.9 J	--	1.4 J	1.8
Inorganic Parameters (mg/kg)					
Aluminum	4,560	6,850	5,230	3,600	4,621
Arsenic	--	0.42 J	1.2 J	0.49 J	0.71
Barium	7.8 J	9.7 J	8.8 J	8.3 J	11.6
Calcium	69.2 J	87.4 J	125 J	250 J	332
Chromium	5.8	7.6	5.8	2.9	4.2
Copper	4.4 J	5.2 J	2 J	1.8 J	3.0
Iron	641	815	2,920	1,960	2,801
Lead	1.3	2.5	3.4	4.7	4.3
Magnesium	45.6 J	90.1 J	74.9 J	99.5 J	112.9
Manganese	1.2 J	2.2 J	8.7	65.4	140.5
Mercury	--	0.05 J	--	0.04 J	0.02
Potassium	52.2 J	101 J	72.5 J	75.6 J	113.8
Selenium	--	--	--	0.19 J	0.25
Sodium	172 J	167 J	203 J	176 J	169
Vanadium	4.7 J	5.8 J	11.4 J	5.2 J	6.9
Zinc	2.4 J	3.8 J	3.6 J	7.4 J	8.1

[1] Additional detail regarding Site 21B surface soil sampling can be found in Technical Memorandum No. 3 (ABB-ES, 1994c).

Notes: J = estimated value.
PCB = Polychlorinated Biphenyl.
4,4-DDE = dichlorophenyl dichloroethene.
4,4-DDT = dichlorophenyl trichloroethane.
μg/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.
-- = compound not detected.
NA = compound not analyzed in background samples.

Sixteen inorganic parameters were detected in surface soil samples. Concentrations of nine of the parameters, including aluminum, arsenic, chromium, copper, iron, lead, mercury, sodium, and vanadium, exceeded the installation-specific average background concentration; however, only the mercury concentrations detected in one surface soil sample was reported to exceed the average background concentration by greater than a factor of two, indicating that this concentration was elevated above background.

3.3.4 Groundwater Sampling Three shallow monitoring wells were installed at Site 21B at the locations depicted on Figure 3-1. One additional monitoring well, WHF-24B-GW-15, was installed at Site 24B and represents the background monitoring well for both sites (Figure 3-1). All three monitoring wells were screened across the water table, at intervals of 3 to 13, 5 to 15, and 18 to 28 feet below land surface (bls). A groundwater sample was collected from each of the monitoring wells. A duplicate sample was obtained from one well. Groundwater samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL inorganic parameters. Additional detail regarding groundwater monitoring well sampling methods at Site 21B and the location of background sample locations are presented in Technical Memorandum No. 4 (ABB-ES, 1994d).

Table 3-3 presents a summary of the analytical results of the groundwater monitoring well sampling conducted at Site 21B. No VOCs, SVOCs, pesticides or PCBs were detected in the four groundwater samples (three samples plus a duplicate) collected from the three monitoring wells at Site 21B.

All inorganic parameters were detected at concentrations that exceeded the concentrations detected in the background monitoring well (24B-GW-15). However, only four parameters, including aluminum, antimony, iron, and manganese, exceeded Federal MCLs/MCLGs and or Alabama MCLs. Three of the four parameters (excluding antimony) also exceeded 2 times the upgradient concentrations.

Table 3-3
Summary Analytical Results for Groundwater Samples Collected at Site 21B [1]

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ABB-ES Sample No.	WHF-21B-GW-1S	WHF-21B-GW-2S	WHF-21B-GW-2SD	WHF-21B-GW-3S	WHF-24B-GW-15	ARARs	
Laboratory No.	90092004/7	90094003	90094004	90094002	90092005	Federal MCL/ MCLG [2]	Alabama Primary/ Secondary MCLs [3]
Date Collected	16-AUG-93	17-AUG-93	17-AUG-93	17-AUG-93	16-AUG-93		
Inorganic Parameters (µg/ℓ)							
Aluminum	20,300 J	5,740 J	5,720 J	17,400 J	7,870 J	[4]50-200/NA	NA/200
Antimony	--	19 J	--	--	--	6/6	6/NA
Barium	64.6 J	32.1 J	31.5 J	64.7 J	27.2 J	2,000/2,000	2,000/NA
Beryllium	0.42 J	--	0.49 J	--	--	4/4	4/NA
Calcium	1,360 J	2,310 J	2,310 J	6,720	784 J	NA/NA	NA/NA
Chromium	31.8	26.3	27.9	19.7	10.8	100/100	100/NA
Cobalt	4 J	--	--	--	--	NA/NA	NA/NA
Copper	16.8 J	11.4 J	13.8 J	11.6 J	5.1 J	100/100	NA/1,000
Iron	22,600 J	44,700	44,700	11,600	21,300 J	[4]300/NA	NA/300
Magnesium	1,410 J	1,430 J	--	1,870 J	--	NA/NA	NA/NA
Manganese	138	234	237	40.4	31.6	[4]50/NA	NA/50
Nickel	16.6 J	15.7 J	15.8 J	15.3 J	--	100/100	100/NA
Potassium	1,780 J	1,350 J	1,220 J	1,940 J	1,470 J	NA/NA	NA/NA
Selenium	--	--	--	1.7 J	--	50/50	50/NA
Silver	--	--	4.2 J	--	--	[4]100/NA	50/NA
Sodium	1,220 J	1,750 J	1,760 J	2,490 J	1,120 J	[5]20,000	NA/NA
Vanadium	77.2	131	132	73.9	35.2 J	NA/NA	NA/NA
Zinc	21.9	13.8 J	15.3 J	40	10.8 J	5,000/NA	NA/5,000

[1] Additional detail provided regarding Site 21B Groundwater Sampling can be found in Technical Memorandum No. 4 (ABB-ES, 1994d).
[2] USEPA Safe Drinking Water Act, National Primary Water Regulations per 40 Code of Federal Regulation (CFR) 141; Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) from Drinking Water Regulations and Health Advisories (USEPA, May 1994).
[3] Alabama Primary Drinking Water Standards and Alabama Secondary Drinking Water Standards (ADEM Admin. Code R 335-7-2 and 335-7-3, respectively, November, 1992).
[4] Value is a Secondary MCL.
[5] Value is the Drinking Water Equivalent Level.

Notes: J = estimated. NA = not applicable.

4.0 HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT

A risk assessment was conducted as part of the RI/FS of OLF Barin (ABB-ES, 1994f). The risk assessment, consisting of a Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA), was conducted to determine if contaminants detected at OLF Barin pose an unacceptable risk to either human or ecological receptors.

4.1 HUMAN HEALTH RISK ASSESSMENT. The HHRA was conducted in accordance with Federal and State guidelines, including *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A* (USEPA, 1989a); *Supplemental Region IV Risk Assessment Guidance* (USEPA, 1991a); *Exposure Factors Handbook* (USEPA, 1989b); and *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors* (USEPA, 1991b). In accordance with this guidance, the HHRA was composed of the following sections:

- Data evaluation and summarization
- Identification of chemicals of potential concern (CPCs)
- Exposure assessment
- Toxicity assessment
- Risk Characterization
- Uncertainty analysis

The data collected during the RI was used to complete the HHRA. Nine analytes detected in surface soil were identified as CPCs. These analytes included the SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene, and the inorganic analytes arsenic and manganese. For subsurface soil, only arsenic and manganese were retained as CPCs. CPCs in groundwater included the inorganic analytes aluminum, antimony, beryllium, chromium, iron, manganese, and vanadium.

Potential exposures to contaminated media at Site 21B were evaluated for residential, transient, and excavation worker exposure scenarios. Current land use exposures were evaluated for transient exposures to surface soil, excavation worker exposures to subsurface soil, and residential exposures to groundwater. These exposure scenarios, in addition to residential exposure to surface soil, were evaluated for potential future site land use. The exposure routes evaluated included residential and transient dermal, ingestion, and particulate emission and vapor exposures to surface soil, excavation worker dermal, ingestion, and particulate emission exposures to subsurface soil, and residential ingestion and vapor exposure to groundwater. Table 4-1 presents a summary of the exposure pathways evaluated at Site 21B.

Results of the risk characterization indicated that no significant human health risks were associated with exposures to surface soil, subsurface soil, and groundwater at Site 21B. Residential, transient, and worker cancer risks for all exposures pathways evaluated were within the USEPA acceptable cancer risk range of $1x10^{-6}$ to $1x10^{-4}$. The hazard index (HI) for non-cancer risks were below one for residential, transient, and worker exposures to soils, indicating that non-cancer effects were not anticipated. For groundwater, the HI for the adult resident was 4. This was primarily attributable to risk associated with potential

groundwater ingestion exposures to antimony. However, this risk was judged to be unsubstantial based on uncertainties associated with the toxicity assessment.

The Risk Assessment Guide for Superfund (USEPA, 1989) states that "if the HI (Hazard Index) is greater than unity as consequence of summing several hazard quotients of similar value, it is appropriate to segregate the compounds by effect (target organ) and mechanism of action....". At Site 21B the cumulative HI is 4 due to summing of the Hazard Quotients (HQs) for three analytes: antimony (HQ - 2); manganese (HQ - 1); and vanadium (HQ = o.5). The additional analysis suggested in RAGS, performed by an ABB-ES toxicologist, indicates that no significant toxicological effects would be expected to result from exposure to these three analytes at Site 21B.

The HQs for manganese and vanadium are less than unity indicating that exposure to these analytes individually is safe. The only HA greater than unity was antimony at 2 and this value is calculated using a Reference Dose (RfD) based upon rat drinking water studies reporting changes in glucose and cholesterol metabolism and a decreased life span in the test animals. However, the USEPA Integrated Risk Information System (IRIS) database indicates a "low" confidence in the applicability of these studies to humans and a high uncertainty factor (1000) in the antimony RfD. This combination of a low confidence rating, a high uncertainty factor in the antimony RfD and an HQ of only 2, indicates a low potential for adverse human health effects at Site 21B due to antimony exposure.

Finally, the question of whether exposure to these three analytes together is safe can also be answered with data from the IRIS database. Animal and human studies on target organs and mechanism of action indicate that these three analytes are toxic to different organs and will not act together to increase toxicity of one another. Therefore, based upon this analysis of USEPA data no adverse health effects would be expected at Site 21B even with a cumulative HI of 4.

In summary, the HHRA concluded that none of the CPCs detected in the surface soil, subsurface soil, and groundwater at Site 21B posed an unacceptable human health risk for current and potential future uses of the site.

4.2 ECOLOGICAL RISK ASSESSMENT. The ERA was conducted in accordance with Federal and State guidelines, including *Risk Assessment Guidance for Superfund* (USEPA, 1989c); *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference* (USEPA, 1989d) *Supplemental Region IV Risk Assessment Guidance* (USEPA, 1991a); *Ecological Assessment of Superfund Sites: An Overview* (USEPA, 1991c); and *Framework for Ecological Risk Assessment* (USEPA, 1992). In accordance with this guidance, the ERA was composed of the following 7 sections:

- Problem Formulation
- Data evaluation and summarization
- Identification of CPCs
- Ecological Characterization
- Exposure assessment
- Risk Characterization
- Uncertainty analysis

Table 4-1
Exposure Routes Evaluated at Site 21B [1]

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Exposure Medium/ Exposure Route	Human Health Exposure			Ecological Receptors
	Resident (present and future)	Transient	Excavation Worker	Terrestrial Receptor
Surface Soil				
Incidental ingestion	X	X	--	X
Dermal contact	X	X	--	--
Food chain uptake	--	--	--	X
Subsurface Soil				
Incidental ingestion	--	--	X	--
Dermal contact	--	--	X	--
Groundwater				
Ingestion	X	--	--	--
Surface Water				
Ingestion	--	--	--	--
Dermal contact	--	--	--	--
Sediment				
Ingestion	--	--	--	--
Dermal contact	--	--	--	--
Air				
Inhalation of shower vapors	X	--	--	--
Inhalation of particulate dust	X	X	X	--
Inhalation of soil vapors	--	--	X	--

[1] Additional detail regarding the Site 21B risk assessment can be found in the Human Health and Ecological Risk Assessment (ABB-ES, 1994f).

Notes: X = exposure evaluated
-- = exposure not evaluated at this site

Table 4-1 presents a summary of the ecological exposure evaluated at Site 21B. Because Site 21B is currently a functioning ecological system, and because no development activities are proposed at the site, current and future exposures in the ecological risk assessment were assumed to be the same; therefore, current and future were evaluated together as one exposure scenario. Only ingestion exposures were evaluated at Site 21B. Dermal and inhalation exposure pathways were not evaluated because they represent unsubstantial routes of exposure. Exposures associated with Sandy Creek and the surface water body to the northeast of Site 21B, were evaluated in the Site 23B ecological risk assessment (ABBES, 1994f).

The data collected during the RI was used to complete the ERA. Thirteen analytes detected in surface soil were identified as CPCs. These analytes included the VOC toluene, the SVOCs benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthrene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and the pesticides 4,4'-DDE, 4,4'-DDT, and dieldrin.

Potential exposures to contaminated media at Site 21B were evaluated for terrestrial receptors. No exposure pathways exist for terrestrial receptor contact with subsurface soil or groundwater. Therefore, these media were not evaluated in the ERA. In addition, since there are no aquatic habitats at Site 21B, aquatic receptor exposures were not evaluated. The terrestrial receptors selected as indicator species represented different taxonomic groups and trophic levels, and included the hispid cotton rat, mourning dove, southern black racer, red fox, and red-tailed hawk. Terrestrial receptor exposures to surface soil CPCs were estimated for the food chain uptake and incidental surface soil ingestion exposure pathways.

Results of the risk characterization indicated that no significant ecological risks were associated with exposure to surface soil at Site 21B. The HIs for the terrestrial receptor indicator species evaluated were below 1, indicating that no elevated risk of adverse effects to the small mammals, ground-foraging avian receptors, or higher trophic level receptors evaluated in the ERA were anticipated.

In summary, the ERA concluded that none of the CPCs detected in the surface soil, at Site 21B posed an unacceptable ecological risk for the indicator species evaluated.

5.0 CONCLUSIONS

The objective of the RI/FS and the Human Health and Ecological Risk Assessment was to evaluate potential contamination and associated risk to human health or ecological receptors from contaminated environmental media at Site 21B. Based upon the analytical results of surface soil, subsurface soil, and groundwater sampling there is no indication that the detected analytes at Site 21B are present at concentrations that pose a risk to human health or the environment for current and potential future land uses. The results of the RI/FS program indicate that a removal action at Site 21B is not warranted, as no areas of contamination were identified. The evaluation also suggests that additional studies would direct the site toward the No Action alternative. Therefore, the No Further Action alternative is recommended for Site 21B at OLF Barin.

6.0 DECISION

On the basis of the findings at Site 21B, Rubble Landfill, at OLF Barin, Foley, Alabama, there is no evidence or reason to conclude that Site 21B has caused environmental contamination or poses an unacceptable current or potential threat to human health or the environment. No remedial action is necessary to ensure protection of human health and the environment. The decision has been made to remove Site 21B from further consideration in the IR Program process. No further action under the IR Program is warranted at Site 21B, Rubble Landfill. Letters of concurrence from USEPA and ADEM constitute concurrence with the No Further Action Decision at Site 21B.

NAVAL AIR STATION WHITING FIELD
Milton, Florida

_____ _____

Captain Tande
Commanding Officer
NAS Whiting Field Base Commander

Date

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