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RECORD OF DECISION FOR SURFACE AND SUBSURFACE SOIL AT SITE 31 SLUDGE BEDS AND DISPOSAL AREAS NAS WHITING FIELD

8/1/2002

NAVFAC SOUTHERN

EPA/ROD/R04-02/063
2002

EPA Superfund
Record of Decision:

WHITING FIELD NAVAL AIR STATION
EPA ID: FL2170023244
OU 19
MILTON, FL
09/25/2002

RECORD OF DECISION
FOR
SURFACE AND SUBSURFACE SOIL AT SITE 31, SLUDGE BEDS AND DISPOSAL AREAS

Naval Air Station
Whiting Field
Milton, Florida
USEPA ID No. FL2170023244

Southern Division
Naval Facilities Engineering Command

AUGUST 2002

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

SEP 25 2002

4WD-FFB

Captain W. B. Watkins
Commanding Officer
Naval Air Station Whiting Field
7550 USS Essex Street
Suite 100
Milton, Florida 32570-6155

Subject: Record of Decision
Site 31, Sludge Beds and Disposal Areas
NAS Whiting Field, Milton, Florida

Dear Captain Watkins:

The U.S. Environmental Protection Agency (EPA) Region 4 has reviewed the above subject decision document and concurs with the selected remedy for the Remedial Action at Site 31. This remedy is supported by the previously completed Remedial Investigation, Baseline Risk Assessment Reports and the removal action completion report.

The selected remedy consists of no further action. This remedial action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective.

EPA appreciates the coordination efforts of NAS Whiting Field and the level of effort that was put forth in the documents leading to this decision. EPA looks forward to continuing the exemplary working relationship with NAS Whiting Field and Southern Division Naval Facilities Engineering Command as we move toward final cleanup of the NPL site.

Sincerely,

Richard D. Green
Director
Waste Management Division

cc: Hansford T. Johnson, Assistant Secretary of the Navy (Installations and Environment)
James Holland, NAS Whiting Field
Linda Martin, SOUTHDIV
James Cason, FDEP

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ACRONYMS

ABB-ES	ABB Environmental Services
ARAR	Applicable or relevant and appropriate requirement
BEI	Bechtel Environmental, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	constituent of concern
ECOPC	ecological constituent of potential concern
ELCR	excess lifetime cancer risk
ERA	ecological risk assessment
F.A.C.	*Florida Administrative Code*
FDEP	Florida Department of Environmental Protection
FS	Feasibility study
GIR	General Information Report
HLA	Harding Lawson Associates
HHRA	human health risk assessment
HI	Hazard Index
HQ	Hazard Quotient
IRA	Interim Removal Action
ICR	incremental cancer risk
IR	installation restoration
mg/kg	milligrams per kilograms
NFA	No Further Action
NAS	Naval Air Station
Navy	Department of the Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	operation and maintenance
PCB	polychlorinated biphenyl
PPE	personal protective equipment
RA	remedial action
RAB	Restoration Advisory Board
RAO	remedial action objective
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RG	remediation goal
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments & Reauthorization Act
SCTL	Soil Cleanup Target Level
SVOC	semivolatile organic compound
TBC	to be considered
TSDF	treatment, storage, and disposal facility
TtNUS	Tetra Tech, NUS, Inc.
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1.0 DECLARATION OF THE RECORD OF DECISION

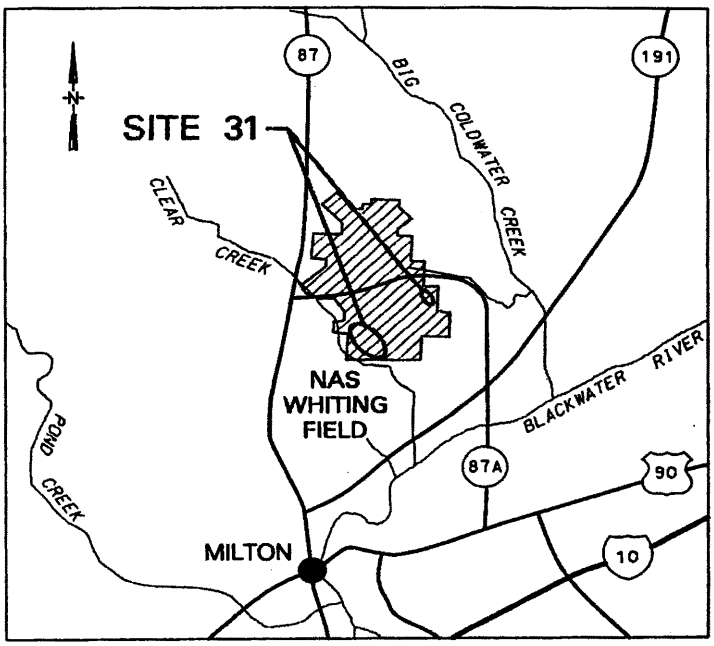
1.1 SITE NAME AND LOCATION

Naval Air Station (NAS) Whiting Field is located approximately 5.5 miles north of the town of Milton, FL in Santa Rosa County, about 25 miles northeast of Pensacola, FL. The main base covers about 3,842 acres, including two airfields. Site 31, Sludge Beds and Disposal Areas, comprises six areas of land totaling approximately 13.4-acres in size located on the southwest and the east side of NAS Whiting Field, Milton, Florida (Figure 1-1). Site 31 is composed of Area 31A: Sludge Drying Beds and Areas 31B, 31C, 31D, 31E, and 31F: Sludge Disposal Areas.

1.2 STATEMENT OF BASIS AND PURPOSE

This decision document proposes No Further Action (NFA) for surface and subsurface soils at Site 31, NAS Whiting Field. This decision is based on the results from previous investigations and an Interim Removal Action (IRA) at the site, including Remedial Investigation (RI) Phase I in 1991 identifying the site, RI Phase IIA in 1992 verifying the site, RI Phase IIB in 1997, Interim Remedial Action Completion Report Sites 9, 10, 17, 18, and 31C Surface Soil Remediation (Bechtel Environmental, Incorporated, {BEI} 2000) in 2000, and the RI Report Site 31 Sludge Beds and Disposal Areas in 2001 (Harding Lawson Associates {HLA}, 2001).

The proposed remedy was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Information supporting the selection of this Remedial Action (RA) is contained in the Administrative Record for this site. The NAS Whiting Field Information Repository, including the Administrative Record, is located at the West Florida Regional Library, Milton Branch, 805 Alabama Street, Milton, Florida, 32570, (850) 623-5565. The United States Environmental Protection Agency (USEPA) and the Florida Department of Environmental Protection (FDEP) concur with the proposed remedy.



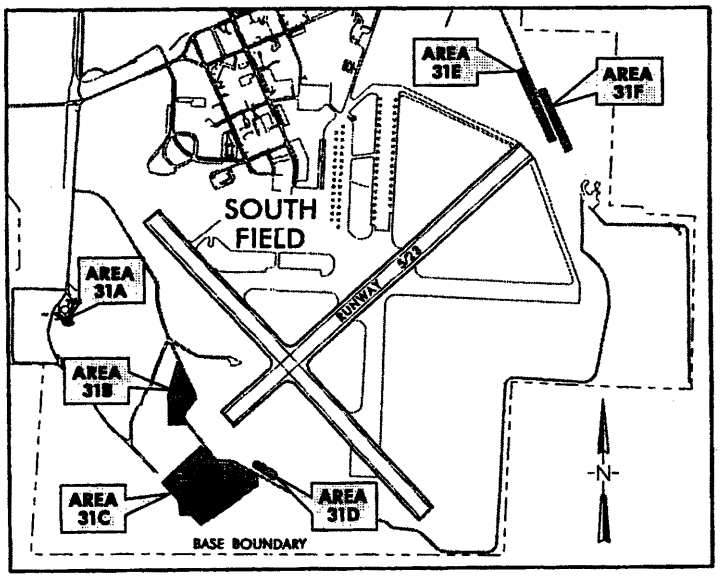


Figure 1-1 Site Location Map and Areas Map

1.3 ASSESSMENT OF THE SITE

In the investigation and evaluation of constituents in the surface and subsurface soil at Areas 31A, 31B, 31D, 31E, and 31F, no constituents exceeded FDEP or USEPA risk-based screening values for residential land use. The Investigation and evaluation of constituents present in the surface soil at Area 31C, identified one polychlorinated biphenyl (PCB), one pesticide, and seven inorganic compounds, exceeding FDEP (FDEP, 1999) risk-based screening values for residential land-use. After an IRA for surface soils at Area 31C, no constituents exceeded FDEP or USEPA risk based screening values for residential land use. In subsurface soil at Area 31C, no constituents exceeded FDEP or USEPA risk-based screening values for residential land use. A more detailed discussion of risks is presented in this document in Section 2.6.1.

A human health risk assessment (HHRA) was not performed for the subsurface soil at Site 31 because no constituents were identified as exceeding USEPA or FDEP risk-based screening values for residential land use.

The results of the ecological risk assessment suggest no changes in community structure and populations are anticipated for Areas 31A, 31B, 31D, 31E, and 31F. Although samples collected from stressed areas of Area 31C during the RI indicated potential risks to plants and wildlife receptors, surface soil from areas of stressed vegetation was excavated and removed during the IRA at Area 31C. A more detailed discussion of the potential ecological risk is presented in Section 2.6.2.

1.4 DESCRIPTION OF THE SELECTED REMEDY

This Record of Decision (ROD) presents the final action for surface and subsurface soil at Site 31 and is based on results of the IRA (BEI, 2000) and the RI (HLA, 2001). Sediment and surface water are not present at Site 31. The proposed remedy for Site 31 is No Further Action for Surface and Subsurface Soil and ensures protection of human health and the environment.

This ROD only addresses surface and subsurface soil at Site 31. Actual or potential groundwater contamination at NAS Whiting Field has been identified as a separate site (Site 40) and will be addressed in a future decision document. No further CERCLA action is necessary. Current conditions at Site 31 are protective of human health and the environment under an unrestricted use scenario.

1.5 STATUTORY DETERMINATIONS

No further remedial action is necessary for Site 31 because the previous response action eliminated the need to conduct further remedial activity. The No Further Action remedy for surface and subsurface soil at Site 31 is protective of human health and the environment based on an unrestricted use scenario, complies with Federal and State requirements legally applicable or relevant and appropriate, and is cost effective. None of the CERCLA Section 121 statutory determinations are necessary because no remedy is being selected. Consequently, no active treatment or monitoring will be conducted at Site 31.

1.6 AUTHORIZING SIGNATURES AND SUPPORT AGENCY ACCEPTANCE OF THE REMEDY

W. B. Watkins
Captain, United States Navy
Commanding Officer, NAS Whiting Field

Date 8/21/02

Richard D. Green
Director, Waste Management Division
USEPA, Region 4

Date 9/25/02

2.0 DECISION SUMMARY

2.1 SITE NAME, LOCATION, AND DESCRIPTION

Naval Air Station (NAS) Whiting Field is located approximately 5.5 miles north of the town of Milton, FL in Santa Rosa County, about 25 miles northeast of Pensacola, FL. The main base covers about 3,842 acres, including two airfields. Site 31, Sludge Beds and Disposal Areas, comprises six areas of land totaling approximately 13.4-acres in size located on the southwest and the east side of NAS Whiting Field, Milton, Florida. Area 31A, the sludge drying beds near the Wastewater Treatment Plant, Areas 31B, 31C, and Area 31D, three disposal areas along the perimeter road near the south end of Runway 5/23 and Areas 31E and 31F, two sludge disposal areas along the perimeter road, northeast of Runway 5/23 (Figure 2-1).

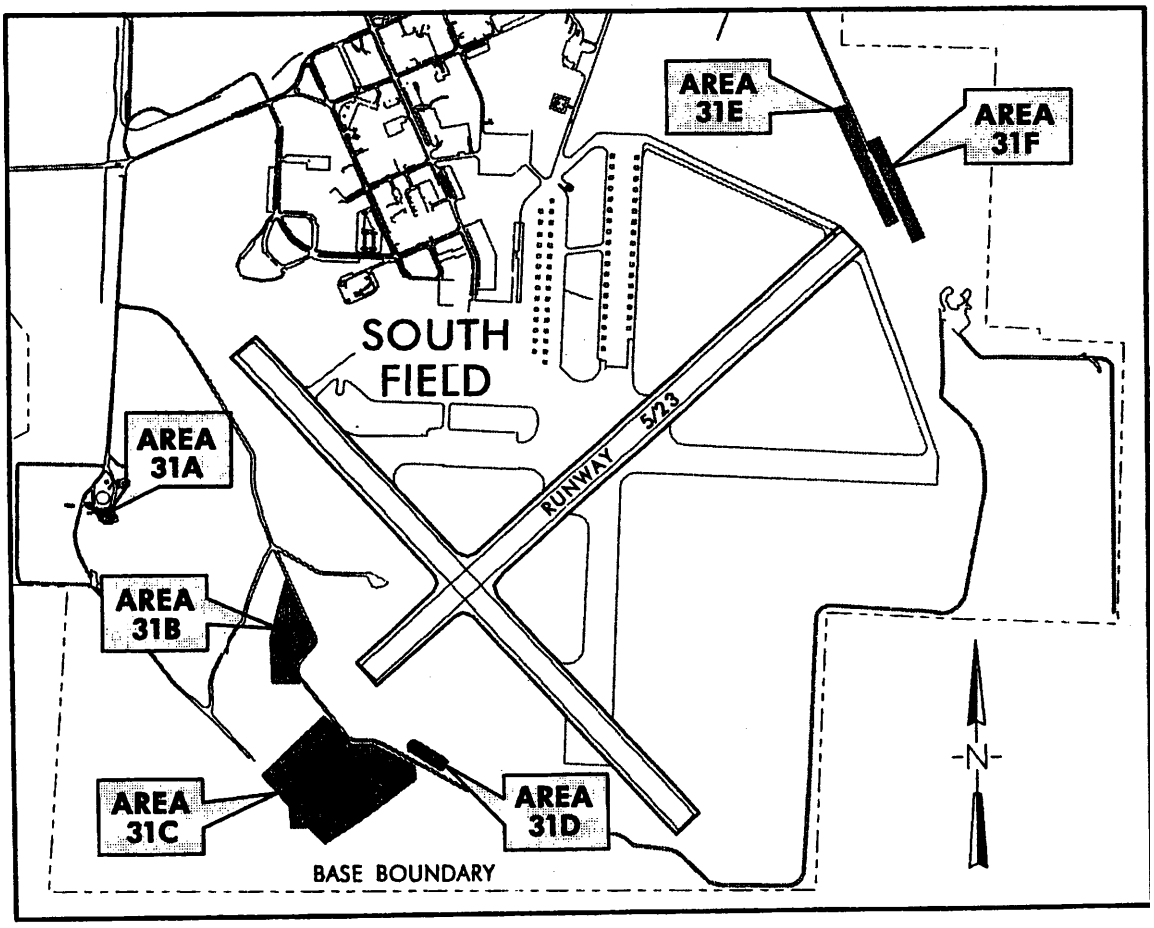


Figure 2-1 Site 31 Areas Map

Area 31A is a sludge drying bed unit, 92 feet long by 80 feet wide. The unit consists of four sludge drying beds surrounded by containment walls extending to a depth of 2 ½ to 3 feet below land surface (bls). The area is approximately 0.2 acre. The sludge drying beds were taken out of service in 1990. Sludge from the wastewater treatment plant may have contained hazardous substances such as methylene chloride and heavy metals from industrial effluent. Areas 31B, 31C, and 31D are mowed grassy areas, totaling 6.3 acres and located in an area of surface water control berms on the southwestern slopes of the South Air Field. A rubble pile containing concrete, asphalt, and metal rubble from former base operations is located at the southwest corner of Area 31C. Dried sludge was periodically removed from Area 31A, and disposed of at Areas 31B, 31C, and 31D. Spray applications of liquid sludge were also applied to the areas by tanker trucks. Areas 31E and 31F are locations where liquid sludge was formerly applied to the land surface northeast of Runway 5/23, east and west of the perimeter road. The extent of Areas 31E and 31F is approximately 6.9 acres.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Although Site 31 was not included in the Initial Assessment Study (IAS) (Envirodyne Engineers Inc., 1985), the IAS indicated several industrial waste sources in the South Field area discharged to the sanitary sewer system. Aircraft cleaning compounds, photo processing chemicals, and silver sludge from the photo laboratory were discharged to the sanitary sewer from 1940 to 1984, potentially accumulating in the sludge at the facility wastewater treatment plant. Site 31 is one of five sites identified during Phase I of the RI, and was subsequently added to the Phase II (A & B) RI program for investigation. Site 31 is comprised of six areas used for drying and disposal of sludge generated at the wastewater treatment plant. From 1940 until 1990, liquid sludge was dried at Area 31A and the resulting solids were later spread at Areas 31B, 31C, and 31D. Liquid sludge was also periodically sprayed from a tanker truck over the areas 31B, 31C, 31D, 31E, and 31F. Appendix A of the General Information Report (GIR) (ABB Environmental Services [ABB-ES], 1998) describes all basewide activities likely to have generated and discharged contaminants entering the wastewater treatment system, potentially impacting soil at Areas 31A – 31F. An Interim Removal Action was performed at Area 31C during the spring of 1999 by the Response Action Contractor (RAC), and is discussed in more detail in the Interim Remedial Action Completion Report Site 9, 10, 17, 18, and 31C Surface Soil Remediation, BEI, 2000.

Elevated concentrations of organic and inorganic compounds were identified during the RI at the site as presented in Section 2.5. The source of elevated inorganic compounds (arsenic, barium and chromium) present at Site 31 is not known, as there are no documented uses of these compounds at the site.

Based on additional review of inorganic data from the facility and surrounding area in April 2001, it was determined the observed arsenic values represent naturally occurring levels (FDEP, 2001). Because the identified human health risks associated with arsenic are now considered to be due to naturally occurring levels, remediation of arsenic in surface and subsurface soil is not required at Site 31.

The RI for Site 31 was concluded in 1998, and an RI Report was issued in 2001 (HLA, 2001). Table 2-1 summarizes the Site 31 investigative history.

No change is anticipated in the future land use of the site.

TABLE 2-1
INVESTIGATIVE HISTORY
SITE 31, SLUDGE BEDS AND DISPOSAL AREAS
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Date	Investigation Title	Activities	Findings
1990-2001	*Remedial Investigation Report Site 31, Sludge Drying Beds and Disposal Areas, NAS Whiting Field, Milton, Florida* (HLA, 2001)	• Collection and analysis of surface soil samples • Collection and analysis of subsurface soil samples • Human Health Risk Assessment • Ecological Risk Assessment	• The HHRA determined the carcinogenic risk from exposure to surface soil was within USEPA's acceptable risk range for current and future receptors at Site 31. • The total ELCR associated with exposure to surface soil by a hypothetical future resident (1.1E-05), and occupational worker (1.5E-06) exceeded FDEP's target level of 1.0E-06, due primarily to the presence of Aroclor – 1260, dieldrin, and copper. • The noncancer HIs associated with ingestion and direct contact of soil under current and hypothetical future land-uses are below USEPA's and FDEP's target of 1.0 except for the child resident, having an HI of 4.8. The noncarcinogenic risk, for the child resident, did not exceed 1.0 for individual target organs • The Ecological Risk Assessment does not predict unacceptable risks to plants or animals from constituents present in surface soil at Site 31, due to the limited quantity and quality of habitat present at the site.
1999-2000	*Interim Remedial Action Completion Report Sites 9,10,17,18, and 31C Surface Soil Remediation, NAS Whiting Field, FL (BEI, 2000)*	• Identified areas with constituents • Excavated and backfilled with 1,635 cubic yards of soil • Confirmation sampling	• No longer poses unacceptable carcinogenic risks to humans • No longer poses unacceptable ecological risk

2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI report (HLA, 2001) and the Proposed Plan (Navy, 2002) for Site 31 were made available to the public for review on 2 July 2002. These documents, and other Installation Restoration (IR) program information, are contained within the Administrative Record in the Information Repository at the West Florida Regional Library, Milton, Florida.

Publication of the notice of availability of the RI and Proposed Plan in the Santa Rosa Press Gazette and Pensacola News Journal on 29 June and 30 June 2002, respectively, targeted the communities closest to NAS Whiting Field. The availability notice presented information on the RI at Site 31 and invited community members to submit written comments on the Proposed Plan.

The RI Report (HLA, 2001) was presented to the NAS Whiting Field Restoration Advisory Board (RAB) at an advertised RAB meeting. Representatives from NAS Whiting Field, Southern Division Naval Facilities Engineering Command, USEPA, FDEP, and the Navy's environmental consultants participated in the meeting. The Proposed Plan (Navy, 2002) was presented to the public and the RAB through mailings.

A public comment period was held from 2 July through 1 August 2002, to solicit comments on the Proposed Plan. The comment period included an opportunity for the public to request a public meeting; however, a public meeting was not held because one was not requested. Comments received during the public comment period are presented in the Responsiveness Summary in Appendix A.

2.4 SCOPE AND ROLE OF REMEDIAL ACTION SELECTED FOR SITE 31

Investigations at Site 31 indicated constituents at the site posed unacceptable risks to human receptors from exposure to surface soil for both commercial/industrial and residential land-use scenarios. Therefore, the purpose of the IRA for Site 31 was to remove surface soil constituents exceeding residential land-use cleanup target levels.

The groundwater at NAS Whiting Field has been designated as a separate site (Site 40, Facility-wide Groundwater) and is not addressed in this ROD.

Based on the evaluation of environmental sampling data and the current and anticipated future use of the site, remedial action objectives (RAOs) and constituent-specific action levels were identified. The RAOs for Site 31 are:

- Protect human health and the environment from carcinogenic and noncarcinogenic risks associated with exposure to contaminated soil

- Comply with all applicable or relevant and appropriate requirement (ARARs) in accordance with USEPA and State of Florida guidelines.

Considering the RAOs, constituent-specific remediation goals (RGs) were developed using ARARs, to be considered (TBC) guidance documents, and established background concentrations. For Site 31, the constituent-specific ARARs were determined to be USEPA Region III Risk-Based Concentrations (RBCs) for residential direct exposure. Soil Cleanup Target Levels (SCTLs) were used as TBC guidance in determining RGs. For organics, the lower of the SCTL or the RBC for a given constituent was used as the RG. The RG for inorganic constituents was the higher of (1) the established background concentration, or (2) the lower of the SCTL or the RBC. Established background concentrations for surface and subsurface soil were provided in the GIR (ABB-ES, 1998)as two times the mean detected concentration.

The RGs were used to determine the areas and volumes of surface and subsurface soil with the potential to impact human health under a residential land-use scenario. The areas where surface soil had the potential to impact human health and was removed for off-site disposal are shown in the RI report (HLA, 2001).

2.5 SITE CHARACTERISTICS

Site 31, six areas totaling 13.4 acres in size, is characterized by gravel, concrete and asphalt rubble, and mowed turf grass with limited human activity.

2.5.1 Aerial Photography Evaluation

Historical aerial photographs and engineering drawings, provided by the Navy, were evaluated during the planning phases of the RI. The objective of the evaluation was to determine the operational history of Site 31 and to verify earlier historical accounts.

2.5.2 Background

A background sampling program was completed for NAS Whiting Field to establish concentrations of inorganics naturally present in surface and subsurface soil.

The results of this background sampling program, presented in the GIR (ABB-ES, 1998), indicated detectable concentrations of various inorganic analytes in the soil.

2.5.3 Surface Soil

Surface soil sampling was conducted at Site 31 to determine the nature and extent of constituents at the site and to assess whether or not surface soil could potentially serve as an exposure pathway to human or ecological receptors. Constituents detected in surface soil at Site 31 include volatile organic compounds VOCs, SVOCs, pesticides, PCBs, and inorganic compounds. A complete list of all constituents sampled and their detected concentrations in surface soil is available in the RI report (HLA, 2001). Evaluation of the constituents present in the surface soil at Area 31C identified one PCB (Arclor-1260), one pesticide (dieldrin), and seven inorganic compounds (arsenic, chromium, copper, lead, barium, silver, and mercury) as exceeding State of Florida (FDEP, 1999) or USEPA (USEPA, 1999) risk-based human health screening values for residential land-use, and only lead exceeded levels for commercial/industrial land use. Areas 31A, 31B, 31D, 31E, and 31F had no surface soil constituents exceeding risk-based human health screening values for residential land-use.

After the Remedial Investigation field sampling and before the Remedial Investigation report, an Interim Removal Action was performed at Area 31C. This action consisted of identifying all areas exceeding State of Florida (FDEP, 1999) or USEPA (USEPA, 1999) risk-based human health screening values for residential land-use, excavating and backfilling of 1,625 cubic yards, and confirmation sampling. The extent of excavation of surface soil constituents exceeding the RGs is shown in the RI report (HLA, 2001).

2.5.4 Subsurface Soil

Subsurface soil sampling was conducted at Site 31 to determine the vertical extent of constituents and to assess whether or not subsurface soil could potentially serve as an exposure pathway to human or ecological receptors. Constituents detected in subsurface soil at Site 31 include VOCs, SVOCs, PCB, pesticides, and inorganic compounds. A complete list of all constituents sampled and their detected concentrations in surface and subsurface soil is available in the RI Report (HLA, 2001). Evaluation of the constituents present in the subsurface soil at Site 31 did not identify any constituents exceeding State of Florida (FDEP, 1999) or USEPA (USEPA, 1999) risk-based human health screening values for residential land-use.

2.5.5 Ecological Habitat

Site 31 is limited in the quantity and quality of habitat for ecological succession or ecological receptors because of regular mowing, and limited human activity. Also, the site comprises only a small portion of the home ranges of most of the terrestrial wildlife species found on the base.

2.5.6 Migration Pathways

As a result of the IRA, there are no longer any COCs at Site 31. The primary agents of migration acting on the soil in the past included wind, water, and human and ecological receptor activity

Transport of the COCs from soil via wind was not a major transport mechanism, due to the presence of vegetation at Site 31. Vegetation is an effective means of limiting wind erosion of soil.

Humans and, to a lesser extent, ecological receptors are effective at moving soil and can greatly affect the transport of soil-bound constituents at hazardous waste sites. Under the past use of Site 31, limited human activity was not a major transport mechanism for the COCs in soils

Leaching of constituents from soil to groundwater will be evaluated as part of the RI/FS for Site 40, Facility-wide Groundwater.

2.6 SUMMARY OF SITE RISKS

A risk assessment was completed for Site 31 to assess whether the site could pose current or future threats to human health or the environment. Both an HHRA and an ERA were performed for Site 31. These risk assessments evaluated the constituents detected in site soils. The risk assessments evaluated the COCs before the IRA was completed. All areas with constituents exceeding State of Florida (FDEP, 1999) or USEPA (USEPA, 1999) risk-based human health screening values for residential land-use were removed; therefore no unacceptable risk remains. The No Further Action is based on the assumption; in the future the land will be used for residential use.

2.6.1 Human Health Risk Assessment

A HHRA was conducted at Site 31 to characterize the risks associated with potential exposures to site-related constituents for human receptors. The HHRA is provided in Chapter 6.0 of the RI Report (HLA, 2001).

The HHRA included the following five components: (1) data evaluation, (2) selection of human health constituents of potential concern, (3) exposure assessment, (4) toxicity assessment, and (5) risk characterization.

Data Evaluation. The data evaluation involved numerous activities, including sorting data by media, evaluating analytical methods, evaluating quantitation limits, evaluating quality of data with respect to qualifiers and codes, comparing potentially site-related constituents with background, developing a data set for use in risk assessment, and identifying constituents of potential concern.

Human Health Constituents of Potential Concern. Table 2-2 summarizes the human health constituents of potential concern selected for surface and subsurface soil at Site 31. These constituents were the focus of the baseline risk assessment.

TABLE 2-2
SUMMARY OF HUMAN HEALTH CONSTITUENTS OF POTENTIAL CONCERN
SITE 31, SLUDGE BEDS AND DISPOSAL AREAS
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Environmental Media	Constituent of Potential Concern
Surface Soil	VOCs: None SVOCs: None Pesticides and PCBs: Dieldrin and Aroclor-1260 Inorganic Analytes: Arsenic, Barium, Copper, Chromium, Lead, Mercury and Silver
Subsurface Soil	VOCs: None SVOCs: None Pesticides and PCBs: None Inorganic: None

Notes: PCB = polychlorinated biphenyl.
SVOC = semivolatile organic compound.
TPH = total petroleum hydrocarbons.
VOC = volatile organic compound.

Exposure Assessment. Site 31 was evaluated to identify the populations potentially coming into contact with site-related constituents and the pathways where exposure might occur.

Surface soil is a potential media source of human exposure. Groundwater has been identified as a separate site (Site 40) and will be evaluated separately from Site 31. Exposure assessments for surface soil is described below.

Surface Soil. Although no humans currently reside at Site 31 and there are no plans for residential development of the site, all exposure scenarios were evaluated for the current and future land-use.

Toxicity Assessment. The toxicity assessment is a two-step process where potential hazards associated with the route-specific exposure to a given constituent are (1) identified by reviewing relevant human and animal studies, and (2) quantified through analysis of dose-response relationships. USEPA has calculated numerous toxicity values having undergone extensive review within the scientific community. These values (published in the Integrated Risk Information System and other journals) are used in the baseline evaluation to calculate both carcinogenic and noncarcinogenic risks associated with each constituent of potential concern and rate of exposure.

Risk Characterization. In the final step of the risk assessment, results of the exposure and toxicity assessments are combined to estimate the overall risk from reasonable maximum exposure to site constituents. For cancer-causing constituents, risk is estimated to be a probability. For example, a particular exposure to constituents at a site may present a 1 in 1 million (or 1.0E-06) chance of development of cancer over an estimated lifetime of 70 years. The USEPA allowable carcinogen risk range is 1.0E-04 to 1.0E-06 and the FDEP acceptable ELCR is 1.0E-06. Therefore, carcinogenic risks greater than 1.0E-06 are unacceptable.

For noncancer-causing constituents, the constituent dose a receptor may be exposed to is estimated and compared to the reference dose (RfD). The RfD is developed by USEPA scientists and represents an estimate of the amount of constituent a person (including the most sensitive persons) could be exposed to over a lifetime without developing adverse effects. The measure of the likelihood of adverse effects other than cancer occurring in humans is called the HI. A HI greater than 1 suggests adverse effects are possible.

The noncarcinogenic risks were below the USEPA and FDEP target HI for all receptors except the hypothetical child resident, before the IRA. Also, before the IRA, FDEP ELCR threshold of 1.0E-06 was exceeded for the occupational worker (1.5E-06), child future resident (5.2E-06), adult future resident (4.5E-06) and child/adult future resident (1.1 E-05) exposure scenarios, due primarily to the presence of Aroclor–1260, dieldrin, and copper in surface soil. The noncarcinogenic HI for the child resident was 4.8, exceeding the USEPA target of 1.0. However, when the HI for the individual target organs of this receptor was evaluated the noncarcinogenic risk did not exceed the USEPA target organ level of 1.0.

Actual or threatened releases of hazardous substances from this site, addressed by implementing the IRA, no longer present a current or future potential threat to public health and welfare. Human health risks for Site 31 soils were acceptable when compared to USEPA and FDEP risk criteria for all receptors.

Table 2-3 provides a summary of the predicted risks (before IRA) land-use exposure scenarios, and Table 2-4 provides a summary of the predicted risks for future potential (after IRA) land-use exposure scenarios.

TABLE 2-3
RISK SUMMARY IN SURFACE SOIL (BEFORE IRA)
SITE 31, SLUDGE BEDS AND DISPOSAL AREAS
NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Receptor	Exposure Route	Excess Lifetime Cancer Risk	Hazard Index	Risk Driver
Resident	Ingestion	**7.0E-06**	Not applicable	
(Adult and Child)	Dermal Contact	**2.7E-06**	Not applicable	
	Inhalation	**1.4E-06**	Not applicable	
	TOTAL	**1.1E-05**	Not applicable	Aroclor-1260, dieldrin, and copper
Resident	Ingestion	**2.0E-06**	.4	
(Adult)	Dermal Contact	**2.0E-06**	.3	
	Inhalation	7.0E-07	–	
	TOTAL	**4.5E-06**	.7	Aroclor-1260, dieldrin, and copper
Resident	Ingestion	**5.0E-06**	**4**	
(Child)	Dermal Contact	7.0E-07	.8	
	Inhalation	8.0E.07	–	
	TOTAL	**5.2E-06**	**4.8**	Aroclor-1260, dieldrin, and copper
Trespasser(1)	Ingestion	2.0E-07	.08	
(Older Child)	Dermal Contact	1.0E-07	.08	
	Inhalation	1.0E-08	–	
	TOTAL	3.1E-07	.16	Aroclor-1260, dieldrin, and copper
Trespasser(1)	Ingestion	2.0E-07	.05	
(Adult)	Dermal Contact	2.0E-07	.07	
	Inhalation	2.0E-08	–	
	TOTAL	4.2E-07	.16	Aroclor-1260, dieldrin, and copper
Occupational Worker	Ingestion	8.0E-07	0.03	
	Dermal Contact	5.0E-07	0.06	
	Inhalation	2.0E-07	–	
	TOTAL	**1.5E-06**	0.08	Aroclor-1260, dieldrin, and copper

(1) The total ELCR for the trespasser (older child/adult) is 7.3E-07.
Bold values exceed the FDEP ELCR target of 1.0E-06 or the target HI of 1.0

TABLE 2-4 RISK SUMMARY FUTURE POTENTIAL LAND USE IN SURFACE SOIL (AFTER IRA) SITE 31, SLUDGE BEDS AND DISPOSAL AREAS NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA				
Receptor	**Exposure Route**	**Excess Lifetime Cancer Risk**	**Hazard Index**	**Risk Driver**
All Receptors	Ingestion	No Risk	No Risk	
Surface Soil	Dermal Contact	No Risk	No Risk	
	Inhalation	No Risk	No Risk	
	TOTAL	No Risk	No Risk	No Risk
All Receptors	Ingestion	No Risk	No Risk	
Subsurface Soil	Dermal Contact	No Risk	No Risk	
	Inhalation	No Risk	No Risk	
	TOTAL	No Risk	No Risk	No Risk
No Risk: No risk less than 1.0E-06				

2.6.2 Ecological Risk Assessment

The purpose of the ERA for Site 31 was to evaluate the potential for adverse effects to ecological receptors at the Sludge Beds and Disposal Areas. A conservative screening level ERA was performed according to USEPA guidance. Components of the screening level ERA included (1) preliminary problem formulation, (2) preliminary ecological effects evaluation, (3) preliminary exposure estimate, and (4) preliminary risk calculation. In addition, Step 3A (Refinement of Constituents of Potential Concern) was also performed in accordance with USEPA and Navy ERA guidance. The ERA completed for Site 31 considered exposure of terrestrial plants, terrestrial invertebrates, and wildlife receptors to constituents in surface soil at the site. All constituents detected in surface soil at Site 31, including pesticides, PCBs, and inorganic compounds were evaluated during the screening level assessment. A complete list of all constituents sampled and their detected concentrations in surface soil is available in the RI Report (HLA, 2001). Table 2-5 provides a summary of the ecological constituents of potential concern (ECOPCs) selected for Site 31 surface soil from the screening level assessment.

Selection of the ECOPCs shown in Table 2-5 was made by comparing the maximum concentration of each constituent detected in surface soil against USEPA Region 4 recommended screening values (USEPA, 1998). Constituents whose maximum concentration exceeded the screening value, as well as constituents without screening values, were retained as ECOPCs. All constituents detected in surface soils were also evaluated by using food chain modeling. Constituents with at least one food chain modeling hazard quotient (HQ) greater than 1.0 were also retained as ECOPCs.

Area 31C was used to represent all of Site 31, because all of the areas have similar habitats and Area 31C had the highest concentrations of the ECOPCs.

Conservative screening is an appropriate initial tool for assessing ecological risks so potential risks are not underestimated. However, assessing ecological risk using only maximum concentrations and very conservative guidelines as tools to determine the need to perform additional ERA has severe limitations and inherent uncertainties. The consideration of other relevant factors to more fully determine the potential for adverse effects to ecological receptors was performed as part of Step 3A (Refinement of ECOPCs). The screening phase of the ERA process described above comprises the first two steps of the ERA process. Step 3 is the first step in the baseline risk assessment process. The baseline risk assessment is a more thorough ecological study. Thus, the Navy (Navy, 1999) developed Step 3A to more fully determine when a baseline risk assessment was necessary and to reassess the conservatism inherent in the screening phase. The relevant factors evaluated as part of Step 3A included:

- Background surface soil concentrations for inorganics – average and maximum concentrations of each inorganic detected at the site were compared to surface soil background values

- Frequency of detection and the spatial relationship of concentrations exceeding screening values

- Consideration of less conservative screening values, including Oak Ridge National Laboratory surface soil screening levels and Dutch intervention values

- The quality and quantity of habitat

- Site foraging frequency (percentage of home range overlapping impacted areas) and the fraction of the year the receptor could be found on the impacted areas

- Constituent-specific bioavailability.

TABLE 2-5 SUMMARY OF ECOLOGICAL CONSTITUENTS OF POTENTIAL CONCERN SITE 31 (AREA 31C), SLUDGE BEDS DISPOSAL AREAS NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA	
Surface Soil Ecological Constituents of Potential Concern	**Basis Of Selection**
Volatiles: Acetone, Carbon disulfide, and Methylene chloride	Food chain Hazard Quotient (HQ) for Acetone and Carbon disulfide were greater than 1.0. Maximum detected concentrations exceed USEPA Region 4 screening values for Methylene chloride
Semivolatiles: Benzo(b)fluoranthene, Benzo(k)fluoranthene, Butylbenzylphthalate: bis(2-ethylhexyl)phthalate	Maximum detected concentrations exceed USEPA Region 4 screening values except for Butylbenzylphthalate and bis(2-ethylhexyl)phthalate Food chain Hazard Quotient (HQ) for Butylbenzylphthalate and bis(2-ethylhexyi)phthalate were greater than 1.0.
Pesticides/PCBs: 4,4'-DDE, Aroclor-1260, and Dieldrin	Maximum detected concentrations for 4,4'-DDE, Aroclor-1260, and Dieldrin exceeded USEPA Region 4 screening values. Food chain HQs for Aroclor-1260, 4,4'-DDE, and Dieldrin were greater than 1.0.
Inorganics: Barium, Cadmium, Chromium, Copper, Lead, Mercury, and Zinc	Maximum detected concentration exceeds USEPA Region 4 screening values.
Aluminum, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Selenium, Silver, and Zinc	Food chain HQ greater than 1.0.

These factors were evaluated using the "weight of evidence" approach (USEPA, 1997) to determine the extent of potential risks for each ECOPC.

After considering the relevant factors evaluated for Step 3A, copper, cadmium, lead and mercury were the only constituents present in the surface soil at Site 31 in concentrations appearing to pose potential risks to terrestrial receptors. None of the VOCs, SVOCs, or other inorganic ECOPCs appeared to pose potential risks. However, Area 31C was the only area in Site 31 having copper, cadmium, lead, and mercury as ECOPCs. The areas of Area 31C having these constituents were removed during the IRA. Site 31 is limited in the quality of habitat for ecological succession or ecological receptors, and comprises only a small portion of the home ranges of most of the terrestrial wildlife species found on the base. As a result of mowing and limited human activity, terrestrial wildlife is deterred from using the site and reduction in growth, survival, and reproduction of small mammal and bird populations at and near Area 31C evaluated in the ERA is unlikely. Therefore, changes in community structure and populations are not predicted for Areas 31A, 31B, 31D, 31E, and 31F and further ecological study at Site 31 is unwarranted.

2.6.3 Risk Summary

Actual or threatened releases of hazardous substances from this site, addressed by implementing the IRA, no longer present a current or future potential threat to public health and welfare. Human health risks for Site 31 soils were acceptable when compared to USEPA and FDEP risk criteria for all receptors.

2.7 SUMMARY OF ANALYSIS OF THE SELECTED REMEDY

In selecting the preferred remedy for Site 31, nine criteria were evaluated. The first seven are technical criteria, based on the degree of protection of the environment, cost, and engineering feasibility issues. The remedy was further evaluated, based on the final two criteria: acceptance by the USEPA and FDEP and acceptance by the community. These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria as shown below.

Threshold Criteria

1. Overall protection of human health and the environment
2. Compliance with ARARs and TBC criteria

Primary Balancing Criteria

1. Long-term effectiveness and permanence
2. Reduction of toxicity, mobility, and volume through treatment
3. Short-term effectiveness
4. Implementability
5. Cost

Modifying Criteria

1. Federal and state acceptance
2. Community acceptance

2.7.1 Threshold Criteria

Overall Protection of Human Health and the Environment No Further Action for Soil would provide protection to human receptors exposed to soil at Site 31. No short-term adverse or cross-media effects

(transfer of constituents from one media [e.g., soil, water, air, etc.] to another media) are anticipated with this remedy.

Compliance with ARARs. USEPA Region III Risk-Based Concentrations (USEPA, 1999) are constituent-specific ARARs and Florida SCTLs (FDEP, 1999) are to be considered (TBC) guidance for Site 31. Action-specific ARARs for the selected remedy (No Further Action for Soil) was associated with the excavation and off-site disposal of contaminated soil (the IRA). No location-specific ARARs are applicable for Site 31.

2.7.2 Primary Balancing Criteria

Long-Term Effectiveness and Permanence. No Further Action for Soil would provide long term protection to human receptors exposed to soil at Site 31. No long-term adverse or cross-media effects (transfer of constituents from one media [e.g., soil, water, air, etc.] to another media) are anticipated with this remedy

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment. Reduction of toxicity, mobility or volume of contaminants through treatment is not needed since completion of the IRA.

Short-Term Effectiveness. Not Applicable

Implementability. Easily implementable.

Cost. Minimal cost.

2.7.3 Modifying Criteria

State and Federal Acceptance. The FDEP and USEPA have concurred with the Navy's selection of No Further Action for Soil.

Community Acceptance. Community acceptance of the preferred alternative has been evaluated, based on the comments received during the public comment period. The comments received during this period are addressed in the Responsiveness Summary included in Appendix A.

2.8 SELECTED REMEDY

The selected remedial action for Site 31 is No Further Action for Soil. No Further Action for Soil consists of no treatment, containment, or restricted access

2.9 STATUTORY STATEMENT

The remedy selected at Site 31 is consistent with the Navy's IR program, CERCLA and the NCP. The selected remedy for surface and subsurface soil is protective of human health and the environment.

No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy. Comparison of the selected remedy to the nine USEPA evaluation criteria is summarized in Table 2-6

The selected remedy achieves compliance with constituent-specific and action-specific ARARs for surface soil and subsurface soil. Table 2-7 provides a summary of ARARs and guidance documents specific to the selected remedy.

The selected remedy is cost effective.

The statutory preference is met by the selected remedy.

2.10 DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes in the selected alternative, as described in the Proposed Plan (Navy, 2002).

TABLE 2-6 SUMMARY EVALUATION OF SELECTED REMEDY SITE 31, SLUDGE BEDS AND DISPOSAL AREAS NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA	
Evaluation Criteria	**Assessment**
Overall Protection of Human Health and the Environment	Provides protection of human health and the environment.
Compliance with ARARs	Meets constituent-specific and action-specific ARARs and guidance for surface and subsurface soil. Meets all other NAS Whiting Field requirements.
Long-term Effectiveness and Permanence	No unacceptable long-term risks or cross-media impacts will be caused by implementation of the remedy
Reduction of Toxicity, Mobility, or Volume through Treatment	Not applicable.
Short-term Effectiveness	No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy
Implementability	Easily implemented.
Total Cost	Minimal cost
Federal and State Acceptance	The USEPA and FDEP have concurred with the selected remedy.
Community Acceptance	The community has been given the opportunity to review and comment on the selected remedy. Comments received were addressed (see Appendix A) but did not alter the selected remedy proposed in the Proposed Plan.

Notes: ARAR = applicable or relevant and appropriate requirement.
FDEP = Florida Department of Environmental Protection.
NAS = Naval Air Station.
USEPA = United States Environmental Protection Agency.

TABLE 2-7
SUMMARY OF FEDERAL AND STATE ARARs AND GUIDANCE SPECIFIC TO SELECTIVE REMEDY
SITE 31, SLUDGE BEDS AND DISPOSAL AREAS NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
PAGE 1 OF 2

Name and Regulatory Citation	Description	Consideration in the Remedial Action Process	Type
USEPA Region III Risk-Based Concentration Table	Provides risk-based concentrations for screening of soil.	Relevant and appropriate. These guidelines aid in the screening of constituents in soil and have been requested by the USEPA to be used at Whiting Field as an ARAR.	Constituent-specific
Comprehensive Environmental Response, Compensation, and Liability Act and the NCP Regulations (40 CFR, Section 300.430)	Discusses the types of institutional controls to be established at Comprehensive Environmental Response, Compensation, and Liability Act sites.	Applicable. These regulations may be used as guidance in establishing appropriate institutional controls at Site 31	Action-specific
Occupational Safety and Health Act (29 CFR Part 1910)	Requires establishment of programs to ensure worker health and safety at hazardous waste sites.	Applicable. These requirements apply to response activities conducted in accordance with the National Contingency Plan. During the implementation of any remedy for Site 31, these regulations must be followed.	Action-specific
National Emissions Standards for Hazardous Air Pollutants (40 CFR Part 61)	Standards promulgated under the Clean Air Act for significant sources of hazardous air pollutants.	Relevant and appropriate. Remedial Action (e.g., soil venting) may result in release of hazardous air pollutants.	Action-specific
Resource Conservation and Recovery Act (RCRA)			
Regulations, Identification and Listing of Hazardous Waste (40 CFR Part 261)	Provides those solid wastes subject to regulation as hazardous waste.	Relevant and appropriate. Any excavated materials would be sampled and analyzed for hazardous characteristics, as defined by 40 CFR Part 261.	Action-specific
Treatment, Storage, and Disposal of Hazardous Waste (40 CFR 262-266)	Regulates the treatment, storage, and disposal of hazardous waste.	Relevant and appropriate. Hazardous waste generated by site remediation activities must meet RCRA generator and treatment, storage, or disposal requirements.	Action-specific
Land Disposal Restrictions (40 CFR 268)	Restricts certain listed or characteristic hazardous waste from placement or disposal on land without treatment.	Relevant and appropriate. Excavated soils or treatment residuals (such as spent activated carbon) may require disposal in a landfill.	Action-specific

TABLE 2-7
SUMMARY OF FEDERAL AND STATE ARARs AND GUIDANCE SPECIFIC TO SELECTIVE REMEDY
SITE 31, SLUDGE BEDS AND DISPOSAL AREAS NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA
PAGE 2 OF 2

Name and Regulatory Citation	Description	Consideration in the Remedial Action Process	Type
Hazardous Materials Transportation Act Regulations, (49 CFR Parts 171-179)	Provides requirements for packaging, labeling, manifesting, and transporting of hazardous materials. Similar requirements are found in 40 CFR Part 263.	Relevant and appropriate. If soil is determined to be hazardous material and off-site disposal is arranged, the hazardous material would need to be handled, manifested, and transported to a licensed off-site disposal facility in compliance with these regulations.	Action-specific
Florida SCTLs (F.A.C., Chapter 62-777)	Human health risk-based soil cleanup goals.	TBC. These regulations are used as TBC guidance to aid in determining soil cleanup levels.	Guidance
Florida Hazardous Waste Rules (F.A.C., Chapter 62-730)	Adopts by reference specific sections of the Federal hazardous waste regulations.	Relevant and appropriate. These regulations are not applicable to Site 31 because they apply to the handling of hazardous waste. These regulations may apply if material is removed from a site.	Action-specific
Florida Brownfield Cleanup Criteria Rule (Chapter 62-785, F.A.C.)	Provides guidance for soil cleanup levels that can be developed.	TBC. These guidelines aid in determining health and leachability-based cleanup goals for soil, if necessary.	Guidance

Notes: ARAR = applicable or relevant and appropriate requirement.
CFR = *Code of Federal Regulations.*
TBC = to be considered guidance materials.
USEPA = United States Environmental Protection Agency.
SCTL = Soil Cleanup Target Level
F.A.C. = Florida Administrative Code

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APPENDIX A

COMMUNITY RELATIONS
RESPONSIVENESS SUMMARY

Responsiveness Summary
SITE 31, SLUDGE BEDS AND DISPOSAL AREAS
Naval Air Station Whiting Field
Milton, Florida

A public comment period on the Site 31 Proposed Plan was held from 2 July through 1 August 2002. No public comments were received, and because a public meeting was not requested one was not held.