Five-Year Review

Naval Air Station Jacksonville
Jacksonville, Florida

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0147

September 2001

01JAX0076

FIVE YEAR REVIEW

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0147

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EPA Five-Year Review Signature Cover

Key Review Information

Site Identification			
Site Name: Naval Air Station Jacksonville			EPA ID: *FL6 170 024 412*
Region: 4	State: FL	City/County: Jacksonville/Duval	
Site Status			
NPL Status: Final			
Remediation Status (under construction, operating, complete): Under Construction and Operating			
Multiple OU's* (highlight): Y N		Number of OU's: 2 (for this review)	
Construction Completion Date: To be determined			
Fund/PRP/Federal Facility Lead: Federal Facility		Lead Agency: Department of the Navy, Southern Division Naval Facilities Engineering Command	
Has site been put into reuse? (highlight): Y N			
Review Status			
Who conducted the review (EPA Region, State, Federal Agency): Southern Division, Naval Facilities Engineering Command			
Author Name: Dana Gaskins		Author Title: Remedial Project Manager	
Author Affiliation: Department of the Navy, Southern Division Naval Facilities Engineering Command			
Review Period: December 2000 to April 2001		Date(s) of Site Inspection: Dec 2000/Apr 2001	
Type of Review: Statutory	Policy Type (name): 1. Pre-SARA 2. Ongoing 3. Removal Only 4. Regional Discretion	Review Number (1, 2, etc.) 1	
Triggering Action Event: Interim Remedial Action			
Trigger Action Date: *March 6, 1995*			
Due Date: *August 11, 1999*			

* OU refers to Operable Unit

Deficiencies:

Deficiencies discovered during the five-year review were as follows: For OU 1, LNAPL Recovery System: There is an inability to determine if RAO has been achieved, the north trench control panel has failed, a health and safety plan and contingency plan was not in place, and the LNAPL has had detected concentrations of PCBs, but the dissolved phase monitoring does not include PCB analyses. With respect to the OU 1, LTMP there has been a spike of COCs in MW–89, and benzene was omitted from the surface water COC list. The station also missed a LUCIP Inspection. For OU 2, the station missed a LUCIP quarterly inspection for the year 2000, and the RCRA program may discontinue groundwater monitoring while COCs remain in excess of MCLs.

Recommendation and Required Actions:

Repair the control panel on the LNAPL Recovery System for OU 1, make sure that the land use control inspections are performed quarterly as agreed upon between the Navy, FDEP, and USEPA; monitor for the COCs in surface water and establish a trigger action level for contingent action for benzene as part of the long term monitoring plan at OU 1; perform a phased investigation at the LNAPL source area to determine the presence and extent of LNAPL remaining in the subsurface, and track the status of the RCRA permit as it relates to OU 2 to determine what actions, if any, should be taken.

Protectiveness Statement(s):

The remedial actions at the OUs at NAS Jacksonville are remain protective of human health and the environment. The implementation of the LNAPL recovery at OU 1 and the long-term groundwater and surface water monitoring program at OU 1, the monitoring at OU 2 and the LUCIPs provide protection for human health and the environment.

This five-year review shows that the Navy is meeting the requirements of the Records of Decision (RODs) for the OUs at NAS Jacksonville.

Signature of U.S. Department of the Navy and Date

M. S. Boensel
Captain, U. S. Navy
Commanding Officer
NAS Jacksonville

9/18/01
Date

ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
ARAR	Applicable or Relevant and Appropriate Requirement
BEI	Bechtel Environmental, Inc.
bgs	Below Ground Surface
BNAs	Base Neutral Acid Extractable Organics
CCTLs	Contaminant Clean-up Target Levels
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CLEAN	Comprehensive Long-term Environmental Action Navy
COC	Contaminants of Concern
CTO	Contract Task Order
DCE	Dichloroethene
DoD	Department of Defense
EETCE	Ethenes as Equivalent to Trichloroethene
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
FRI	Focused Remedial Investigation
FS	Feasibility Study
ft	feet
HASP	Health and Safety Plan
HSWA	Hazardous and Solid Waste Amendments of 1984
IR	Installation Restoration
IRA	Interim Remedial Action
IROD	Interim Record of Decision
LNAPL	Light non-aqueous phase liquid
LSA	LNAPL Source Area
LTMP	Long-term Monitoring Plan
LUCIP	Land Use Control Implementation Program
MCL	Maximum Contaminant Levels
MIP	Membrane Interface Probe
MOA	Memorandum of Agreement
msl	Mean Sea Level

ACRONYMS (Continued)

µg/L	Micrograms per Liter
mg/kg	Milligrams per Kilogram
mg/L	Milligrams per Liter
NAS	Naval Air Station
NAT	Navy Aviation Trades
Navy	United States Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
OSHA	Occupational Safety and Health Administration
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
ppt	Parts Per Thousand
PSC	Potential Source of Contamination
psi	Pounds Per Square Inch
RA	Risk Assessment
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SOUTHNAVFACENGCOM	Southern Division Naval Facilities Engineering Command
SQAGs	Sediment Quality Assessment Guidelines
SSFP	Scoping Study Field Program
SVOCs	Semivolatile Organic Compounds
TCLP	Toxicity Characteristic Leaching Procedure
TCE	Trichloroethene
TLCA	Trigger Levels for Contingent Action
TPH	Total Petroleum Hydrocarbons
TtNUS	Tetra Tech NUS, Inc.

ACRONYMS (Continued)

UCS	Unconfined Compressive Strength
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds
WWTP	Wastewater Treatment Plant
yd^3	Cubic Yards

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1.0 INTRODUCTION

This five-year review has been prepared under Contract Task Order (CTO) 0147 as part of the Comprehensive Long-term Environmental Action Navy III (CLEAN) Contract Number N62467-94-D-0888 for the Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). Tetra Tech NUS, Inc. (TtNUS) conducted the five-year review of Operable Units (OUs) 1 and 2 at Naval Air Station (NAS) Jacksonville, located in southwestern Duval County within the city limits of Jacksonville, Florida. A general site location map of NAS Jacksonville is shown on Figure 1-1, and the locations of the OUs are shown on Figure 1-2. The NAS Jacksonville Partnering Team agreed to only include OU 1 and OU 2 in this five-year review.

The purpose of the five-year review is to determine whether the selected remedies at the OUs are protective of human health and the environment. The methods, findings, and conclusions of the reviews are documented in this report. In addition, this report identifies deficiencies found during the review, if any, and recommendations to address them.

This is the first five-year review for the NAS Jacksonville OUs. The triggering action for the statutory review was the first start date for construction of the OU 1 LNAPL System, which is March 6, 1995. This five-year review is being conducted because hazardous substances, pollutants, and contaminants from past storage, handling, and disposal practices remain at OU 1 and OU 2 above levels that allow for unlimited use and unrestricted exposure NAS Jacksonville.

The United States Environmental Protection Agency (USEPA) is responsible for implementing statutory five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). However, by Executive Order 12580, federal facilities under the jurisdiction, custody, or control of the Department of Defense (DoD) relieves the USEPA of this responsibility and delegates the responsibility to the DoD. The United States Navy (Navy) is the lead agency responsible for this Five-Year Review at NAS Jacksonville, working with the USEPA and the Florida Department of Environmental Protection (FDEP) through the Federal Facilities Agreement (FFA).

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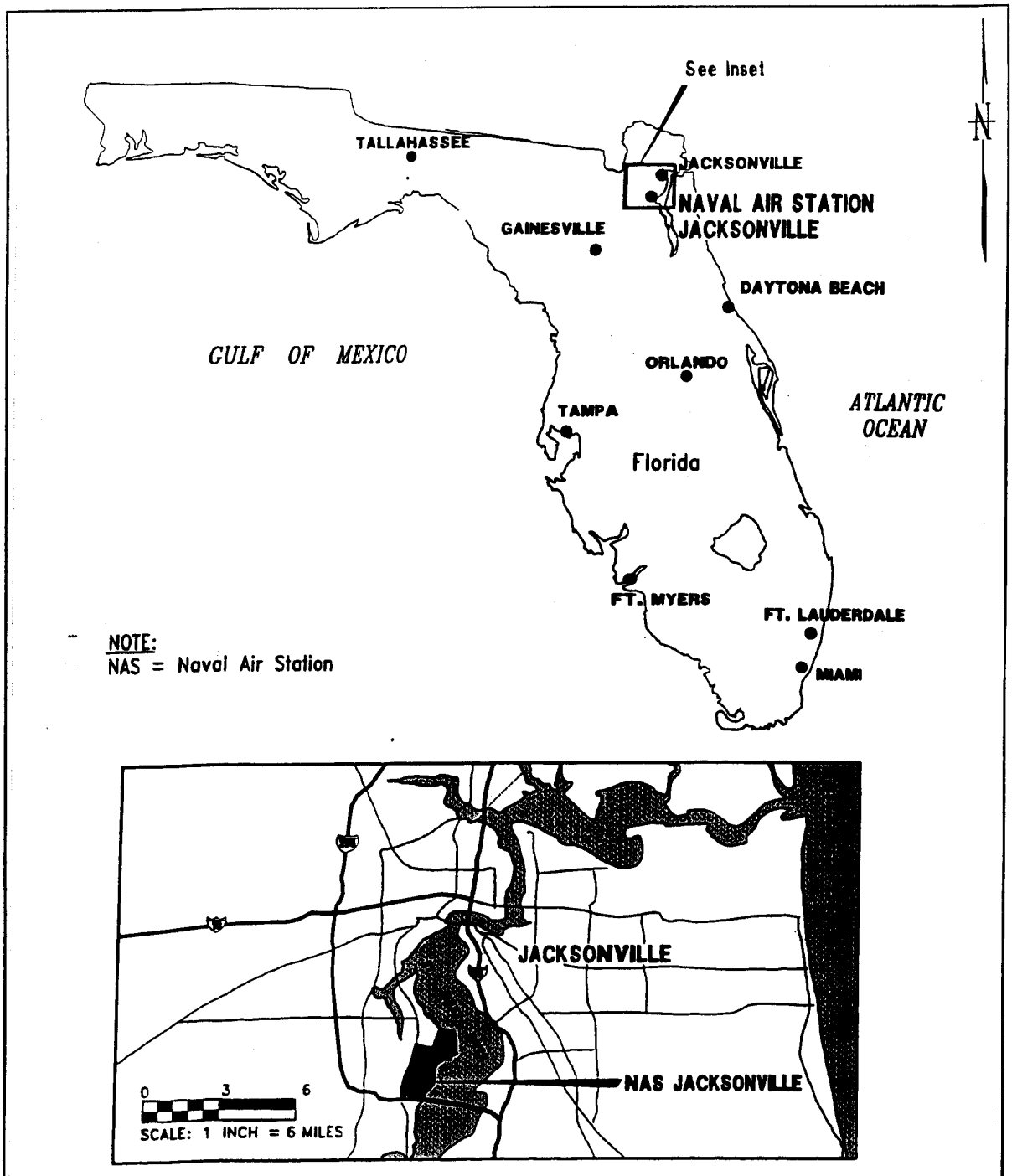
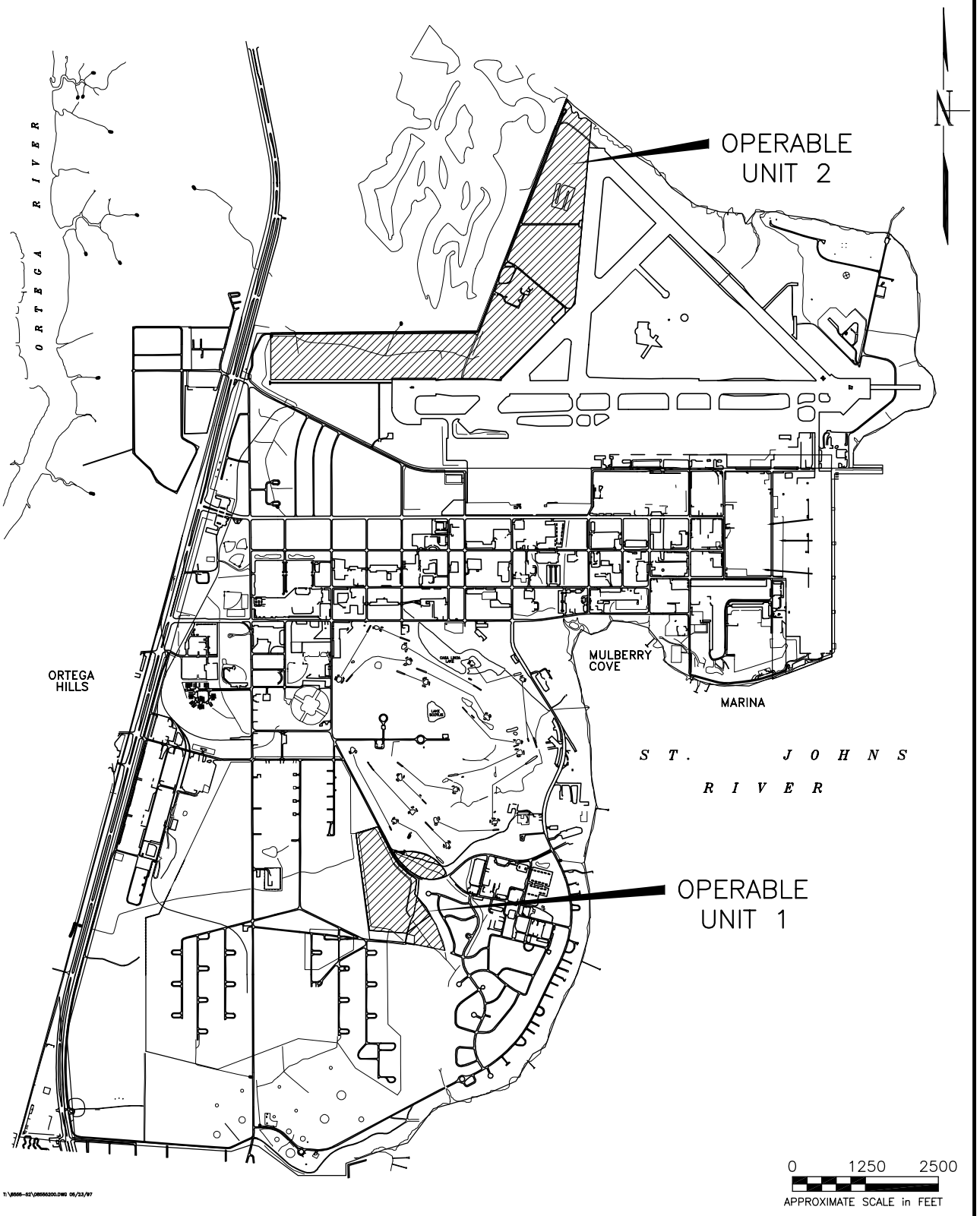


DRAWN BY LLK DATE 5/11/01			CONTRACT NO. 3885
CHECKED BY DATE		GENERAL SITE LOCATION MAP FIVE-YEAR REVIEW NAS JACKSONVILLE JACKSONVILLE, FLORIDA	APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-1 REV. 0

SOURCE: Remedial Investigation and Feasibility Study Operable Unit 3, Harding Lawson Associates, May 1999



DRAWN BY LK DATE 3/8/00		LOCATION OF OPERABLE UNITS FIVE-YEAR REVIEW NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NO. 3885
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1-2 REV. 0

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

Five-year reviews are also conducted in accordance with USEPA policy. The USEPA conducts five-year reviews as a matter of policy at:

(1) Sites where no hazardous substances will remain above levels that allow unlimited use and unrestricted exposure after completion of remedial actions, but where the cleanup levels specified in the ROD will require five or more years to attain.

(2) Sites addressed before the Superfund Amendments and Reauthorization Act where the remedy, upon attainment of cleanup level, does not or will not allow unlimited use and unrestricted exposure.

(3) Removal-only sites where hazardous substances remain on site at levels that will not allow unlimited use and unrestricted exposure.

OU 3 and OU 4 were not included in this five-year review because the RODs for these sites were signed after the five-year review was funded and per the agreement of the NAS Jacksonville Partnering Team. OU 5 (PSC 51), OU 6 (Hangar 1000), OU 7 (Defense Re-utilization Marketing Office), and OU 8 (Pesticide Shop/Disease Vector Ecology Control Center) are currently in the RI/FS process and RODs have not been signed for these sites at this time. It is anticipated that the RODs for these sites will be completed and the remedial actions will be in process at the time of the next review.

This report consists of four sections as listed below:

- Section 1.0 discusses the purpose of the report, provides a summary of the history and site chronology of NAS Jacksonville, and evaluates the changes that have occurred in the Applicable or Relevant and Appropriate Requirements (ARARs).

- Sections 2.0 and 3.0 are the five-year reviews for OU 1, and OU 2, respectively at NAS Jacksonville. Each section includes the OU chronology, background, summary of the remedial actions performed, and the five-year review findings, assessment, deficiency list, recommendations, and protectiveness statements.

- Section 4.0 provides a general summary, conclusions, and protectiveness statement for the NAS Jacksonville facility. This section also identifies when the next five-year review is required and the other tasks that should be performed as part of that five-year review.

TtNUS conducted the five-year review in conjunction with the NAS Jacksonville Partnering Team, which includes:

- Dana Gaskins, SOUTHNAVFACENGCOM
- Anthony Robinson, SOUTHNAVFACENGCOM
- Tim Woolheater, USEPA Region IV Remedial Project Manager
- Jorge Caspary, FDEP Remedial Project Manager
- Tim Curtin, NAS Jacksonville
- Greg Roof, TtNUS Task Order Manager
- Mike Halil, JA Jones

This five-year review consisted of a review of relevant documents, interviews, and a site inspection. In addition, an announcement (included as Appendix A) of the review was provided to the public prior to the completion of the review. The completed report is available in the information repository at the Webb Wesconnett Library located at 6887 103rd Street, Jacksonville, Florida.

1.1 OVERVIEW OF NAS JACKSONVILLE

The official mission of NAS Jacksonville is to provide facilities, service, and support for the operation and maintenance of naval weapons and aircraft to operating forces of the Navy as designated by the Chief of Naval Operations. Some of the tasks required to accomplish this mission include operation of fuel storage facilities, performance of aircraft maintenance, maintenance and operation of engine repair facilities and test cells for aircraft engines, and support of weapon systems. The following sections provide a history and chronology, as well as a brief description of the physical and geological conditions at NAS Jacksonville.

1.1.1 History and Site Chronology

NAS Jacksonville was commissioned on October 15, 1940 to provide facilities for pilot training and a Navy Aviation Trades (NAT) School for ground crewmen. With the advent of World War II, the physical size of the NAS Jacksonville more than doubled, and military functions supported the war effort. During 1942, the Navy phased out pilot training, and the station became the headquarters for the Chief of Naval Operational Training, the final training phase before fleet assignment. The NAT School became the Naval Air Technical Training Center under the Chief of Naval Air Technical Training, NAS Memphis. The operational areas of the station still maintained coastal protection with seaplanes. The facility reached a peak of 42,000 naval personnel and 11,000 civilians by 1946 (TtNUS, 2000a).

At the conclusion of World War II, NAS Jacksonville was devoted entirely to aviation training. In 1945, Chief of Naval Operational Training was redesignated Chief Naval Air Advanced Training. In July 1946, the Seventh Naval District was transferred from Miami, Florida to the NAS Jacksonville facility, as joint command with Chief Naval Air Advanced Training. On April 5, 1948, the Navy transferred the Chief Naval Air Training and all training facilities to NAS Corpus Christi, Texas.

By January 1949, NAS Jacksonville's mission was to support the operational carrier squadrons with fleet squadrons assigned to Commander, Naval Air Bases, Sixth District and patrol squadrons assigned to Combat Patrol Wing Eleven. On January 1, 1951, the Navy reactivated the Naval Air Technical Training Center and Marine Air Division activities in support of the Korean build-up of facilities. This joint operational and training status continues to this time.

The Navy initiated an environmental investigation of NAS Jacksonville in 1979. Currently, the cleanup program is being conducted under the Navy's Installation Restoration (IR) program. As a result of IR activities, 52 potential sources of contamination (PSCs) have been identified as needing additional investigation. The USEPA issued a Hazardous and Solid Waste Amendments of 1984 (HSWA) permit to the installation in June 1987 and a Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) was included in the USEPA-issued permit. The site was placed in the National Priorities List (NPL) in November 1989. Subsequently, a FFA was signed that decreed that the cleanup of these PSCs would be conducted under the CERCLA, with RCRA as an ARAR. In addition to the IR/CERCLA program, the facility has other active regulatory programs. A Florida RCRA permit was issued to NAS Jacksonville by the FDEP. An Underground Storage Tank Program is currently investigating over 50 tank sites as provided for by Florida Administrative Code (FAC) Section 62-770 (TtNUS, 2000a).

1.1.2 Land Use

NAS Jacksonville occupies approximately 3,900 acres in southeastern Duval County, Florida and is located approximately nine miles south of downtown Jacksonville. The facility is located on the St. Johns River approximately 24 miles upstream from its confluence with the Atlantic Ocean. The main portion of NAS Jacksonville is bordered to the north by the Timaquana Country Club, to the east and northeast by the St. Johns River, to the south by a residential area, and to the west by Highway 17 (Roosevelt Boulevard), with Westside Regional Park, commercial developments, and other NAS Jacksonville operations beyond.

NAS Jacksonville is a multi-mission base hosting more than 100 tenant commands and employing more than 26,000 active duty and civilian personnel. The installation is home to the P-3C Orion long-range

martitime surveillance aircraft, the SH-60F Seahawk helicopter, and the S-3B Viking jet aircraft. The Naval Aviation Depot, located on NAS Jacksonville, is the largest industrial employer in northeast Florida and performs maintenance, repair, and overhaul of Navy aircraft.

In addition to the many operational squadrons flying P-3, C-12, C-9 aircraft, and SH-60F helicopters, NAS Jacksonville is home to Patrol Squadron Thirty (VP-30), the Navy's largest aviation squadron and the only "Orion" Fleet Replacement Squadron that prepares and trains U.S. and foreign pilots, air crew, and maintenance personnel for further operational assignments.

Support facilities include an airfield for pilot training, a maintenance depot (employing more than 150 different trade skills capable of performing maintenance as basic as changing a tire to intricate micro-electronics or total engine disassembly), a Naval Hospital, a Fleet Industrial Supply Center, a Navy Family Service Center, and recreational facility.

1.1.3 Physiography and Topography

NAS Jacksonville is located in the Coastal Plain physiographic province. The Coastal Plain is composed of marine/coastal sediments in the vicinity of the facility. The sediments were deposited in terraces related to prehistoric fluctuations in sea level. The terrace deposits are in the form of ridges that tend to parallel the current coastline. The topography of the terrace deposits is characterized by very low relief with gentle slopes to the east-southeast. Seven terraces are present in northeast Florida with NAS Jacksonville located within the Pamlico terrace [10-25 feet (ft) mean sea level (msl)].

The overall topography at NAS Jacksonville is generally flat with a gentle slope to the southeast according to the topographic map for Orange Park (USGS, 1993).

1.1.4 Climate

The climate in northeast Florida approaches semi-tropical as it lies near the northern limit of the trade winds (the prevailing easterly winds that moderate summer and winter temperatures). The annual mean temperature is 68 to 70 degrees Fahrenheit with an average temperature in the summer of 82 to 83 degrees Fahrenheit and a winter average 56 to 57 degrees Fahrenheit. Summer highs reach the middle to upper 90 degrees Fahrenheit, sometimes exceeding 100 degrees Fahrenheit. The winter lows can reach the upper teens, although temperatures seldom drop below freezing.

The region experiences an average of 53 to 54 inches of rainfall per year, most of which accumulates during frequent summer thunderstorms. Extended dry periods may occur throughout the year; however,

they are most common in spring and fall. The relative humidity averages 87 percent and the average annual sunshine is 62 percent of the maximum.

Wind speed in northeast Florida averages eight miles per hour with winds predominantly from the northeast in the winter and from the southwest in the summer. Winds of hurricane force can be expected once in five years with significant deviations from the average. Tropical storm activity mostly occurs from August through October, although the six-month period from June 1 through November 30 is officially considered the Atlantic hurricane season.

1.1.5 Soil

Soil at NAS Jacksonville developed in marine terrace sediment deposits and is regionally classified by the United States Department of Agriculture (USDA), Soil Conservation Service as the Pelham-Mascotte-Sapelo soil series assocation. Soils in this association are characterized as nearly level, poorly drained sands to a depth of 20 inches below ground surface (bgs), which are underlain by loamy sands (USDA, 1978).

1.1.6 Regional Geology

The geologic profile at NAS Jacksonville is comprised of unconsolidated surficial deposits of predominantly fine to very fine clastic sediments that range from clean medium- to fine-grained sands, to silty fine sands, to sandy and silty clay (Fairchild, 1972) overlying thick deposits of phosphatic sands and clays of the Hawthorn Group (Scott, 1988) and limestones and dolomites of the Floridan aquifer systems (Leve, 1966).

The Hawthorn Group is significant at NAS Jacksonville because it contains as much as 200 ft of low permeability, silty, sand-clay layers (Scott, 1988). This low permeability deposit acts as an aquiclude for the underlying Floridan aquifer system. The Floridan aquifer system is the major source of potable water in the Jacksonville area and throughout much of northeastern and central Florida.

1.1.7 Regional Hydrology

1.1.7.1 Surface Water

Two principal waterways are located near NAS Jacksonville, the St. Johns River and the Ortega River. The St. Johns River forms the eastern boundary of NAS Jacksonville. The river is rated by the FDEP as a Class III water body, which is designated for fish and wildlife propagation and body contact recreational use. The river at this point is influenced by tidal action and can be considered part of the St. Johns River

estuary (TtNUS, 2000a). Based on salinity measurements taken during the Scoping Study Field Program (SSFP), which ranged from 7.0 to 8.8 parts per thousand (ppt) as reported in the OU 3 Remedial Investigation/Feasibility Study (RI/FS), the water would be classified as marine. Salinity values greater than 2 ppt will support marine vegetation and aquatic life.

1.1.7.2 Groundwater

Three aquifer systems have been identified in the Jacksonville area including the surficial aquifer, intermediate aquifer consisting of permeable units within the Hawthorn formation, and the Floridan aquifer system.

The surficial deposits consist of sediments of Late Miocene to Recent age. The sediments are highly variable and include sands, shelly sands, coquina, silts, clay, and shell beds. While the surficial aquifer may be considered a single unit on a regional or base-wide scale, localized clay layers or discontinuous lenses may divide the aquifer into distinct permeable units in some areas [ABB Environmental Services, Inc. (ABB-ES), 1995a]. The contact between the surficial aquifer deposits and the underlying Hawthorn Group, containing the intermediate aquifer, is an unconformity generally identified by a coarse phosphatic sand and gravel bed (Leve, 1966). Average well yields in Jacksonville for the shallow groundwater aquifer were estimated by the City of Jacksonville Planning Department to be between 200 and 500 gallons per day (Toth, 1990). This groundwater is primarily used for lawn irrigation, domestic purposes, and the heat exchange unit in air conditioning and heating units.

The Hawthorn Group consists mainly of dark-gray and olive-green sandy to silty clay, clayey sand, clay and sandy limestone encountered at a depth of approximately 50 to 70 ft bgs. Black phosphatic sand, granules, and pebbles are common throughout the Hawthorn Group (Fairchild, 1972). The combination of numerous thick clay layers within the Hawthorn Group serves as a confining layer that separates the surficial aquifer from the underlying Floridan aquifer system. The most common carbonate components of the Hawthorn Group are dolomite and dolosilt. Clay minerals associated with the Hawthorn Group sediments are smectite, illite, palygorskite, and kaolinite.

A marine carbonate sequence makes up the Floridan aquifer system beneath NAS Jacksonville. The Floridan formation components are Eocene in age and consist of, in descending order, the Ocala Group, Avon Park Limestone, Lake City Limestone, and Oldsmar Limestone. The Floridan aquifer system is the principal source of fresh water in northeast Florida. The water bearing zones consists of soft, porous limestone and porous dolomite beds. The top of the Floridan aquifer in the vicinity of NAS Jacksonville occurs at a depth of about 400 ft bgs. Published transmissivities of the Floridan aquifer in eastern Duval County range from approximately 85,000 to 160,000 gallons per day per foot (Leve, 1966). Groundwater in the Floridan aquifer in the vicinity of NAS Jacksonville is moving eastward toward areas of heavy

pumping (Fairchild, 1977). Floridan aquifer wells in the vicinity of NAS Jacksonville are under sufficient artesian pressure to flow at the surface.

1.2 ARAR AND SITE-SPECIFIC ACTION LEVEL CHANGES

The five-year review is being conducted for two purposes:

- To determine if the remedial actions that have been implemented as specified in the ROD protect human health and the environment.

- To determine if there have been changes in the ARARs or site-specific action levels that call into question the protectiveness of the remedy.

The ARARs identified in each of the RODs were reviewed, as were new federal and state regulations that have been promulgated. This section describes the new or changed ARARs that address the risk posed to human health or the environment. Since the OU 1 ROD was signed in 1997 and the OU 2 ROD was signed in 1998, there have been only a few ARAR changes.

The most significant change in the ARARs that has occurred in the past five years is related to changes in the State of Florida regulations and guidance. Florida promulgated Chapter 62-785 (Brownfields Criteria Rule) in the FAC in July 1998 and Promulgated Chapter 62-777 (Contaminant Target Levels Rule) in the FAC in August 1999. These regulations developed risk-based cleanup target levels for contaminants of concern (COCs) in soil, groundwater, freshwater surface water, and marine surface water.

In general, these ARAR changes do not currently affect protectiveness. The groundwater and surface water cleanup standards, established in Table 1 of Chapter 62-770, were evaluated for applicability, relevance, and appropriateness. However, the FDEP has decided that for the current time these ARARs should not be applied to these sites.

The federal ARARs and other state ARARs have not significantly changed since the signing of the OU 1 ROD in September 1997. Examples of some of the changes that have occurred are as follows:

- Nickel was withdrawn as a standard in the Safe Drinking Water Act (40 CFR Sections 141 to 146).

- Promulgation of Chapter 62-785 and Chapter 62-777 of the FAC provide criteria for soil, surface water, and groundwater for many chemical parameters based on risk evaluation. The specific COCs for each OU are reviewed and compared to these criteria in the following sections.

The USEPA and the State of Florida have developed ecological risk toxicity values as guidelines for surface water and sediment quality over the last five years. The following guidance documents were reviewed that could affect protectiveness:

- USEPA Region IV Ecological Screening Values published in November 1995 and updated in December 1998.

- FDEP Sediment Quality Assessment Guidelines (SQAGs) for Florida Coastal Waters

The criteria in the USEPA Region IV Ecological Screening Values and FDEP Approach to Sediment Quality in Florida Coastal Waters are guidelines that have not been promulgated. However, the criteria should be considered for protection of the ecological environment. The surface water chronic screening value for benzene of 53 µg/L is less than the regulatory value for benzene in surface water from FAC 62-302.

2.0 OPERABLE UNIT 1, PSC 26 AND PSC 27

Implementation of the remedial actions at OU 1 began approximately in 1983. This five-year review consists of an approximate nine-year period of data and provides a current status update for OU 1.

This review is required by regulation because landfill wastes are still contained on site and do not allow for unlimited use and unrestricted exposure.

Information pertaining to OU 1 is as follows:

- OU 1 contains a landfill (PSC 26) and a polychlorinated biphenyl (PCB) transformer storage area (PSC 27).

- Because PSC 26 and PSC 27 are located adjacent to each other and share the same potential fate and transport mechanism for contaminants, the sites are collectively known as OU 1. The area drains into a tributary to the St. Johns River estuary and adjoining wetlands and abuts a military housing area.

- The final remedy for the site included a cap for the landfill, continuation of the LNAPL recovery system, surface water monitoring, and monitored natural attenuation for the groundwater with a contingent action for active remediation of groundwater and surface water. Construction of the final remedy for OU 1 was completed in August 1998.

- Surface water monitoring, the monitored natural attenuation program, and LNAPL recovery are on-going.

2.1 HISTORY AND SITE CHRONOLOGY

A list of important OU 1, PSC 26 and PSC 27 historical events and relevant dates in the site chronology is shown in Table 2-1. The identified events are illustrative, not comprehensive.

TABLE 2-1
OU 1 Site Chronology

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Event	Date
U.S. Army disposed of non-hazardous debris such as vehicles at PSC 26.	Prior to 1940
The Navy disposed of radium-226 and radium-228 paint waste and luminescent dials at PSC 26.	1940 to 1950
PSC 26 served as a NAS Jacksonville disposal area for household, sanitary, and industrial waste.	1940 to 1979
Excavation activities resulted in 501 barrels of radiological contaminated material at PSC 26.	1973
Oil was discovered seeping into a man-made ditch at PSC 26.	1978
PSC 27 served as the PCB transformer storage area.	Prior to 1978
Vandalism to transformers at PSC 27, the Navy removed the transformers.	1978
PSC 26 closed as a disposal site.	1979
LNAPL containing PCBs discovered and documented.	1979
Trench system constructed and operated temporarily to recover LNAPL.	1983 to 1984
Several investigations of the LNAPL contamination.	1990 to 1991
Focused RI/FS on LNAPL source area.	Dec 93
Interim Record of Decision (IROD) signed for LNAPL removal.	11 Aug 94
Interim remedial action initiated for LNAPL removal.	Feb 95
RI/FS complete for OU 1.	Mar 96
ROD signature for OU 1.	23 Sep 97
Excavation and disposal of contaminated surface soil and sediment from PSC 27 into PSC 26.	Completed July 98
Installation of a cap and cover system at PSC 26.	Completed Aug 98
Inspection of the cap and cover since installation.	Ongoing
LNAPL recovery.	Ongoing
Groundwater and surface water monitoring including monitored natural attenuation.	Ongoing

2.2 BACKGROUND

Figure 1-2 is a generalized map of NAS Jacksonville that shows the location of OU 1 in the southwestern portion of the facility. A figure of OU 1 showing the relative locations of PSC 26 and PSC 27, the surface water drainage at the site, and the unnamed tributary is provided as Figure 2-1. PSC 26 and PSC 27 combined occupy approximately 41 acres, 17 acres of which is occupied by the landfill.

PSC 26, the Old Main Registered Disposal Area, was also known as the Oil and Solvents Disposal Pits Area. Prior to 1940, the U.S. Army disposed of non-hazardous debris such as vehicles on this site. From 1940 to 1950, the Navy disposed of radium-226 and radium-228 paint waste and luminescent dials on this site. From 1940 to 1979, the site was the NAS Jacksonville disposal area for household and sanitary waste, industrial waste and demolition and construction debris. Liquids and solids were placed in open pits or trenches and ignited. The pits were covered with soil when full of burned residues. The Navy officially closed PSC 26 as a disposal site in 1979. The Navy reportedly disposed of 1,000 gallons per week of volatile organic waste products at this site over a 40-year period. Other wastes disposed of at this site included 200 gallons per week of cold carbon remover residue, 300 gallons per week of vapor degreaser solution, and 600 gallons per week of paint shop waste (ABB-ES, 1997a).

In 1973, the Navy oversaw excavation activities that resulted in 501 barrels of radiological contaminated materials. In 1978 oil was discovered seeping into a man-made drainage ditch at PSC 26. Further investigation determined that oil LNAPL was in the shallow groundwater system. Subsequent installation of wells and analysis of groundwater samples indicated the presence of volatile organic compounds (VOCs) and inorganics at concentrations exceeding drinking water standards. An LNAPL trench recovery system was constructed in 1983 and operated until 1984 when the discharge from the drainage ditch system failed to meet National Pollutant Discharge Elimination System permit requirements. Earthen dams were constructed across the ditches to prevent off-site drainage from OU 1 (ABB-ES, 1994a).

Several investigations conducted in 1990 and 1991 reported the presence of LNAPL contamination in the soil. A Focused Remedial Investigation (FRI)/Focused Feasibility Study (FFS) report for the LNAPL Source Area (LSA) was issued in December 1993. The purpose of the FRI/FFS was to “characterize the nature and extent of contamination of free-phase LNAPL at OU 1 and to develop and screen potential remedial alternatives that can meet the response objectives established for free-phase LNAPL removal” (ABB-ES, 1993a). The IROD for OU 1 was signed in 1994 for the removal of the LNAPL. The ROD, signed and implemented in 1997, specified that contaminated soil from surrounding properties and sediment from the unnamed stream, and its tributaries be excavated, and placed on PSC 26 after which the landfill would be capped and covered. In addition to soil and sediment, groundwater within the plume area was to be treated using intrinsic bioremediation (natural attenuation). The ROD also included a

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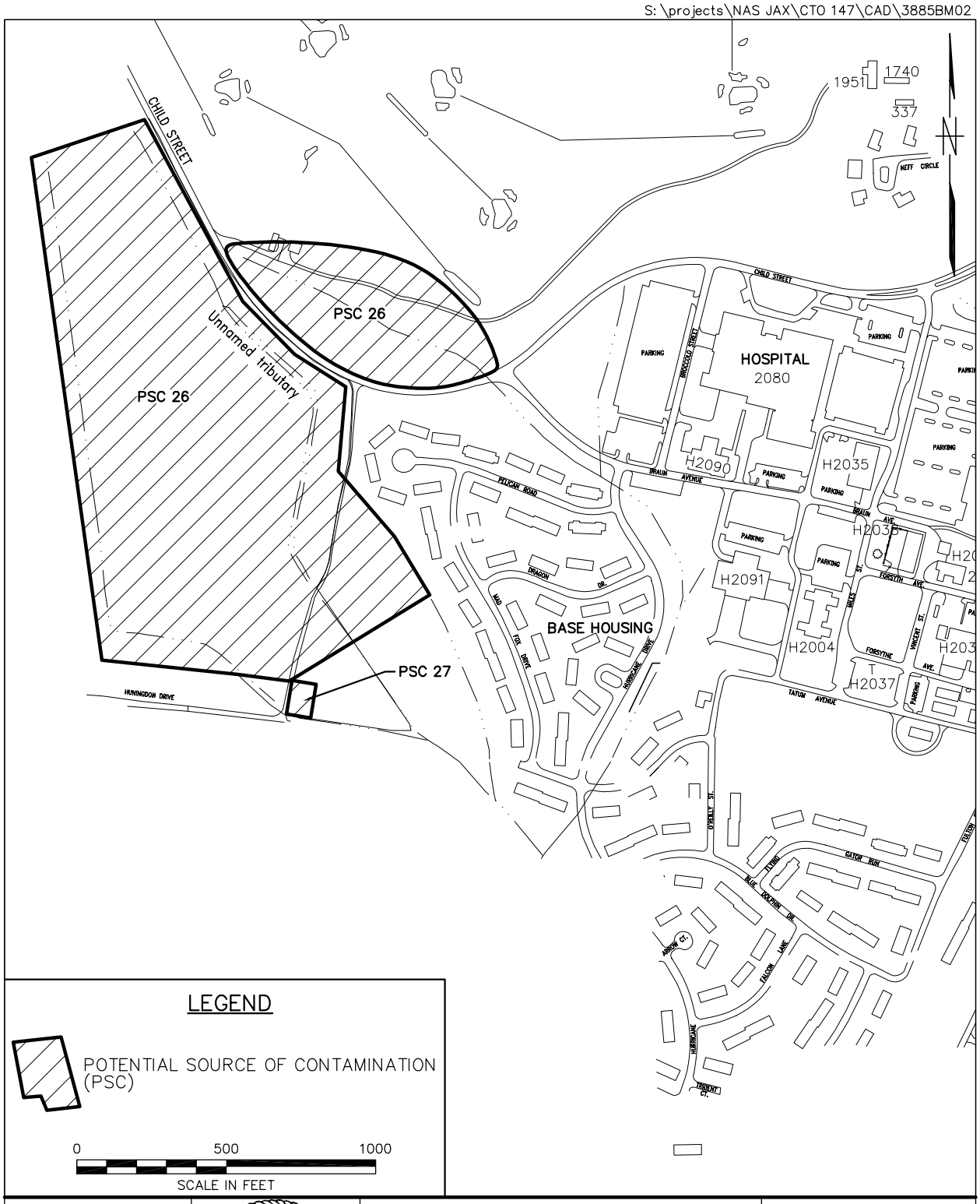

LEGEND

POTENTIAL SOURCE OF CONTAMINATION (PSC)

0 500 1000

SCALE IN FEET

DRAWN BY LLK DATE 5/11/01		PSC 26 AND 27 LOCATION MAP OPERABLE UNIT 1 FIVE-YEAR REVIEW NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NO. N3885
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-1 / REV. 0

FORM CADD NO. SDIV_AV.DWG – REV 0 – 1/20/98

contingent action designed to protect surface water and groundwater (see Appendix B). Under this contingency, if monitoring data indicates the exceedence of established thresholds at select locations, then provisions for the collection and treatment of surface water are mandated. For groundwater, if monitoring data indicate that natural attenuation processes are not sufficient to meet corrective action goals within 30 years, then enhanced bioremediation of groundwater will be conducted.

PSC 27, the Former PCB Transformer Storage Area, is adjacent to PSC 26, the Old Main Registered Disposal Area. PCB-containing electrical transformers were stored at this location until 1978. Vandalism to the transformers occurred in 1978 and resulted in the release of dielectric fluid containing PCBs. Not until 1979, when LNAPLs were discovered and investigated, was PCB contamination documented. The study discovered that leaking electrical transformers containing PCB-contaminated dielectric fluid at PSC 27 had contaminated soils and groundwater. Because of contamination from previous soil and solvent disposal at PSC 26, further investigation was conducted at OU 1 encompassing PSC 27 (ABB-ES, 1994b). Remedial investigation (RI) field activities in 1992 and 1993 confirmed PCB contamination in PSC 27 soil and sediment in an adjacent tributary. The RI/FS was completed in 1996 and a ROD was signed and implemented in 1997. The ROD specified that PCB-contaminated sediments in the adjacent tributary be excavated and placed under the landfill cap at PSC 26. The contaminated soils at PSC 27 were covered with approximately 19 inches of compacted soil over which was placed a 6-inch vegetative soil cover for a total soil cover of 2 ft.

2.3 REMEDIAL ACTIONS

2.3.1 Remedy Selection

The twofold purpose of remedial action at OU 1 was to contain and control the contamination at OU 1 and to reduce risks posed by COCs to acceptable levels within 30 years. To meet these goals, ten remedial action objectives (RAOs) were identified for six mediums. Table 2-2 (a reproduction of Table 2-2 from the ROD for OU 1) lists the RAOs for OU 1.

Five remedial alternatives were evaluated in the Feasibility Study (FS) for OU 1 to address the ten RAOs. Of the five alternatives evaluated the selected remedial action for OU 1 was Alternative 3 as listed in the RI/FS and ROD for OU 1. The specific activities involved with Alternative 3 are further described in the following paragraph. Figure 2-2 presents the general site layout proposed for the selected alternative.

TABLE 2-2
Remedial Action Objectives for OU 1

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Medium	Contaminants Causing Unacceptable Risk	Remedial Action Objectives
Landfill Soil and Debris	Polychlorinated biphenyls (PCBs) Inorganics Radionuclides	Reduce Exposure to contaminants in the landfill. Prevent contaminants on the surface of the landfill from washing off the site. Control leachate generation from the additional material placed on the landfill.
LNAPL in the vadose zone	Presence of LNAPL [containing PCBs and polynuclear aromatic hydrocarbons PAHs)]	Remove LNAPL if greater than 0.1 inch from the water table.
Soil outside landfill	Semivolatile Organic Compounds (SVOCs) PCBs Inorganics	Reduce human and ecological exposure to contaminants in the soil. Reduce the potential for humans or ecological receptors to swallow contaminants in the soil.
Groundwater	Low-level VOCs	Reduce the potential for humans to ingest or breathe contaminants found in the groundwater.
Surface water in unnamed tributary	None	Reduce the potential for humans and ecological receptors to come in contact with contaminants in the surface water that are the result of contamination in the sediment and groundwater.
Sediment in unnamed tributary	Pesticides PCBs Inorganics	Reduce human and ecological exposure to contaminants in the sediment. Reduce the potential for human and ecological receptors to ingest contaminants in the sediment.

Notes: OU = operable unit.
PCBs = polychlorinated biphenyls.
LNAPL = light non-aqueous phase liquid.
PAH = polynuclear aromatic hydrocarbon.
SVOC = semivolatile organic compounds.
VOC = volatile organic compound.

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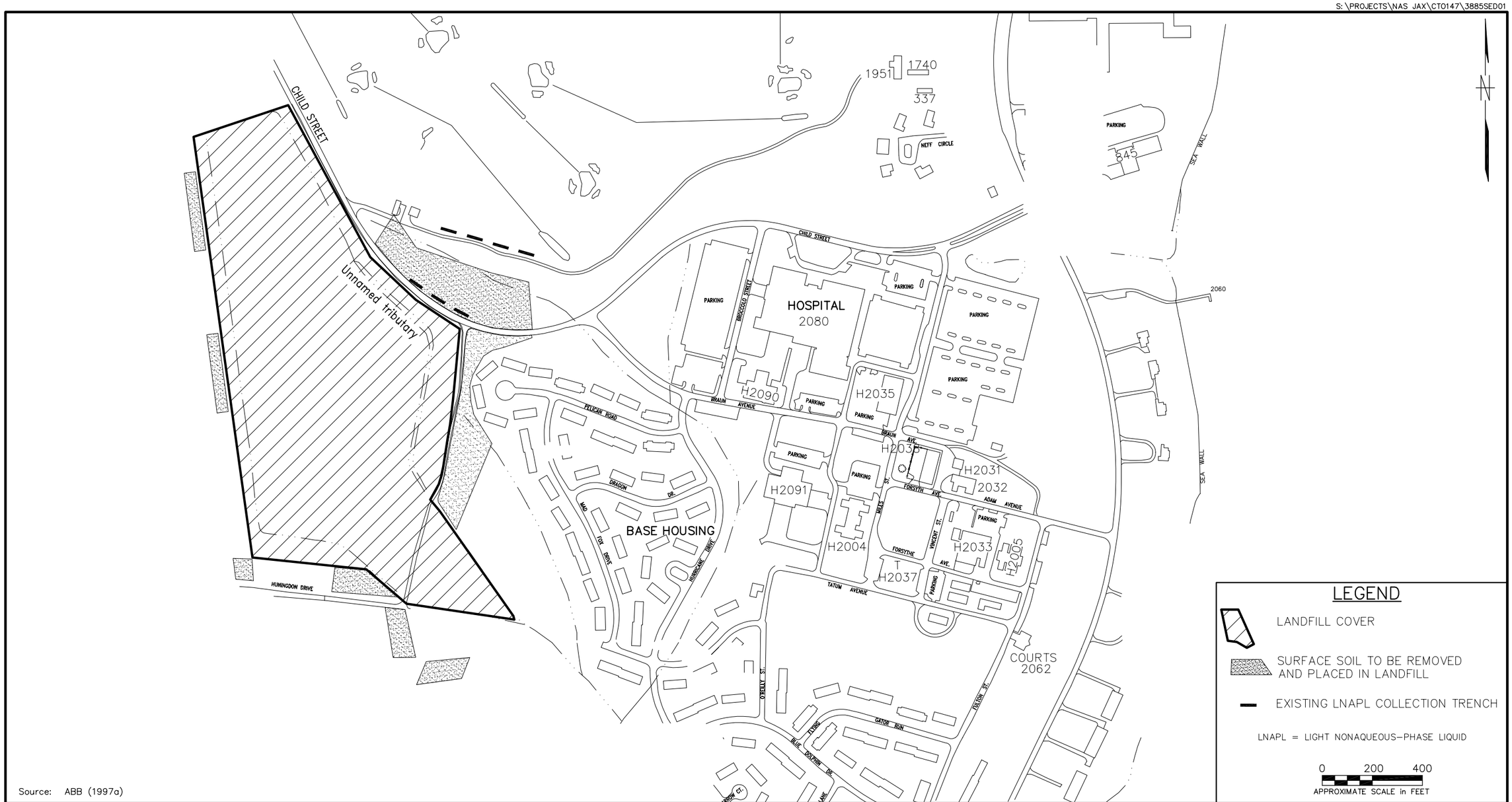

Source: ABB (1997a)

LEGEND

- LANDFILL COVER
- SURFACE SOIL TO BE REMOVED AND PLACED IN LANDFILL
- EXISTING LNAPL COLLECTION TRENCH

LNAPL = LIGHT NONAQUEOUS-PHASE LIQUID

0 200 400
APPROXIMATE SCALE in FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY LLK DATE 3/26/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

DEPARTMENT OF THE NAVY · SOUTHERN DIV FACILITIES ENGINEERING COMMAND

SITE LAYOUT FOR THE SELECTED ALTERNATIVE
(ALTERNATIVE 3)
OPERABLE UNIT 1
FIVE-YEAR REVIEW
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO. N3885
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2-2
REV. 0

FORM CADD NO. SDIV_BH.DWG - REV 0 - 1/20/98

Landfill Soil and Debris

The soil and debris within the landfill was capped and/or covered. The proposed cover is a partial cover/ cap system with a geomembrane layer cap for a specific portion of the landfill, and the remaining area of the landfill covered with a layer of soil. The proposed cover/cap system consisted of the following:

- A 30-mil geomembrane laid over the radionuclide-contaminated soil and debris and additional materials placed on the landfill (to prevent water from infiltrating through this material).

- An 18-inch layer of soil placed over the geomembrane and on the remainder of the landfill.

- A 6-inch layer of vegetative cover placed over the entire landfill to promote vegetation, absorb rainwater, and reduce surface runoff.

LNAPL

LNAPL collection and off-site disposal was continued as described in the IROD for LNAPL. This included the potential for upgrading of the LNAPL collection system to an active system if required to meet RAOs (ABB-ES, 1994b).

Soil and Sediment

Prior to capping of the landfill, contaminated soils and sediments exceeding the 1×10^{-4} risk action levels were to be excavated from the area outside the landfill and placed on the existing soil and debris within the landfill. Approximately 9,000 cubic yards (4,000 cubic yards from north of Child Street and 5,000 cubic yards from south of Child Street) of soil were to be excavated (see Figure 2-2).

In addition to excavating soil from outside the landfill, approximately 900 cubic yards of sediment from the unnamed tributary were also to be excavated as shown on Figure 2-3. Based on practical and technical implementation issues (i.e., impact to wetlands, forested areas, ecological receptors, and de-watering), only hot spots of contaminated sediments were to be selected for excavation. Excavation of those hot spots were expected to reduce the cumulative, residual risk to approach the low (i.e., more aggressive) end of USEPA's acceptable risk range.

Once excavated, the media (i.e., soil from outside the landfill and sediment from the unnamed tributary) would be capped under the partial cap and cover system (ABB-ES, 1994b). The intent of the "partial" cap was to prevent water migration through the area that contained radionuclides, inorganics and PCBs. The cover was used to reduce human and ecological receptor exposure for the entire landfill.

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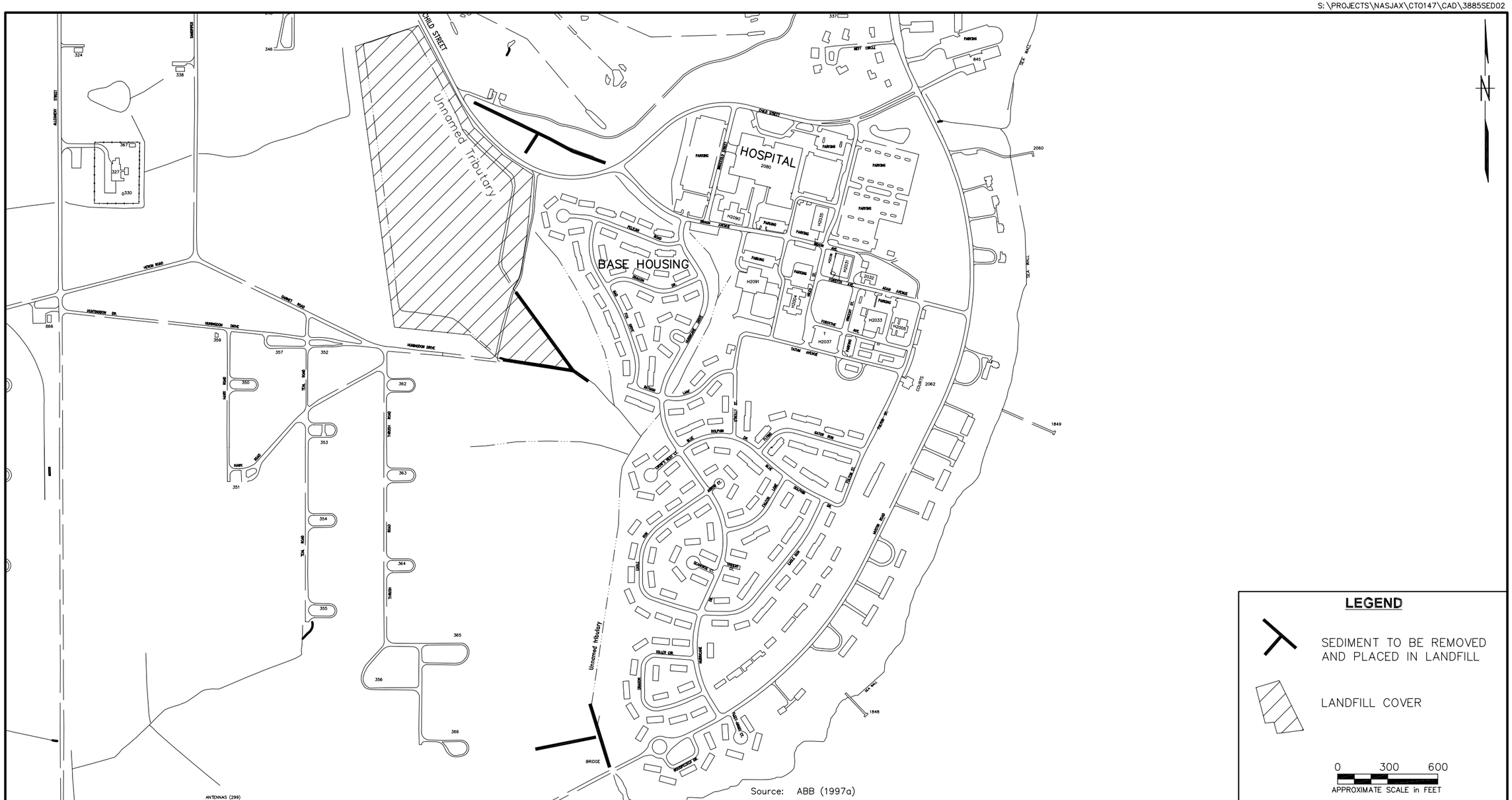

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DRAWN BY LLK DATE 5/11/01
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COST/SCHED–AREA
SCALE AS NOTED

SEDIMENT REMOVAL AREAS
OPERABLE UNIT 1
FIVE–YEAR REVIEW
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO. 3885
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2–3
REV. 0

FORM CADD NO. SDIV_BH.DWG – REV 0 – 1/20/98

Groundwater

The groundwater treatment component of the selected remedy consisted of natural, unaided biodegradation, and natural attenuation. Access restrictions were to be used to prevent consumption of the groundwater at OU 1 from the surficial aquifer in the affected area. The restrictions included constructing a fence around the site, posting signs along the fence, and obtaining a legal restriction on use of groundwater for consumption[1]. These restrictions were to remain in effect until the groundwater contamination levels for COCs met or were below maximum contaminant levels (MCLs) and concurrence was obtained from FDEP and USEPA to remove them (ABB-ES, 1994b).

Groundwater and surface water monitoring was to be implemented upon completion of the remedial action to assess the restoration of the surficial aquifer, to evaluate the potential for breakthrough of contaminants into the unnamed tributary (i.e., the point of compliance), and to assess when groundwater access restrictions could be lifted. Groundwater and surface water monitoring locations are presented on Figure 2-4 and described in Table 2-3. Surface water was also to be sampled and analyzed during the monitoring program (ABB-ES, 1994b).

Contingent Actions

In addition to the primary action, the selected alternative also has two contingency actions: (1) a tributary collection system (i.e., collection of surface water) with on-site treatment and discharge and (2) enhanced bioremediation.

If monitoring data for two consecutive quarters, indicated that concentrations of chemicals in surface water or groundwater from monitoring wells adjacent to the tributary were greater than the Florida surface water standards established in the ROD [i.e., trigger levels for contingent action (TLCA)], then one or more seepage meters were to be installed to collect water samples at the direct interface of groundwater discharge to surface water (see Table 2-4 for TLCA criteria). These samples were to be analyzed and if concentrations of COCs were still greater than Florida surface water standards, then the first contingent

[1] The Record of Decision for OU 1 stated that "access restrictions will be placed on the base to prevent consumption of the groundwater at OU 1 from the surficial aquifer in the affected area. These restrictions would include constructing a fence around the site, posting signs along the fence, and obtaining a legal restriction on use of groundwater for consumption". The Feasibility Study for OU 1 states in Section 11.1.1.4 Institutional Controls for Sediment "Institutional controls included in this alternative consist of the existing fence, signs, and deed restrictions to reduce potential exposure". This is the only reference about fencing in the Feasibility Study. The selected alternative (Alternative 3) refers back to Section 11.1.1.4 for institutional controls for sediment. In the Alternative 3 description in the Feasibility Study, there is no mention of fence construction for the institutional controls of groundwater. Therefore, it is TtNUS' interpretation that the fence mentioned in the groundwater section of the ROD refers to the existing fence mentioned in the sediment section of the Feasibility Study. A fence is in place around the landfill at OU 1. The text was not altered because the text states what was directed in the Record of Decision.

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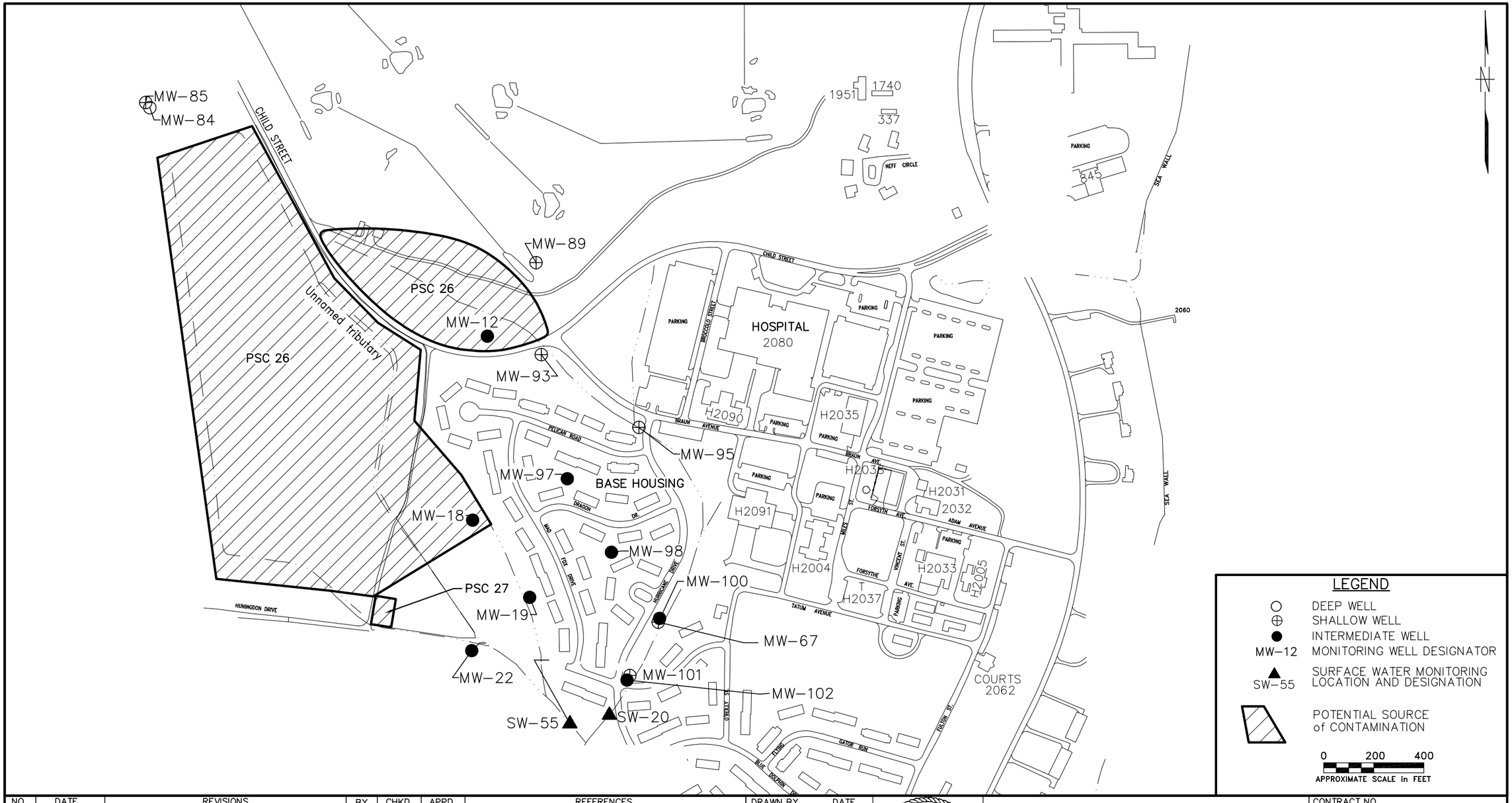

LEGEND

- DEEP WELL
- SHALLOW WELL
- INTERMEDIATE WELL
- MW-12 MONITORING WELL DESIGNATOR
- SW-55 SURFACE WATER MONITORING LOCATION AND DESIGNATION
- POTENTIAL SOURCE of CONTAMINATION

0 200 400
APPROXIMATE SCALE in FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY LLK DATE 5/10/01
CHECKED BY DATE
COST/SCHED–AREA
SCALE AS NOTED

DEPARTMENT OF THE NAVY · NORTHDIV FACILITIES ENGINEERING COMMAND

MONITORING WELL LOCATIONS
OPERABLE UNIT 1
FIVE–YEAR REVIEW
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO. N3885
APPROVED BY DATE
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FORM CADD NO. SDIV_BH.DWG – REV 0 – 1/20/98

TABLE 2-3
Monitoring Program at OU 1

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Monitoring Location	Depth (relative)	Screened Interval (feet below surface)	Purpose of Sampling
Groundwater Monitoring			
MW-12	Deep	30 to 35	Monitor groundwater downgradient of LNAPL area.
MW-18	Deep	26.5 to 31.5	Monitor groundwater downgradient of landfill.
MW-19	Deep	19 to 24	Monitor groundwater downgradient of landfill.
MW-22	Deep	25 to 30	Monitor southern edge of dissolved plume.
MW-67	Shallow	3.5 to 13.5	Monitor vicinity of groundwater discharge to surface water.
MW-84	Deep	35 to 40	Monitor groundwater upgradient from the landfill (serves as background).
MW-85	Shallow	3 to 13	Monitor groundwater upgradient from the landfill (serves as background).
MW-89	Shallow	3 to 13	Monitor concentrations of compounds in vicinity of LNAPL area.
MW-93	Shallow	3 to 13	Monitor groundwater between the stream and the housing area.
MW-95	Shallow	3 to 13	Monitor groundwater between the stream and the housing area.
MW-97	Deep	22.5 to 27.5	Monitor extent of dissolved plume in housing area.
MW-98	Deep	20.5 to 25.5	Monitor extent of dissolved plume in housing area.
MW-100	Deep	16.5 to 21.5	Monitor vicinity of groundwater discharge to surface water.
MW-101	Shallow	3 to 13	Monitor vicinity of groundwater discharge to surface water.
MW-102	Deep	16.5 to 21.5	Monitor vicinity of groundwater discharge to surface water.
Surface Water Monitoring			
SW-20	Surface water	--	Monitoring point for surface water
SW-55	Surface water	--	Monitoring point for surface water

Source: Record of Decision (ABB-ES, 1997a)

TABLE 2-4
Trigger Levels for Contingent Action

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Parameter (Contaminant of Concern in Groundwater or Surface Water)	Concentration Triggering Contingent Action[1]
Volatile Organic Compounds (ug/l)	
1,1-dichloroethene	3.2
1,2-dichloroethane	1,580
1,2-dichloroethene (cis)	--
1,2-dichloroethene (trans)	--
benzene	--
trichloroethene	80.7
vinyl chloride	--
Semivolatile Organic Compounds (ug/l)	
bis(2-ethylhexyl) phthalate	--
naphthalene	--

Notes:

1 Concentrations triggering contingent action are the Florida surface water standards for Class III freshwaters. Where an entry is marked "--", no standard is available for that compound.

Trigger levels for contingent action are for the two surface water sample locations and monitoring wells MW-67, MW-100, MW-101, and MW-102.

Source: Record of Decision (ABB-ES, 1997a)

action, tributary water collection, would be implemented. The surface water pump and treat system was intended to operate until the contamination was reduced to less than the MCLs (ABB-ES, 1994b).

If, after a review of data accumulated during the first five years of natural attenuation, predicted concentrations of COCs in groundwater would not achieve MCLs in 30 years, the second contingent action, enhanced bioremediation would be implemented.

The remedial action selected for implementation at OU 1 is consistent with CERCLA and the NCP. The selected remedy satisfies the statutory preference for treatment to the extent practicable, which permanently and significantly reduces the mobility, toxicity, and/or volume of hazardous substances as a principle element. A copy of the Contingency Plan Chart for OU 1 developed in the Long-term Monitoring Plan (LTMP) is included as Appendix B.

2.3.2 Remedy Implementation

A ditch system was constructed with overflow weirs in 1983 to recover LNAPL from the LNAPL source area. The ditch system, while demonstrating some effectiveness in removing LNAPL, was discontinued in 1984 due to failure to meet National Pollutant Discharge Elimination System permits. The current LNAPL recovery system was installed in April 1995 in general accordance with the IROD for OU 1 (EBASCO, 1995). The recovery system, as designed, was installed below the groundwater soil interface and removes the light phase layer from the top of the water table. The system consisted of three recovery trenches with lengths of 20 ft, 195 ft, and 240 ft, each 18 ft deep. The south trench is 195 ft long and is located directly north of Childs Street. The 20 ft trench is located beneath Childs Street, which is connected to the south trench. (See Appendix C for trench details) The north trench is 240 ft long and is located north of the other two trenches, near the golf course. The installation of the trenches was completed as designed except for the drainpipes that were installed at the bottom of the trenches. During installation of the trenches the drainpipe that was installed in the south trench broke after the first 40 ft of trenching. Similarly, the north trench drainpipe line broke 10 ft to 12 ft into trenching operations. These trenches were completed without the drainpipe. The drainpipe was installed as designed in the small trench. A drawdown modeling report (EBASCO, 1995) was performed to provide an analysis of the impact to active pumping operations as a result of not having the entire horizontal drainpipe installed. The drawdown modeling report (EBASCO, 1995) indicated that the absence of the horizontal drainpipe would have minimal affect on active pumping operations. A copy of the recovery system layout plan for the recovery trench is included as Appendix C.

The remedial design, which included the closure and post-closure plans for the OU, was initiated in late 1996 and was completed by ABB-ES for the Navy in June 1997. The remedial design included the specifications necessary to conduct the remedial actions listed in the ROD (Bechtel, 1999).

Remedial activities began in 1998. Bechtel Environmental, Inc. (BEI) completed the excavation of contaminated surface soil from PSC 27 and contaminated surface soil and sediment from outside PSC 26 (including sediment from the unnamed tributary) in July 1998. The disposal of the excavated soil and sediment into PSC 26 was completed in July 1998. The installation of the cap and cover system at PSC 26 was completed in August 1998 (Bechtel, 1999).

The monitoring and maintenance of the landfill cap was initiated after the completion of the cap and cover system in August 1998. Starting for the year 2000, TtNUS has conducted and continues to conduct inspections of the landfill semi-annually.

The long-term monitoring program, which includes groundwater monitoring, monitored natural attenuation, and surface water sampling, is being conducted by TtNUS and was initiated in February 1999.

The institutional controls for OU 1 were developed through Land Use Control Implementation Program (LUCIP) in October 1998. A Memorandum of Agreement (MOA) between the USEPA, FDEP, and the Department of the Navy was signed on August 31, 1998. The purpose of the MOA was to ensure compliance with land use controls to protect human health and the environment from exposure to contaminated media at NAS Jacksonville. Therefore, land and groundwater use restrictions at OU 1 were identified and enforced under the guidelines of the MOA (USEPA, 1998a).

2.3.3 System Operations/Operation and Maintenance

The Navy has operated the LNAPL recovery system since July 1995. As stated in the IROD, the LNAPL recovery system was expected to operate for two years and recover approximately 5,000 to 10,000 gallons of LNAPL (ABB-ES, 1994a). During a site interview with the operator of the LNAPL recovery system, historical recovery records were obtained to estimate the total amount of recovered LNAPL. The total recovered LNAPL over the five plus years of operation is estimated to be approximately 700 gallons. These estimates are attached as Appendix D.

The Navy's original 1994 present worth cost estimate for implementation and operation of the LNAPL recovery system was approximately $621,000. The actual cost of implementation of the system and Operation and Maintenance (O&M) to date is $922,048.

The Navy has contracted with TtNUS to perform the long-term monitoring and maintenance for OU 1. The work is being conducted as directed by the ROD, the OU 1 Monitoring Plan for Selected Remedy, and the Maintenance and Monitoring Plan for OU 1. The completed activities for the long-term monitoring include the following:

- The first year of groundwater monitoring (quarterly), surface water sampling and analysis (quarterly), and quarterly reporting of results.

- The second year of semi-annual monitoring of groundwater, surface water, and reporting.

- The first two years of semi-annual inspection and maintenance of the landfill cover. The first year of inspections by BEI and the second year by TtNUS.

As stated in the ROD for OU 1 (ABB-ES, 1997) The Navy's original 1996 cost estimate for implementation of remedial action and closure of OU 1 and 30 years of long-term monitoring program (risk-reduction) was approximately $4.2 million. The actual costs of remedial actions for OU 1 are $6.1 million. The actual cost for the long-term monitoring program has not yet been tabulated since the monitoring is ongoing.

2.4 FIVE-YEAR REVIEW

2.4.1 Site Inspection and Interviews

TtNUS conducted a site inspection of OU 1, PSC 26 and 27 on December 16, 2000. The site inspection included visual observations of the landfill cover, surface water, sediment, LNAPL recovery system, fence and access gate, and groundwater monitoring wells.

The landfill cover was a mixture of grass and weeds. Visual observations of the area did not provide evidence of erosion problems, trespassing, or disturbance of the landfill. Site restrictions (i.e. fence, access gate, and signs) were in place and in good condition. Surface water and sediment were not evident in the landfill area.

A site inspection was conducted at the LNAPL recovery system, along with an interview with the environmental technician in charge of the LNAPL system. The system consists of the north and south trench, each containing a recovery system. Both systems appeared in good condition from the exterior. The fence, equipment storage sheds, and recovery sumps were in good condition and locked. Warning signs were clearly marked and in good condition. No signs of trespassing were evident and the

technician in charge of the site said that there have been no complaints, violations, or incidents. Health and safety and contingency plans were not located on site. Permits and operational records and logs were made available. There is not a continuous presence of personnel at OU 1. According to the technician in charge of the site, site visits were weekly for the first couple of years. The following two years the site visits were monthly, and last year site visits were twice per month.

The south trench LNAPL collection system was operational and working during the time of inspection. The south trench runs in a west-to-east direction and has three recovery sumps: a sump at the west end of the trench, a sump in the middle of the trench, and a sump on the south side of Child Street in the fenced in landfill area. When product is detected in the sumps, the system turns on and the product is removed by the sumps via bladder pumps and deposited in a drum. According to the technician on-site, LNAPL has not been detected or recovered from the sump at the west-end of the trench since initial system operations. LNAPL has been detected and removed from the central sump from the start date to the current time. The recovery sump in the landfill area has not had detected product for approximately one year. The three sumps discharge LNAPL into a drum stored in a fenced-in shed on site.

The north trench has two recovery sumps: one at the west-end and one in the middle of the trench. According to the site technician, LNAPL has been detected in both sumps since start up, but recovered at a slower rate than at the south trench. The north trench has not been operational since February 2000 due to damage to the control panel resulting from a compressor malfunction. LNAPL has been recovered from the north trench sumps by peristaltic pumps twice a month since the north trench system became inoperable. However, the site technician reports that they are in the process of getting the compressor and control panel for the north trench system repaired or replaced.

During the site interview and site inspection, the LNAPL product recovery logs were acquired to determine the total amount of product recovered since system start-up in June 1995. The total LNAPL recovery is discussed in the Document and Analytical Review Section.

TtNUS has conducted several site visits at OU 1 as part of the LTMP in 1999 and 2000, and landfill inspections in 2000. The site visits included groundwater and surface water sampling quarterly in 1999 and semi-annual in 2000. Two landfill inspections were conducted in 2000, and maintenance activities to repair minor erosional areas occurred in December 2000. No unusual observations were documented during these site visits. However, the NAS Jacksonville environmental department reported that during the year 2000, a cable company attempted to install a cable thorough the OU 1 area adjacent to and just north of Child Street without permission. The cable company was stopped during the initial stages of installation and the abandoned line was left in place. The landfill cover was reportedly not breached during this event.

During site visits and a meeting to discuss historical operations at OU 1, the OU 1 LUCIPs and land use control inspections were obtained. These documents are included in Appendix E. The land use for the site has remained unchanged.

2.4.2 Document and Analytical Data Review

OU 1 documents were reviewed to determine if the remedial actions were implemented as designed, to determine if any new information has come to light since that time, and to determine if the remedial actions selected are working as designed.

A review of the LUCIP Inspection Checklists for OU 1 determined that a quarterly inspection was missed for the year 2000.

LNAPL Recovery System

Documents indicating the amount of recovered LNAPL were obtained (Appendix D). It was estimated that approximately 700 gallons of LNAPL have been recovered to date. LNAPL calculations are located in Appendix F.

Historical documents pertaining to the LNAPL system were reviewed to determine if the RAOs of the IROD and ROD were being met. The one RAO developed from the IROD was to remove LNAPL from the shallow surficial aquifer at the LSA and manage it in accordance with USEPA and FDEP regulations to control a source of groundwater contamination. The LNAPL is interpreted to be a weathered petroleum waste containing greater than 50 milligrams per kilogram (mg/kg) PCBs.

The Station Public Works Center analyzes the recovered LNAPL on a yearly basis for waste characterization disposal. The LNAPL has been characterized as hazardous due to ignitability. In addition, the LNAPL has been classified as PCB contaminated waste every year except 2001, where the recovered LNAPL was characterized only as ignitable. Although the solubility of PCBs is low, the solubility does increase in the presence of organic solvents. PCBs are not currently monitored in groundwater at OU 1, and PCBs were not detected in groundwater during the RI. The groundwater and surface water criteria for PCBs are five orders of magnitude lower than the disposal requirements for PCBs.

Based on the critical threshold value of total petroleum hydrocarbons (TPH) in soil above which LNAPL could be recovered using gravity flow, an estimated volume of potentially recoverable LNAPL ranged from an estimated 5,900 to 10,200 gallons of LNAPL. It was anticipated that the LNAPL recovery system

would recover the estimated volume of LNAPL within 24 to 25 months. The LNAPL recovery system was operational on June 5, 1995. As indicated in the ROD, signed September 23, 1997, until the interim RAOs are met, the activities described in the IROD would continue in parallel with the other remedial actions at OU 1. There are no existing monitoring wells in the LNAPL source area to monitor the LNAPL plume. Therefore, TtNUS was unable to determine the amount and extent of LNAPL that is present in the subsurface, or evaluate the effectiveness of the LNAPL recovery system.

LTMP

Review of records and monitoring reports indicate that long-term monitoring through the Second Semi-Annual Sampling Report has occurred in accordance with the LTMP for OU 1. A review of these reports indicates that four quarterly long-term monitoring events were conducted in 1999 and two semi-annual monitoring events were conducted in 2000 as required by the LTMP for OU 1. Results from the most recent monitoring event (the Second Semi-Annual Monitoring Report) were reviewed and are discussed below. As part of the monitoring program, groundwater and specified surface water locations are analyzed for the COCs as indicated in the ROD. Additionally, natural attenuation parameters were monitored for each of the quarterly sampling events, and annually thereafter. The results of the groundwater chemical analysis (exceedences only) from the November 2000 Monitoring Event are shown on Figure 2-5.

The OU 1 ROD specified groundwater concentration criteria for nine groundwater COCs including the following: 1,1-dichloroethene (DCE) [7 micrograms per liter (µg/L)]; 1,2-dichloroethane (3 µg/L); cis-1,2-DCE (70 µg/L); trans-1,2-DCE (100 µg/L); benzene (1 µg/L); trichloroethene (TCE) (3 µg/L); vinyl chloride (VC) (1 µg/L); bis-(2-ethylhexyl) phthalate (6 µg/L); and naphthalene (6.8 µg/L). The groundwater COC criteria are equal to the Florida MCL for the individual parameters with the exception of naphthalene for which the criteria was equal to the Florida Groundwater Guidance Concentration (LTMP). However, bis-(2-ethylhexyl) phthalate and naphthalene were eliminated after the first year of monitoring as approved by FDEP and USEPA due to lack of detection of either constituent during the 1999 year.

The Monitoring Plan required that the total ethenes equivalent as TCE (EETCE) or TCE be graphed using a semi-logarithmic scale to show trends in specific monitoring wells (MW-18, MW-19, MW-67, MW-100, MW-101 and MW-102). Figure 2-6 is a graphical representation of the EETCE (y-axis) versus time since January 1993 (in years, x-axis). From Figure 2-6, MW-102 shows an increase in EETCE as a general trend with a recent decrease.

Review of the analytical data to date shows a general decrease in COC concentrations over the monitoring period. Exceptions to the general decrease in COC concentrations over time are monitoring wells MW-67, MW-89, and MW-97. Well MW-67 is located on the downgradient edge of the plume and

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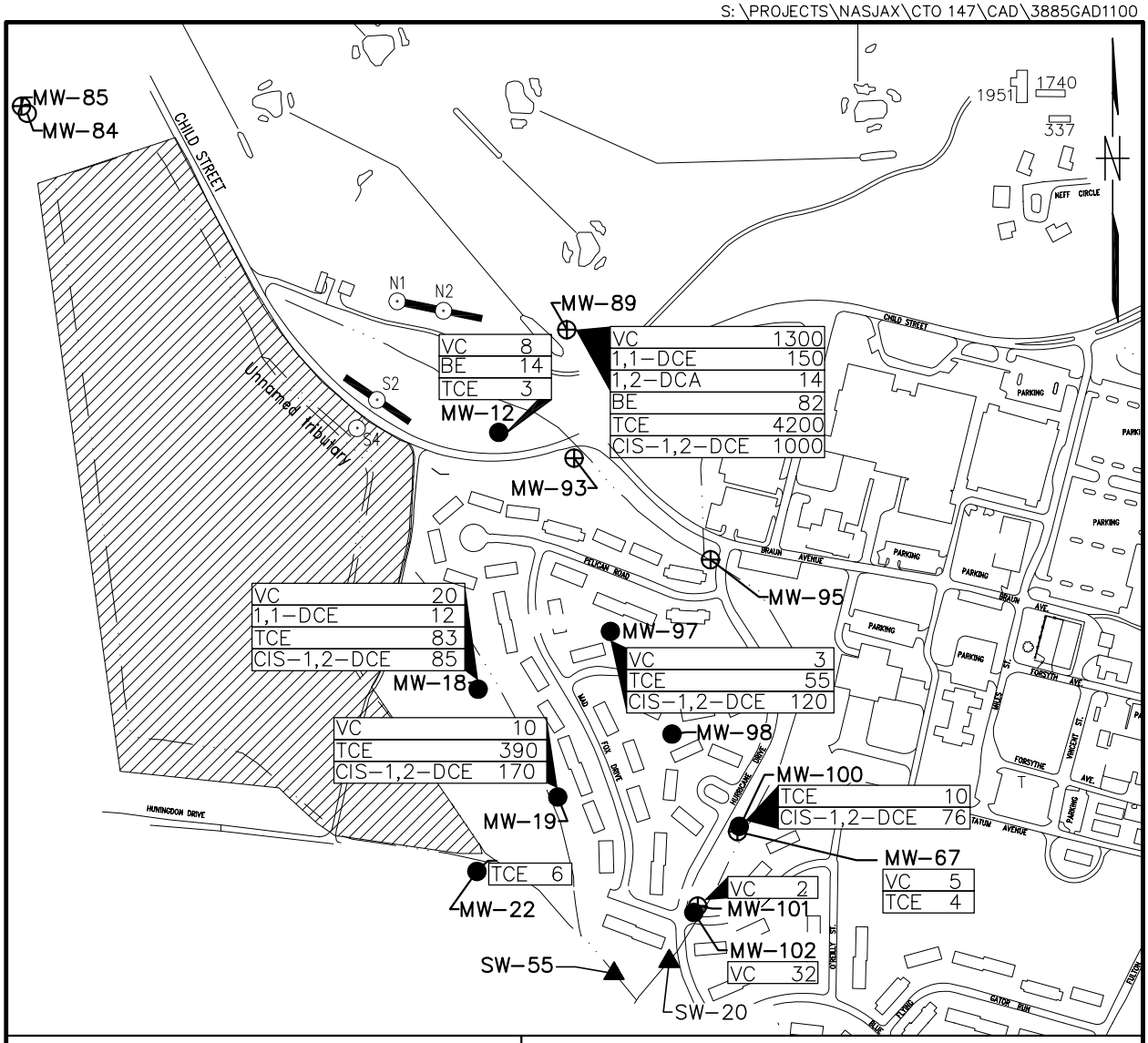


LEGEND

- DEEP WELL
- SHALLOW WELL
- INTERMEDIATE WELL
- MW-12 MONITORING WELL DESIGNATOR
- LANDFILL COVER
- SW-55 SURFACE WATER MONITORING LOCATION AND DESIGNATION
- S2 SUMP AND TRENCH FOR LNAPL COLLECTION

0 500 1000

SCALE IN FEET

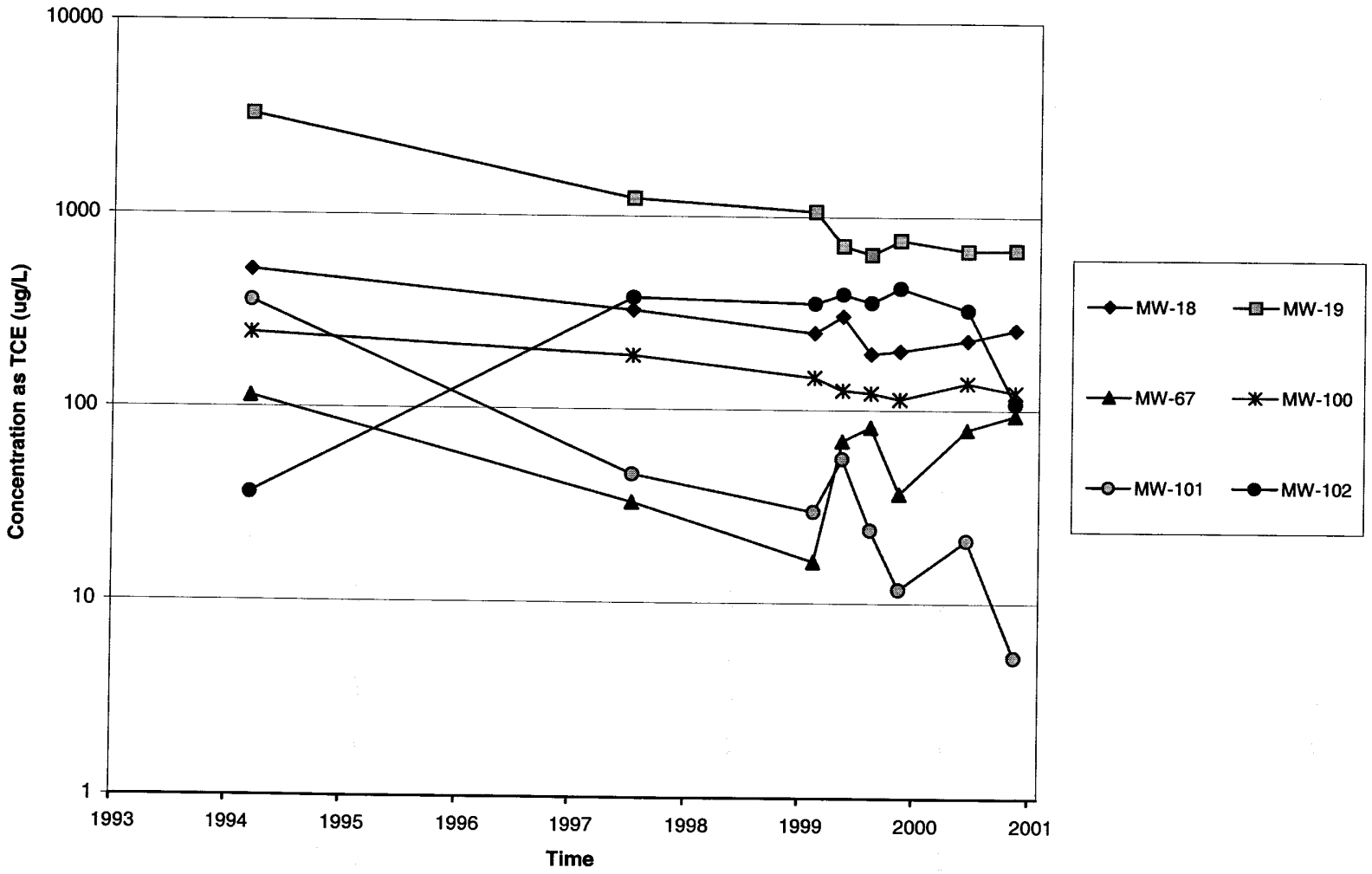
LNAPL	LIGHT NONAQUEOUS-PHASE LIQUID
NAS	NAVAL AIR STATION
VC	VINYL CHLORIDE
1,1-DCE	DICHLOROETHENE
1,2-DCA	DICHLOROETHANE
BE	BENZENE
TCE	TRICHLOROETHENE
TRANS-1,2-DCE	DICHLOROETHENE
CIS-1,2-DCE	DICHLOROETHENE

DRAWN BY CW	DATE 1/3/01	GROUNDWATER CONCENTRATIONS EXCEEDING GCTLs NOVEMBER 2000 FIVE-YEAR REVIEW OPERABLE UNIT 1 NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NO. 3885
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-5 REV. 0

DEPARTMENT OF THE NAVY ★ SOUTHERN DIV FACILITIES ENGINEERING COMMAND ★

FORM CADD NO. SDIV_AV.DWG - REV 0 - 1/20/98

FIGURE 2-6
TOTAL ETHENES IN GROUNDWATER AS TCE



the increasing concentrations in this well may represent downgradient movement of the contaminant plume. Well MW-89 is located in the LNAPL plume area east of the LNAPL recovery system, and the increasing contaminant concentrations may be a result of the operational failure of the north trench of the LNAPL recovery system. The control panel/system for the north trench of the LNAPL system has been inoperable since February 2000 and contaminant concentrations have increased since that time. MW-97 is a midpoint intermediate monitoring well located on the lateral edge of the landfill plume and the increasing concentrations in this well may represent downgradient movement of the contaminant plume (TtNUS, 2000b). TtNUS conducted a trend analysis of the COCs for select wells in the most recent monitoring report. Concentration versus time plots and analytical tables for wells MW-12, MW-18, MW-19, MW-67, MW-89, MW-97, MW-100, MW-101, and MW-102 are presented in Appendix G and are discussed herein.

The well network monitors two separate source areas consisting of the LNAPL area and a dissolved plume from the landfill area. Well MW-89 monitors the shallow zone of the aquifer in the LNAPL plume area. Well MW-12 monitors the intermediate zone between the LNAPL area and the landfill area. Well MW-18 monitors the area near the landfill. These wells contain chlorinated COCs (TCE, DCE, and VC) and benzene. A review of Appendix G figures shows general decreases in source well COC concentrations (wells MW-89, MW-12, MW-18) from year one (1994) to the beginning of year six (1999). After the beginning of year six, COC concentrations in well MW-12 have decreased slightly, while COC concentrations in well MW-18 have increased slightly. COC concentrations in MW-89 have continued to increase since year six.

Over the monitoring period, benzene concentrations in MW-12 have slightly increased. TCE concentrations have decreased, as have the concentrations of the daughter compounds, DCE and VC. VC concentrations have slightly increased since the last monitoring event.

Since June 1994, the TCE and 1,2-DCE concentrations in MW-18 show a significant decrease (50%), while 1,1-DCE and VC concentrations remain relatively consistent.

Wells MW-97 and MW-19 are intermediate midpoint wells. Since 1994, well concentrations of TCE, VC, and 1,1-DCE have been relatively constant. 1,2-DCE has decreased slightly over the same period. Well MW-97 had a spike in the TCE and 1,2-DCE concentrations in 1999. Then after a significant reduction, increased to similar concentrations in the latest sampling event. Well MW-97 is located on the lateral edge of the landfill plume and the results may be indicative of seasonal fluctuations and/or downgradient plume migration.

Concentrations in MW-89 decreased significantly between 1994 and 1999. However the sampling since early 1999 indicates that the concentrations of TCE and VC have increased to concentrations exceeding the 1994 levels. Benzene, 1,1-DCE, and 1,2-DCE have reduced concentrations over the same period. As stated earlier, it appears that the increased concentrations in well MW-89 may be related to the inoperable LNAPL collection system.

The downgradient wells are MW-67, MW-100, MW-101, and MW-102. Of the shallow wells, MW-67 shows a decrease in TCE over the period since 1994 while 1,2-DCE increased slightly and VC remained relatively constant. In the other leading edge shallow well, MW-101, TCE has not been detected during the monitoring period and 1,2-DCE has decreased significantly to below Groundwater Cleanup Target Levels. VC has also decreased in this well over the same time period. In intermediate well, MW-100, TCE and 1,2-DCE has decreased, while VC has been relatively constant at low levels. MW-102, on the other hand, has had a spike of 1,2-DCE and VC in the 1999 monitoring events, but has since returned to near 1994 concentrations. TCE and 1,1-DCE have remained consistent at very low concentrations.

The trend analysis from the most recent monitoring report suggests a conceptual model where source zone concentrations show considerable variability with data collected from the semi-annual sampling in 2000. An overall decrease in COCs continues for wells MW-12 and MW-18 from the first data collected in 1994, but concentrations have remained similar since 1999. Concentrations of COCs for well MW-89 continue to increase since 1999. Midpoint plume concentrations appear to be relatively consistent with the quarterly results of 1999. The downgradient end of the plume shows considerable variability with data collected in 2000 suggesting that a concentration front has reached the southern most well during this time. The 12 µg/L of TCE detected at the surface water sample location SW-55 indicates that the plume has reached the southernmost wells and is discharging to the creek. The current TCE concentrations detected in the southernmost wells and at SW-55 do not currently pose a significant threat to this receptor since concentrations are below the Florida Surface Water Standards (80 µg/L). The TLCA are set at the Florida Surface Water Standards and if concentrations of COCs continue to increase to levels at or above the TLCA, then the contingent actions specified in the ROD are to be implemented.

The Natural Attenuation Study at OU 1 is ongoing and results of the study will be modeled after 5 years of data. However, the preliminary information appears to indicate that reductive dechlorination via iron reduction is the preferred degradation pathway.

The LTMP for OU 1 has a contingency decision making process (see Appendix B) to assure protectiveness if groundwater monitoring indicates the potential release of COCs to the unnamed tributary. If groundwater in designated wells adjacent to the creek or surface water samples detect COCs above the established TLCA, then the contingency action occurs. A review of the TLCAs in the LTMP

indicated that 1,1-DCE, 1,2-dichloroethane, and TCE have established trigger levels. The established trigger levels for these COCs are based on the Florida Surface Water Standards for Class III freshwaters. A review of the surface water standards indicates that the trigger action level for 1,2-dichloroethane identified in the ROD and LTMP is incorrect. In addition, HLA representatives reported that the benzene freshwater standard of 71.28 µg/L annual average, was omitted as a TLCA since they didn't believe this level would be reached in the creek. The other groundwater plume COCs, which are the daughter products of trichloroethene, are not monitored in the surface water.

2.4.3 ARAR Level Changes

The following standards were identified as chemical-specific ARARs in the ROD. They were reviewed for changes that could affect protectiveness:

- Clean Water Act Regulations, Ambient Water Quality Criteria (40 CFR Part 131)
- Florida Surface Water Standards, FAC, Chapter 62-302, August, 1994
- Groundwater Classes, Standards, and Exemptions, FAC, Chapter 62-520, October 1994
- Florida Water Quality Based Effluent Limitations, FAC, Chapter 62-650, November, 1989

The Florida Surface Water Standards, FAC, Chapter 62-302, were updated in December 1996. The trigger action levels for contingent action at OU 1 are the Florida surface water standards for Class III freshwaters. The trigger action concentrations have remained unchanged for the three COCs with established levels. However, the ROD and the Long Term Monitoring Plan for OU 1 did not specify monitoring for benzene and establish a TLCA for benzene in surface water, although benzene has an established surface water concentration (71.28 µg/L, annual average) for Class III freshwater.

There are additional ARARs from the promulgation of the FDEP regulations [FAC, Chapter 62-777, Contaminant Cleanup Target Levels (CCTLs) Rule and FAC, Chapter 62-785, Brownfields Criteria Rule]. These new rules, although not applicable, may be relevant and appropriate. These new CCTLs rely upon health-based risk assessments. These new ARARs will not affect the protectiveness for groundwater because the new clean-up target levels default to Florida MCLs 62-550 and are the same as the established MCLs for OU 1. The only change is for naphthalene, which is not being monitored due to non-detect concentrations in the groundwater at OU 1 monitoring wells. The established criterion for naphthalene is less than the criterion established in FAC, 62-777. Surface water criteria were developed for many constituents without quantitative values in FAC, 62-302. This rule established criteria for constituents detected in groundwater, but not analyzed in surface water. Reportedly the limited list of analytes for surface water was due to not having established ARARs for these compounds. The following compounds have criteria listed in FAC, 62-777:

trans-1,2-dichloroethene	11,000 µg/L (Toxicity Criteria)
1,2-dichloroethane	5 µg/L (Human Health)

Where:

The toxicity criteria are 1/20 of the applicable LC50 data.

During conversations with the FDEP, they stated that this rule should not be considered for our site at this time. It should be re-evaluated during the next five-year review.

The only location-specific ARAR for OU 1 is the Endangered Species Act, which has remained unchanged. The action-specific ARARs for OU 1, governing actions such as the construction of landfills, have not changed since the signing of the ROD. These requirements are called for by the RCRA.

2.5 ASSESSMENT

The following conclusions support the determination that the remedy at OU 1 is expected to be protective of human health and the environment.

Question A: Is the remedy functioning as intended by the decision documents?

- ***Health and Safety Plan (HASP)/Contingency Plan:*** A HASP and a maintenance and monitoring plan are in place for the OU 1 landfill and post-closure monitoring, sufficient to control risks, and properly implemented. A HASP and a Contingency Plan are not in place for the LNAPL recovery system.

- ***Implementation of Institutional Controls and Other Measures:*** Institutional controls are in place as part of the LUCIP at NAS Jacksonville. There are no known current or planned land use change at this time that would render the LUCIPs ineffective. OU 1 is inspected quarterly to insure the controls remain in place. The fence and signs on site are maintained and in good condition. No water supply wells are allowed in the restricted area. A quarterly inspection in the Year 2000 was not performed. The Facilities Officer did not sign one of the year 2000 quarterly inspections.

- ***Remedial Action Performance:*** The landfill cover system appears effective at isolating waste and contaminants. The long term monitored natural attenuation plan with contingency actions is effective for monitoring site conditions. These factors indicate that the remedial actions continue to be effective. As previously discussed the north trench of the LNAPL recovery system is not functional at

this time. The south trench of the LNAPL recovery system continues to operate and LNAPL continues to be removed, although at a slower rate than expected. Since there is no available method for determining if the RAO is being achieved, it is not possible to determine if the systems need repair or redesign.

- ***System Operations/O&M:*** System operations of the LNAPL recovery system have not operated as designed. The system has not recovered the LNAPL to the extent expected. One sump in the south trench has not collected LNAPL since the start-up of the system. The north trench recovery system has been not been operating as designed for a little more than a year. The landfill cap and monitoring wells are in good condition and maintained.

- ***Cost of System Operations/O&M:*** As noted above in Section 2.3.3, costs, for the most part, have been within the acceptable range. Costs have been higher with the LNAPL Recovery System because the system has operated longer than expected.

- ***Opportunities for Optimization:*** The LNAPL recovery system has recovered LNAPL at a rate much lower than expected, and the control panel system for the north trench is inoperable. There are no monitoring wells in the LNAPL source area to determine the extent of LNAPL that remains. An investigation in the LNAPL source may help determine the extent of LNAPL remaining, and determine if repairing or upgrading the LNAPL recovery system would increase source area recovery operations.

COCs (TCE, 1,2-DCE, and 1,1-DCE) in monitoring well MW-89 have increased to concentrations greater than detected during the RI. Due to these increased concentrations, supplemental investigations in the area of MW-89 are warranted to evaluate the extent of the chlorinated plume.

- ***Early Indicators of Potential Remedy Failure:*** One early indicator of potential remedy failure was noted during this review. The LNAPL recovery system has not obtained the RAO in the expected timeframe. Costs and maintenance activities have been consistent with expectations considering the additional time of operation of the LNAPL recovery system, but are approximately 50 percent greater than predicted.

Question B: Are the assumptions used at the time of remedy selection still valid?

- ***Changes to Standards and To Be Considered:*** This five-year review identified State Risk Action Levels that had been promulgated since the ROD was signed. According to Jorge Caspary of FDEP, these FDEP standards, listed in FAC, 62-777, do not need to be considered for this review.

- ***Changes in Exposure Pathways:*** No changes in the site conditions that affect exposure pathways were identified as part of the five-year review. First, there are no current or planned changes in land use. Second, no new contaminants, sources, or routes of exposure were identified as part of this five-year review. Finally, there is no indication that hydrologic/hydrogeologic conditions are not adequately characterized.

- ***Changes in Toxicity and Other Contaminant Characteristics:*** Toxicity and other factors for contaminants of concern have not changed.

- ***Changes in Risk Assessment Methodologies:*** Changes in risk assessment methodologies since the time of the ROD do not call into question the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has been identified that would call into question the protectiveness of the remedy.

2.6 DEFICIENCIES

Deficiencies were discovered during the five-year review and are noted in Table 2-5. None of these are sufficient to warrant a finding of not protective as long as corrective actions are taken.

TABLE 2-5
OU 1 Deficiencies

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Deficiencies	Currently Affects Protectiveness (Y/N)
Systems Operation	
1. Operation failure of North Trench LNAPL recovery system control panel. 2. Recovery of 700 gallons vs. predicted 10,000 gallons of LNAPL. 3. LNAPL system operational time 5.5 years versus a projected time of 2 years. 4. LNAPL RAO not adequately defined 5. Spike in COC concentrations in MW-89 in recent monitoring event. 6. Insufficient standards for COCs in surface water.	N
Land Use Controls	
1. Missed LUCIP quarterly inspection for the year 2000. 2. Attempted television cable installation at OU 1.	N
HASP	
No HASP for LNAPL Recovery System	N

2.7 RECOMMENDATIONS AND REQUIRED ACTIONS

The recommendations and follow-up actions are outlined in Table 2-6.

TABLE 2-6

OU 1 Recommendations and Required Actions

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Deficiencies	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Follow-up Actions: Affect Protectiveness (Y/N)
System Operations-LNAPL Recovery (inability to determine if RAO is achieved)	Perform phased assessment of extent of LNAPL, including the analysis of PCBs. End result is to determine whether the RAOs have been achieved, require modification, and the fate of the recovery system.	Navy	6 Mar 05	N
System Operations – LNAPL Recovery (North trench control panel failure)	Repair/replace north trench control panel.	Navy	31 Dec 02	N
System Operations – LNAPL Recovery (PCB concentrations in investigation derived waste vs. no dissolved phase monitoring for PCBs)	Perform a round of PCB analyses to determine if they have become a COC for groundwater or surface water.	Navy	31 Dec 02	N
System Operations - LTMP (spike of COCs in MW-89)	Investigate the reason why COCs have increased in MW-89.	Navy	6 Mar 05	N
System Operations - LTMP (benzene omitted from surface water COC list)	Add monitoring for benzene in surface water and establish a TLCA for benzene.	Navy	31 Dec 01	N
Missed LUCIP Inspection	Inspect OUs quarterly as agreed upon with MOA between EPA and FDEP	Navy	31 Dec 01	N
- -	Add monitoring of TCE daughter products in surface water for information for the five-year modeling assessment. Establish TLCAs for COCs as deemed appropriate by the partnering team.	Navy/ Partnering Team	20 Jun 01	N
- -	Remove TLCA for 1,2-dichloroethane since there is not a surface water standard for this constituent.	Navy	31 Dec 01	N

The NAS Jacksonville Partnering Team has agreed that although the HASP and Contingency Plan for the LNAPL recovery system were absent, they are not necessary and no recommendations are suggested for this deficiency.

During this five-year review it was difficult to determine the extent of LNAPL located in the subsurface due to a lack of monitoring wells in the LNAPL source area. Therefore, the effectiveness of the LNAPL recovery system was unable to be determined. It was agreed upon by the NAS Jacksonville Partnering Team that a phased approach be implemented to evaluate the current LNAPL thickness at OU 1. An investigation may include a direct-push technology investigation or membrane interface probe (MIP) technology and the installation of monitoring wells. During this investigation soil and groundwater samples will also be analyzed for PCBs. After the thickness and extent of LNAPL is determined, recommendations can be made to determine if the recovery system requires modifications, or if the system can be removed. After the investigation is complete, if it is determined that the RAO for LNAPL recovery has been met, then an exit strategy will be devised. If the RAO is not being met, then an evaluation of the system should be conducted to determine how to meet the existing or new RAOs for the LNAPL source area. The recommended conceptual approach to addressing this issue is as follows:

- Free product characterization.
- Install wells strategically.
- Evaluate system effectiveness.
- Amend or develop new RAOs for LNAPL reduction, if required.
- Establish recommendations for continued operation of the existing system or a re-design.

Due to the systems operation failure of the control panel for the north trench, it is recommended that the control panel be repaired or replaced. The repair of the control panel will result in the recovery of additional LNAPL until the entire remedial system is assessed and modified.

As a result of the spike in COCs in monitoring well MW-89, it is recommend that an investigation and/or assessment be performed to determine the cause of the spike, and determine if the spike is a continuing trend or a unique occurrence.

During this five-year review it was determined that some groundwater COCs are not monitored in the surface water. Specifically, benzene and certain daughter products of TCE are not analyzed in the surface water and TCLAs are not established for these compounds. To assure the protectiveness of human health and the environment it is recommended that all COCs that are currently monitored in the groundwater program also be monitored in the surface water. Additionally, it is recommended that TCLAs

should be established for the COCs in surface water as deemed appropriate by the NAS Jacksonville Partnering Team.

During this five-year review it was determined that some LUCIP inspections were missed and a cable company attempted to install a cable through the OU 1 area. It is recommend that to assure institutional controls are adequate, that all OUs at NAS Jacksonville be inspected quarterly as agreed upon with the MOA between NAS Jacksonville and the EPA and FDEP.

2.8 PROTECTIVENESS STATEMENT

The remedy at OU 1 remains protective of human health and the environment. The implementation of the LTMP and institutional controls (LUCIPs) provide a degree of protection of human health and the environment.

The remedial actions for the source control alternative are being implemented as designed with the exception of the trench construction. This deviation from the design was presented and approved by the Partnering team. Although the system is currently partially inoperable, the other portion of the LNAPL recovery system provides a reduction in source contaminants. In addition, the groundwater monitoring downgradient of the LNAPL area maintains that the remedy is still protective.

The LTMP has been implemented as designed. The continued monitoring in connection with the contingency clause are protective of human health and the environment.

Based on the completed activities and the activities that are underway or planned, the intent and goals of the ROD for OU 1 have or will be met.

3.0 OPERABLE UNIT 2, PSC 3, PSC 4, PSC 41, PSC 42, AND PSC 43

Implementation of the remedial actions at OU 2, the Wastewater Treatment Area, began in 1994. This five-year review consists of a seven-year period of data. The risks posed by the PSCs at OU 2 were addressed through interim remedial actions. The ROD for OU 2, which was signed in 1998, specified that No Further Action (NFA) was required except for the implementation of land use controls restricting groundwater use and land use at OU 2. This action was contingent on the RCRA groundwater monitoring program at PSCs 41, 42, and 43.

This five-year review is being conducted for OU 2 because contaminated subsurface soil and groundwater are still contained on site and do not allow for unlimited use and unrestricted exposure. This review is being conducted for OU 2 by statute because hazardous substances remain on site at levels that will not allow unlimited use and unrestricted exposure.

The former Fire-fighting Training Area (PSC 2) is located within OU 2. Previous burning of fuels within an unlined pit, located at the training area, affected the soil quality at PSC 2. Although this site is located within the area designated as OU 2, due to the presence of LNAPL and petroleum related contaminants, and based on the CERCLA petroleum exclusion, PSC 2 was transferred to the State's petroleum program prior to the signing of the ROD (HLA, 1998). Therefore, PSC 2 is not reviewed as part of this five-year review.

3.1 HISTORY AND SITE CHRONOLOGY

A list of significant OU 2, PSC 3, PSC 4, PSC 41, PSC 42, and PSC 43 historical events and relevant dates in the site chronology is provided in Table 3-1 below. The identified events are illustrative, not comprehensive.

TABLE 3-1
OU 2 Site Chronology

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Event	Date
PSC 2 - 6,000 gallons of jet fuel and waste oil were burned annually.	1966 to 1991
PSC 3 – 20,000 tons of sludge containing metals were dumped.	1962 to 1980
PSC 4 – Used for disposal of paint shavings, sewage sludge, asbestos, oil, and petroleum products.	1968 to 1975
PSC 41 – waste sludge drying beds received sludge from wastewater treatment plant (WWTP).	1970 to 1980
PSC 42 – WWTP effluent polishing pond operational.	1970 to 1987
PSC 43 – industrial waste sludge drying beds operational.	1980 to 1988
PSCs 2, 3, and 4 were identified as potential sources of contamination.	1983
Compliance monitoring at PSCs 41 and 42 detected contamination.	1991
PSC 4 grouped into OU 2.	1992
Focused RI/FS for PSCs 2, 41, and 43.	1994
IROD for PSCs 2, 41, and 43.	1994
Focused RI/FS for PSCs 3 and 42.	1995
IROD for PSC 42.	1995
Completion Report for PSC 2.	1996
Certification and Closure Report for PSC 41.	1997
Certification and Closure Report for PSC 42.	1997
Certification and Closure Report for PSC 43.	1997
Remedial Investigation for OU 2.	1998
Record of Decision for OU 2.	October 1998

3.2 BACKGROUND

A generalized map of NAS Jacksonville showing the location of OU 2 in the northwestern portion of the facility is provided on Figure 1-1. A map of OU 2 showing the relative locations of the PSCs is provided on Figure 3-1.

PSC 3 –WWTP Former Sludge Disposal Area

The former sludge disposal area for the WWTP is approximately 15 acres in size, where domestic and industrial sludge containing organic and inorganic materials were disposed between 1962 and 1980. In

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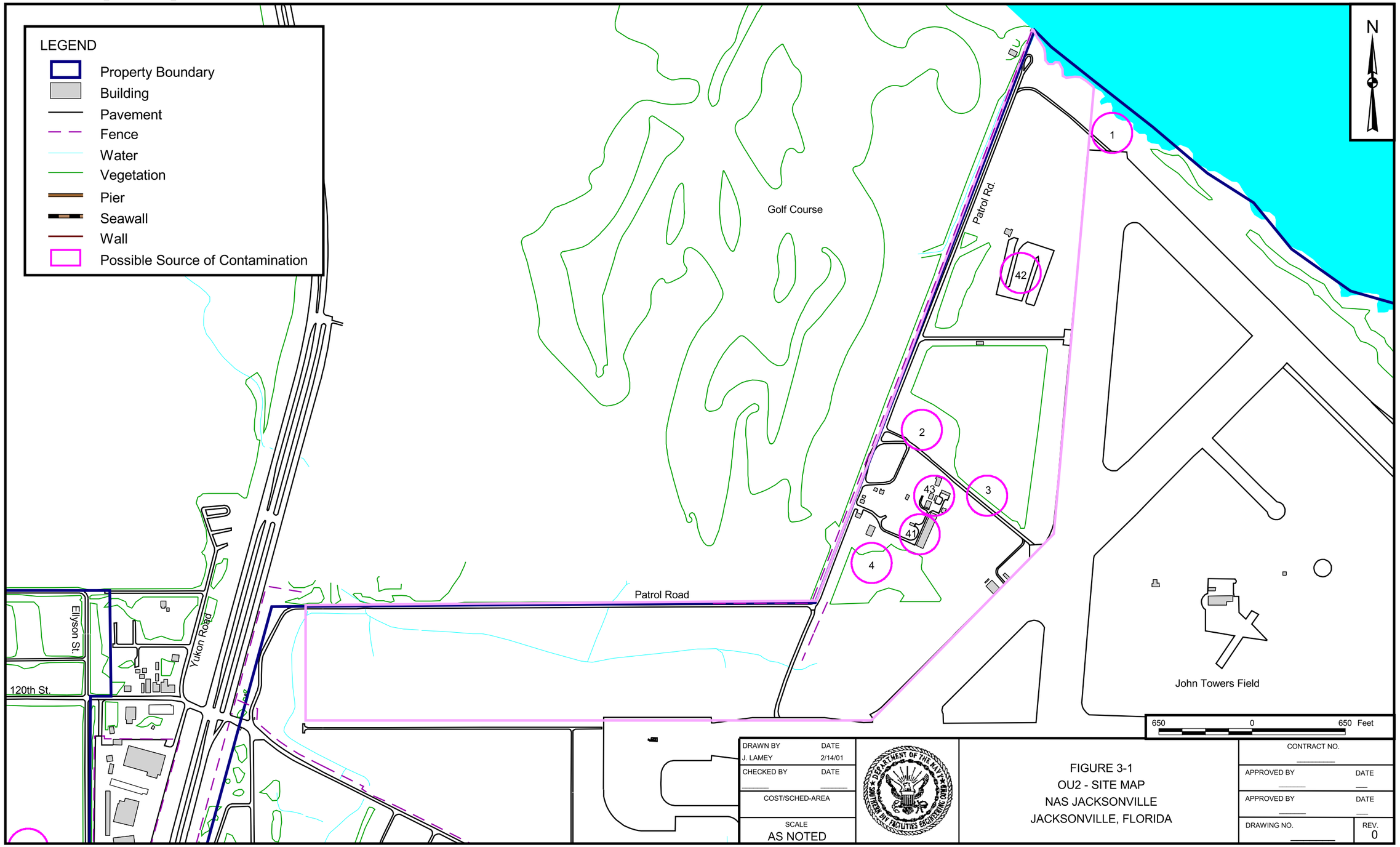

DRAWN BY / DATE	J. LAMEY 2/14/01
CHECKED BY / DATE	
COST/SCHED-AREA	
SCALE	AS NOTED

FIGURE 3-1
OU2 - SITE MAP
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO.	
APPROVED BY / DATE	
APPROVED BY / DATE	
DRAWING NO.	REV. 0

1991, various waste materials were identified including inorganics, VOCs, and semivolitile organic compounds SVOCs. Apparent sludge disposal practices and stressed vegetation indicated contaminants were potentially present in the soil. Although no monitoring wells were installed at PSC 3, groundwater samples from PSC 41 near PSC 3 indicated the presence of inorganic and organic contaminants in the groundwater near the WWTP. Investigations at PSC 41 indicated that the contamination detected in the groundwater at PSC 41 may have been a result of migration from PSC 3, but could not be confirmed. Groundwater was further characterized at OU 2 through semi-annual monitoring at the sludge drying bed area. An RI was performed to address environmental concerns at OU 2. A focused RI at PSC 3, completed in 1993, indicated soil contamination from VOCs and SVOCs was not extensive and no PCB compounds were detected. Pesticide analytes were consistent with existing stationwide background samples that were attributed to past stationwide pest control practices rather than past sludge disposal practices. The five inorganic compounds (metals) found at PSC 3 were attributed to past sludge disposal practices since these metals were known to have been used in the plating shops that discharged to the WWTP. Although contaminants were identified, the focused risk evaluation indicated that contaminants were not at unacceptable levels and did not suggest the need for remedial action or source removal. Surface soil around one area at PSC 3, where lead exceeded the guidance cleanup goals, was removed in 1997 (ABB-ES, 1998). The RI for OU 2 was completed in 1998. The ROD was signed in 1998, which specified that NFA was required at PSC 3 except for the implementation of land use controls restricting land and groundwater use at OU 2.

PSC 4 – Pine Tree Planting Area

The Pine Tree Planting Area located south of the WWTP was used for disposal of WWTP sludge, asbestos, oil, and other petroleum products from 1968 to 1975. Inspections of the area in 1983 reported visual evidence of contamination such as paint shavings and WWTP sludge. In 1985, three temporary monitoring wells were installed to confirm whether or not leachate containing heavy metals was contaminating the groundwater. Trace concentrations of organic and metals contaminants were detected in the groundwater.

In 1991, PSC 4 was grouped into OU 2 and a RI was conducted in 1992. Soils samples were collected throughout PSC 4 and laboratory testing indicated no significant VOCs or SVOCs were detected. Pesticide analytes were consistent with existing stationwide background samples that were attributed to past stationwide pest control practices. Because of metal concentrations, sludge piles and soil surrounding one soil sampling location were removed in 1997 (HLA, 1998). The RI for OU 2 was completed in 1998. The ROD was signed in 1998 and specified that NFA was required at PSC 4 except for the implementation of land use controls for land and groundwater use at OU 2.

PSC 41 – Domestic Waste Sludge Drying Beds

The Domestic Waste Sludge Drying Beds were constructed in 1970 to receive sludge from the anaerobic digester at the WWTP. Prior to the construction of the Industrial Waste Sludge Drying Beds (PSC 43) in 1980, sludge from the industrial wastewater treatment operations was channeled to the Domestic Waste Sludge Drying Beds. In 1984, four shallow monitoring wells were installed. Groundwater samples were collected and analyzed from 1984 to 1991 as part of the Quarterly Compliance Monitoring Program for RCRA compliance. Based on historical data, it was concluded that the bulk of the sludge channeled to the drying beds apparently originated from paint-stripping operations with lesser contributions from the plating and metal-treating shops. Fourteen contaminants listed in Appendix IX (40 CFR 261) were detected in groundwater samples. The USEPA classified the domestic Waste Sludge Drying Beds as a surface impoundment operated to treat hazardous wastes F006 and F019. PSC 41 was also used to store sludge from electroplating operations, wastes from paint stripping and parts cleaning operations (F001 through F005), and sludge from the anaerobic digester of the domestic WWTP. During its operations, an average of 170 gallons per day of dewatered sludge from PSC 41 was disposed at an off-site landfill. The drying beds were removed from service in 1987.

In 1988, the FDEP issued a consent order to NAS Jacksonville indicating the station was out of compliance with Permit Number H016-119108 based on hazardous constituents found in groundwater. The consent order mandated corrective actions. In 1989, additional wells were installed and sampled to characterize groundwater beneath PSCs 41 and 43. The results indicated that groundwater flow was to the northeast with a mounding effect near the beds. Groundwater sampling results indicated groundwater contamination from VOCs, SVOCs, and metals in both shallow and deep monitoring wells. In 1991, the FDEP issued a Closure permit for closure and post-closure of PSCs 41, 42, and 43.

The Interim Remedial Action (IRA) for source control at PSC 41 was to excavate and treat the sludge drying bed material and hazardous debris on-site by stabilization and solidification, then backfill with the treated material, and to dispose of non-hazardous debris offsite. Soil and filter media from the ground surface down to the water table were excavated and stabilized. Stabilized materials from PSC 41 and PSC 43 were used to backfill the excavation at PSC 41. In 1997, the stabilized and solidified sludge and soil materials were excavated from PSC 41 and incorporated as backfill at PSC 42. Radiological surveys conducted in 1995 indicated that the PSCs were free of radiological contaminants (ABB-ES, 1998). The RI for OU 2 was completed in 1998. The ROD was signed in 1998 that specified that NFA was required except for the implementation of land use controls and monitoring under the RCRA program until cleanup is achieved.

PSC 42 – Effluent Polishing Pond

The WWTP Effluent Polishing Pond built in 1970 provided final clarification for approximately 2.3 million gallons per day of combined domestic and industrial treated effluent prior to chlorination and discharge to the St. Johns River. In 1983, the USEPA classified the Polishing Pond as a surface impoundment to treat RCRA hazardous wastes F001 through F006 and F019 (toxic hazardous wastes from non-specified sources). In 1984, three monitoring wells were installed around the Polishing Pond for quarterly monitoring. In 1985, a compilation of quarterly monitoring results indicated that the analytes were below primary drinking water standards with the exception of iron, TPH, chloromethane, and 1,1,1-trichloroethane. Additional monitoring wells were installed and sampled in 1987. Results from wells surrounding the WWTP indicated that 14 analytes were above permit criteria.

In June 1987, the FDEP authorized Permit Certification Number H016-119108. Included in the environmental compliance requirements of the permit was that NAS Jacksonville stop adding wastes to the designated surface impoundments including the Polishing Pond. In anticipation of this requirement, the Polishing Pond was permanently removed from service on May 23, 1987.

Post closure monitoring reports summarized in 1991 indicated that contamination was detected at concentrations above background concentrations in the shallow aquifer wells. One plume previously identified at PSC 42 had migrated from its originally delineated location. In June 1991, six additional wells were installed. Continued post-closure monitoring revealed that groundwater flow around PSC 42 had changed as a result of dewatering and construction in the area since 1991.

In 1992, PSC 42 was included in the RI/FS for OU 2. In 1993, PSC 42 was included in a fisheries investigation. No fish were collected or observed. Some vegetation was observed and the pond provided habitat for some birds and mammals. Surface water sampling results indicated contamination of six inorganic analytes in excess of the Federal Ambient Water Quality Criteria and Florida Surface Water Standards. Sediment sample results indicated contamination of 18 inorganic analytes exceeding the EPA Sediment Quality Criteria or the National Oceanic and Atmospheric Administration (NOAA) Effects Range for Sediments.

In 1995, the IROD, implemented in 1996-1997, selected a source control alternative that included dredging the sediment, on-site stabilization, and on-site redeposition of treated material. During that time, the pond was dewatered and the water was treated prior to discharge to the St. Johns River. Following the dewatering operations, the sediment in the pond was solidified in place. Stabilized soil and filter material from PSCs 41 and 43 and sludge and soil from PSCs 3 and 4 were incorporated into the stabilized pond. The area was then graded and covered with clean soil and grass. Radiological surveys conducted in 1995 indicate that the PSCs are free of radiological contaminants (ABB-ES, 1998). The RI

was completed for OU 2 in 1998. The ROD was signed in 1998, which specified that NFA was required except for the implementation of land use controls and monitoring under the RCRA program until cleanup is achieved.

PSC 43 – Industrial Waste Sludge Drying Bed

The Industrial Waste Sludge Drying Beds were constructed in 1980 to dewater industrial wastewater treatment sludge from electroplating operations. Between 1980 and 1988, approximately 8,250 gallons of dried sludge was excavated and removed from the surface impoundment annually. The drying beds were removed from service in 1988.

In 1984, four shallow monitoring wells were installed. Groundwater samples were collected and analyzed from 1984 to 1991 as part of the Quarterly Compliance Monitoring Program for RCRA compliance. Based on historical data, it was concluded that the bulk of the sludge channeled to the drying beds apparently originated from paint-stripping operations with lesser contributions from the plating and metal-treating shops. Fourteen contaminants listed in Appendix IX (40 CFR 261) were detected in groundwater samples. The USEPA classified the industrial Waste Sludge Drying Beds as a surface impoundment operated to treat hazardous wastes F006 and F019. PSC 43 was also used to store sludge from electroplating operations, wastes from paint stripping, and parts cleaning operations (F001 through F005).

In 1988, analytical results from groundwater monitoring wells indicated that several inorganic and some organic compounds exceeded the USEPA Groundwater Protection Standards. In June 1988, the FDEP issued a consent order to NAS Jacksonville stating the station was out of compliance with Permit Number H016-119108 based on hazardous constituents found in groundwater. The consent order mandated corrective action including preparation of a closure plan for PSC 43. In response, NAS Jacksonville developed a closure plan for PSCs 41, 42, and 43. In 1989, additional wells were installed and sampled to characterize the plume beneath PSCs 41 and 43. The results indicated that groundwater flow was to the northeast with a mounding effect near the beds. Groundwater sampling results indicated that VOCs, SVOCs, and inorganics contamination in both shallow and deep monitoring wells. In 1991, the FDEP issued a Closure permit for closure and post-closure of PSCs 41, 42, and 43.

The IRA for source control at PSC 43 was to excavate and treat the sludge drying bed material and hazardous debris on-site by stabilization and solidification, then backfill with the treated material and to dispose of non-hazardous debris off site. Soil and filter media from the ground surface to the water table were excavated and stabilized. Stabilized materials from PSCs 41 and 43 were used to backfill the excavation at PSC 41. The PSC 43 excavation was backfilled with clean soil materials. In 1997, the stabilized and solidified sludge and soil materials were excavated from PSC 41 and incorporated as backfill into the IRA at PSC 42. Radiological surveys conducted in 1995 indicate that the PSCs are free

of radiological contaminants (ABB-ES, 1998). The RI for OU 2 was completed in 1998. The ROD was signed in 1998, which specified that NFA was required except for the implementation of land use controls and monitoring under the RCRA program until cleanup is achieved.

3.3 REMEDIAL ACTIONS

3.3.1 Remedy Selection

Investigations at OU 2 prior to the ROD indicated the presence of soil, groundwater, surface water, and sediment contamination resulting from past disposal practices. IRAs were completed prior to the ROD for OU 2 for PSCs 41, 42, and 43. In addition, "hot spot" soil removals were completed at PSCs 3 and 4. The RI for OU 2 was completed in 1998 and the ROD for OU 2 was signed in October 1998. In the ROD it stated that because the source of contamination at OU 2 was removed during IRAs, contamination in the groundwater was expected to decline over time. Therefore, as stated in the ROD, the Navy, USEPA, and FDEP decided that the site conditions, Risk Assessment (RA) results, and regulatory requirements (ARARs) did not warrant establishing RAOs for OU 2 (HLA, 1998).

It should be noted that in the Declaration of the Record of Decision Section 1.0 of the ROD it states "Because PSCs 41, 42, and 43 are all classified as RCRA sites, they require a period of groundwater monitoring. The Navy, USEPA, and FDEP agreed that a post-closure monitoring program of 2 to 3 years, combined with groundwater data collected over the last decade, would meet the requirements of the RCRA. The groundwater monitoring data will be used to determine if there are any significant changes in chemical levels that could potentially impact human health and the environment over time." Section 2.7 Description of the No Action Alternative states "However, PSCs 41, 42, and 43 have all been classified as RCRA units and require post-closure monitoring of groundwater until standards are achieved. An abbreviated monitoring program of two to three years is believed to meet such requirements. Should groundwater standards not be achieved in that time frame, groundwater will continue to be monitored as per RCRA instructions" (HLA, 1998). This is significant because the assumption in the ROD expected groundwater contaminants to be below MCLs in 2 to 3 years, and some groundwater contaminants are still above MCLs.

Based on the risk assessment from the RI, no unacceptable human health or ecological risks were identified at OU 2 with the implementation of land use controls at OU 2 to control groundwater use. In addition, it required post-closure monitoring at PSCs 41, 42, and 43 until standards are achieved under the RCRA program. Language in the ROD stated that an abbreviated monitoring program of two to three years was implemented to meet the requirements. A contingency clause of continued groundwater

monitoring per RCRA instruction was to be implemented if groundwater standards were not met by that time.

3.3.2 Remedy Implementation

The ROD selected remedy for OU 2, based on results of the RI and RA, determined that the preferred remedial action at OU 2 was implementation of LUCIPs and RCRA monitoring of the groundwater plume associated with PSCs 41, 42, and 43. The remedy was selected for OU 2 because remedy implementations for OU 2 were completed through IRAs at PSCs 3, 4, 41, 42, and 43, and PSC 2 was transferred to the underground storage tank program.

Interim Remedial Actions at PSCs 3 and 4

Approximately 20 cubic yards (yd^3) of previously dried sludge was transported to PSC 42 from surface layers and piles identified at PSCs 3 and 4, the wastewater treatment plant sludge disposal areas.

Paint chips, observed in the shallow surface soil during the first phase of the RI, confirmed that sludge was disposed at PSC 3. Of the two parcels of land at PSC 3, only the southern one (Parcel 2) appears to have been utilized for sludge disposal. Although risks were not expected from exposure to soil at PSC 3, there were concerns about the exceeded guidance cleanup goals for lead detected in one surface soil sample location at Parcel 2 (HLA, 1998). Metals concentrations in this sample were also much higher than those detected in other PSC 3 samples. Because of these concerns, soil around this sample was removed in January 1997 and incorporated into the ongoing IRA at PSC 42.

Sludge piles and a sludge layer containing paint chips were discovered at PSC 4 during the first portion of the RI for OU 2. Samples of the sludge material were collected and analyzed in 1995 during the OU 2 RI/FS sampling program. Samples from the piles contained high metal concentrations that further indicated that the piles consisted of sludge from the WWTP. Soils from the sludge disposal areas were contaminated with RCRA-listed hazardous wastes having the same waste codes and source (F006 and F019) as sludge at PSCs 41, 42, and 43. Because of the metals concentrations, the piles were removed in January 1997 along with soil surrounding one sampling location in the same area as the piles. Five piles of contaminated sludge material were removed from PSC 4. Waste sludge material collected from PSCs 3 and 4 were placed into the dewatered cells at PSC 42 and stabilized (i.e., treated) during the ongoing IRA at PSC 42 during that time.

Interim Remedial Actions at PSCs 41 and 43

Remediation of contaminated materials at PSCs 41 and 43 was conducted simultaneously, due to their proximity to each other (less than 200 yards apart), the same types of media being treated, similar COCs,

and ultimately the same original source. COCs for PSC 41 and PSC 43 were identified as arsenic, cadmium, chromium, and nickel. According to the completion report (ABB-ES, 1997e &1997f), remedial activities at PSC 41 and PSC 43 were conducted in two phases.

Phase One, conducted between March and October 1995, included excavation and on-site stabilization of contaminated media (sludge/soil) from PSCs 41 and 43. Stabilized materials were temporarily stored in the excavated area of PSC 41 until the second phase of site remediation could be completed.

After contaminated media from PSCs 41 and 43 had been stabilized, samples of the treated material were collected and analyzed to verify that stabilized material had met the criteria listed below.

- Unconfined compressive strength (UCS) equal to, or greater than, 30 pounds per square inch (psi) after 14 days of curing.

- Toxicity Characteristic Leaching Procedure (TCLP) extract concentrations at or below the following concentrations for the five metals identified below.

Arsenic	5.0 milligrams per liter (mg/L)
Cadmium	0.19 mg/L
Chromium (total)	0.86 mg/L
Nickel	5.0 mg/L
Lead	0.37 mg/L

Selection of metals used as stabilization criteria for PSCs 41 and 43 was based on results of the risk evaluation for both PSC 41 and 43. The total volume of stabilized material from the IRAs at both PSC 41 and PSC 43 was approximately 2,795 yd^3.

Phase two of the IRA was initiated in January 1997. The treated sludge material from PSCs 41 and 43 was excavated from PSC 41 and incorporated into the backfill used during completion of the IRA at PSC 42. Stabilized material at PSC 41 was excavated to the depth of the sand and plastic layer placed at the bottom of the original 1995 excavation. The total volume of stabilized material and native soil overcuts removed from PSC 41 was approximately 3,000 yd^3. The excavated materials from PSC 41 was spread onto stabilized portions of PSC 42 and used as backfill. After stabilized/solidified material at PSC 41 was excavated for transfer to PSC 42, sampling of the excavation boundary was conducted. The confirmatory sampling indicated the exceedence of only one COC (Nickel). After the solidified/stabilized material had been excavated from PSC 41 and sidewall samples had been collected, analyzed, and accepted, the excavation was backfilled to grade. After compaction testing and verification

of the backfill had been completed, site restoration was completed by hydroseeding the newly graded area (ABB-ES 1997e, 1997f).

Interim Remedial Action at PSC 42

Contaminated media treated at PSC 42 included soils and sludges along the bottom and sides of the pond. The COCs for PSC 42 were identified as cadmium, chromium, lead, nickel, and silver. The RAOs for PSC 42 were as follows:

- Lower the risk of potential future exposure to humans and the environment by reducing the leachability of contaminated material.

- Close the polishing pond in accordance with RCRA closure requirements.

To achieve the RAOs, cleanup criteria for the contaminated soil and sludge at PSC 42 were established. The primary cleanup objectives for the solidification/stabilization process to be used were as follows:

- TCLP extract levels for the five metals identified below to be at or below the following concentrations:

Cadmium	0.19 mg/L
Chromium	0.86 mg/L
Lead	0.37 mg/L
Nickel	5.00 mg/L
Silver	0.30 mg/L

- UCS of stabilized material to be 30 psi after 14 days of wet curing.

Interim remediation of the site was accomplished by in-situ stabilization of the contaminated soil and sludge material. Remediation activities were conducted between March 6, 1996 and April 21, 1997.

The polishing pond (PSC 42) was conceptually divided into sequential cells with approximate dimensions of 40 ft by 105 ft for stabilization. Forty-two cells were stabilized in the polishing pond. Prior to stabilization, established cells were de-watered by pumping excess water from the cells to other unstabilized portions of the pond. Approximately 12,500 yd^3 of sludge and 9,500 yd^3 of native soil were stabilized during the IRA at PSC 42. Composite TCLP samples were collected from each stabilized cell and analyzed for compliance with treatment criteria. TCLP sample results for each cell met the design criteria listed (ABB-ES, 1997b).

Institutional Controls

The institutional controls for OU 2 were developed through a MOA between the USEPA, FDEP, and the Department of the Navy and signed on August 31, 1998. The purpose of the MOA was to ensure compliance with land use controls to protect human health and the environment from exposure to contaminated media at NAS Jacksonville. Therefore, land and groundwater use restrictions at OU 2 were to be identified and enforced under the guidelines of the MOA (USEPA, 1998a). The LUCIP at NAS Jacksonville incorporated the restrictions at OU 2 after the ROD was signed in October 1998.

The RCRA groundwater monitoring for PSCs 41, 42, and 43 continued after the ROD with the annual sampling event in January 1998. Semi-annual and annual sampling events continued in 1999 and 2000.

3.3.3 System Operations/ O&M

There are no system operations/O&M at OU 2. However, RCRA groundwater monitoring is performed for the post closure of RCRA sites PSC 41, 42, and 43. The Navy contracted with HRP/Spectrum Inc. to perform the semi-annual and annual groundwater monitoring. The work is being conducted in accordance with RCRA and is not part of the CERCLA program. Results of the groundwater monitoring are discussed in the Document and Analytical Review portion of this document to provide additional information.

3.4 FIVE-YEAR REVIEW

3.4.1 Site Inspection

TtNUS personnel conducted the NAS Jacksonville site inspection for OU 2. TtNUS visited OU 2 for the site inspection on April 3, 2001. Prior to the site visit, copies of the LUCIP and LUCIP Inspection Checklist for OU 2 were acquired to determine if the land use controls were being followed. These documents are included in Appendix E. The land use for the site has remained unchanged. The fence and signs at the site were in good condition. The security and fence restricting access to the airfield also provides restrictive access to the sites. The ground cover at PSC 42 is in good condition and the facility reports that there have been no incidents of trespassing or vandalism in the area.

3.4.2 Document and Analytical Review

OU 2 documents were reviewed to determine if the remedial actions were implemented as designed, to determine if new information has come to light since that time, and to determine if the remedial actions selected are working as designed. Additionally, the post-closure RCRA monitoring reports for PSCs 41, 42, and 43 were reviewed to provide additional information on these sites.

A review of the LUCIP Inspection Checklists for OU 2 determined that a quarterly inspection was missed for the Year 2000. The Facilities Officer did not sign an additional quarterly inspection for 2000. Completed quarterly inspections were conducted at OU 2 in January, May, July, December of 1999, July, and October of 2000, and February 2001. A third inspection in January 2000 was performed; however, the inspection was not signed. LUCIP Inspection Checklists are included in Appendix E.

A review of records and monitoring reports indicates that a total of 13 monitoring wells are included in the post-closure monitoring of OU 2 as part of the RCRA post-closure monitoring program for PSCs 41, 42, and 43 (Figure 3-2). Semi-annual monitoring events are performed on 8 of the 13 wells associated with PSC 41 and PSC 43. The remaining five wells associated with PSC 42 are monitored on an annual basis. The well network is divided into two categories: shallow [13 to 17 ft bgs] and deep (34 to 37 ft bgs). Of the 13 wells, 10 are screened in the shallow zone and three are screened in the deep zone. Figure 3-2 indicates the location of the wells monitored at OU 2. The monitoring wells at OU 2 are monitored for Appendix IX VOCs, BNAs, Appendix IX Metals, Gross Beta, Gross Alpha, Radium-226, Radium-228, cyanide distillation, cyanide total, total dissolved residue, VOCs (8260), SVOCs, phenol distillation, phenol, metals digestion, arsenic, mercury total, mercury digestion, lead, selenium, and Prep Method 3510. Graphs from the January 2001 monitoring event provided by Tetra Tech EMI, Inc. (the current subcontractor for RCRA monitoring at NAS Jacksonville) are included as Appendix H. The graphs indicate contaminant concentrations over time and exceedences of annual groundwater monitoring results for PSCs 41, 42, and 43 for 1997, 1998, 1999, and 2000.

Results of the graphs in Appendix H indicate intermittent detections of COCs above MCLs. Benzene was detected in background well NAS 4-9 during the January 2000 and January 2001 monitoring events. The benzene concentration may be a result of the adjacent PSC 2 where petroleum constituents are present. This site is currently being remediated under the petroleum program.

Monitoring results at PSC 41, the domestic sludge drying beds, indicate the MCL exceedance of iron, lead, manganese, sodium, vanadium, gross beta, and radium-226 from the January 2001 monitoring event. MCL Exceedances primarily occurred in well NAS 41-4.

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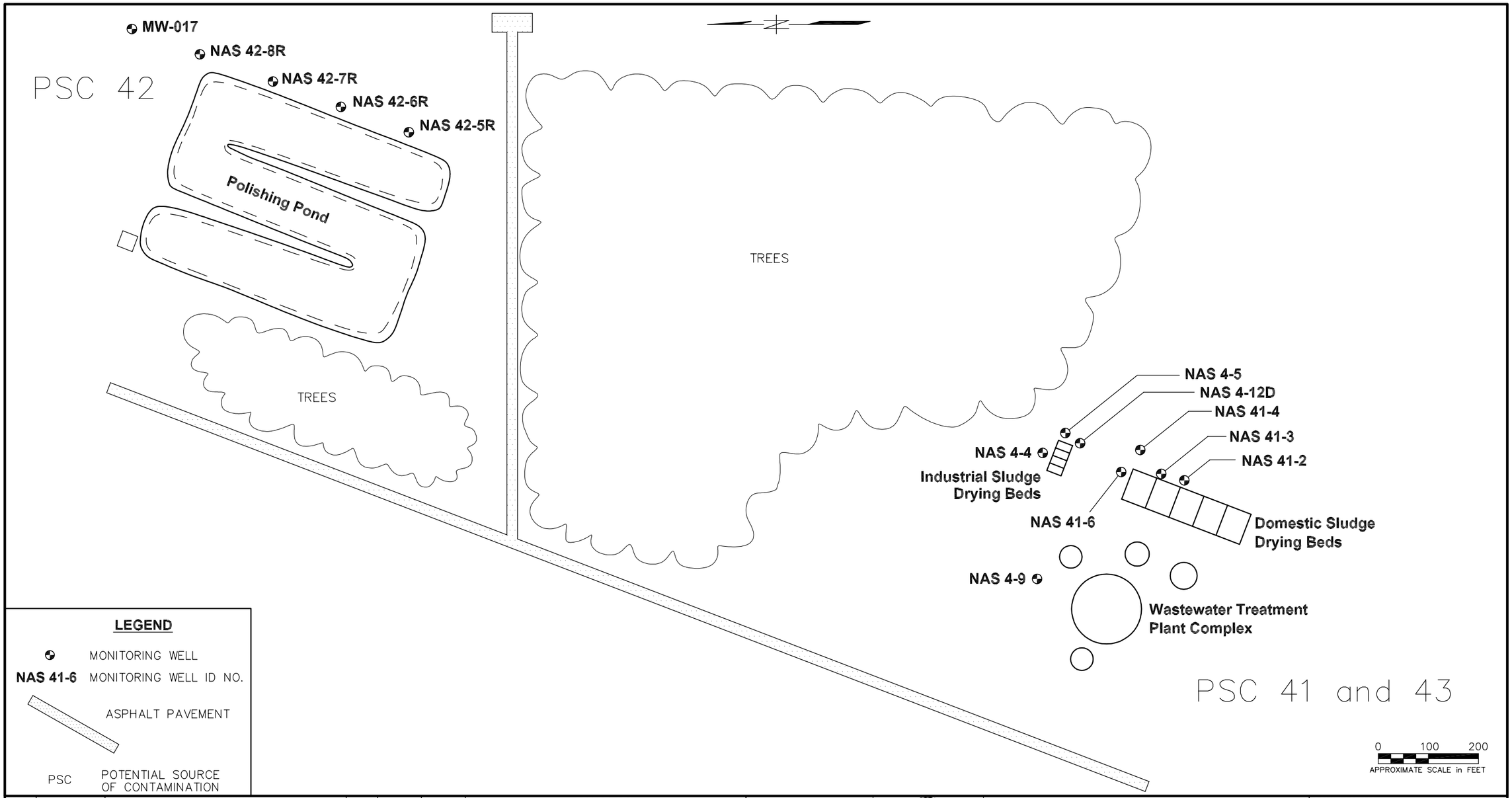

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY LLK DATE 3/16/01
CHECKED BY DATE
COST/SCHED–AREA
SCALE AS NOTED

SLUDGE DRYING BEDS, POLISHING POND
AND MONITORING WELL LOCATIONS
OPERABLE UNIT 2
FIVE–YEAR REVIEW
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO. 3885
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3–2
REV. 0

FORM CADD NO. SDIV_BH.DWG – REV 0 – 1/20/98

Monitoring results at PSC 42, the polishing pond, indicate MCL exceedances of chromium, iron, lead, manganese, vanadium, gross alpha, radium-226, and gross beta from the January 2001 monitoring event.

Monitoring results at PSC 43, the industrial sludge drying beds, indicate the exceedance of iron, cadmium, and radium-226 from the January 2001 monitoring event.

3.4.3 ARAR Chemical-Specific Level Changes

The following standards were identified as chemical-specific ARARs in the ROD. They were reviewed for changes that could affect protectiveness.

- Occupational Safety and Health Administration (OSHA) Health and Safety Regulations, 29 CFR Part 1910, Subpart Z

- RCRA, Identification and Listing of Hazardous Wastes, 40 CFR Part 261

- RCRA, Releases from Solid Waste Management Units, 40 CFR Part 264, Subpart F

The chemical-specific ARARs have not changed since the ROD was signed. PSCs 41, 42, and 43 are currently undergoing RCRA post closure monitoring. The promulgation of the FDEP regulations [FAC, Chapter 62-777, CCTLs Rule and FAC, Chapter 62-785, Brownfield Criteria Rule] are discussed in Section 2.4.3.

Human health risk and ecological health risks procedures have not changed since the ROD was signed.

3.5 ASSESSMENT

The following conclusions support the determination that the remedy at OU 2 is expected to be protective of human health and the environment.

Question A: Is the remedy functioning as intended by the decision documents?

- ***HASP/Contingency Plan:*** A HASP is in place for the OU 2 post-closure monitoring, sufficient to control risks, and properly implemented.

- ***Implementation of Institutional Controls and Other Measures:*** Institutional controls are in place as part of the LUCIP at NAS Jacksonville. There are not any current or planned changes in land use at the site to suggest that the institutional controls are ineffective. OU 2 is inspected quarterly to insure the controls remain in place. The fence restricting access to the airfield is effective in restricting access to OU 2 and is in good condition. The signs on site are maintained and in good condition. No water supply wells are allowed in the restricted area and none were observed during the site inspection. A quarterly inspection in the Year 2000 was missed.

- ***Remedial Action Performance:*** Remedial actions were performed through interim remedial actions, and no remedial actions were performed after the ROD was signed.

- ***System Operations/O&M:*** There are no system operations/O&M for OU 2. Post-closure RCRA monitoring is being performed at OU 2 as required by RCRA permit.

- ***Opportunities for Optimization:*** There are no recommendations for opportunities for optimization.

- ***Early Indicators of Potential Remedy Failure:*** No early indicators of potential remedy failure were noted during this review.

Question B: Are the assumptions used at the time of remedy selection still valid?

- ***Changes to Standards and To Be Considered:*** There are no changes to the ARARs for OU 2. The on-going monitoring of OU 2 must comply with the RCRA permit for the site.

- ***Changes in Exposure Pathways:*** No changes in the site conditions that affect exposure pathways were identified as part of the five-year review. First, there are no current or planned changes in land use. Second, no new contaminants, sources, or routes of exposure were identified as part of this five-year review. Finally, there is no indication that hydrologic/hydrogeologic conditions are not adequately characterized.

- ***Changes in Toxicity and Other Contaminant Characteristics:*** Toxicity and other factors for COCs have not changed. Results from the three annual reports indicate intermittent detections of the COCs above the MCLs.

- ***Changes in Risk Assessment Methodologies:*** Changes in risk assessment methodologies since the time of the ROD do not call into question the protectiveness of the remedy.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

The RCRA Monitoring for OU 2 (PSCs 41, 42, and 43) is included as part of the current NAS Jacksonville RCRA permit that is due to expire in October 2001. A permit application has been prepared and submitted to the FDEP for approval. Information provided to TtNUS about the new permit application indicates that OU 2 monitoring has not been included in the permit application and if accepted by the State the groundwater monitoring at these sites will be discontinued. However, the groundwater contaminants at the PSCs are above MCLs.

3.6 DEFICIENCIES

Two deficiencies were noted during the five-year review (see Table 3-2). A quarterly land use control inspection was missed in the year 2000. Quarterly inspections are required under the MOA between NAS Jacksonville, FDEP, and USEPA. The deficiency does not warrant a finding of not protective. The other deficiency is the potential for the groundwater-monitoring program to be discontinued while groundwater contaminants remain above MCLs. The deficiency does not warrant a finding of not protective.

TABLE 3-2
OU 2 Deficiencies

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Deficiencies	Currently Affects Protectiveness (Y/N)
Land Use Controls	
Missed LUCIP quarterly inspection for the year 2000	N
System Operations/O&M	
RCRA program may discontinue groundwater monitoring while COCs remain in excess of MCLs.	N

3.7 RECOMMENDATIONS AND REQUIRED ACTIONS

The recommendations and required actions developed by the NAS Jacksonville Partnering Team based on the inspection and five-year review are shown in Table 3-3.

TABLE 3-3
OU 2 Recommendations and Required Actions

Five-Year Review
Naval Air Station Jacksonville
Jacksonville, Florida

Deficiencies	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Follow-up Actions: Affect Protectiveness (Y/N)
Missed quarterly LUCIP inspection.	Inspect OU 2 quarterly to assure that institutional controls remain in place.	Navy	31 Dec 01	N
RCRA Program may discontinue monitoring.	Determine results of RCRA Permit Renewal for PSCs 41, 42, and 43, and evaluate any required actions.	NAS Jacksonville Partnering Team	6 Mar 05	N

3.8 PROTECTIVENESS STATEMENT

The remedy at OU 2 is protective of human health and the environment. The institutional controls (LUCIPs) provide a significant degree of protection of human health and the environment as long as they are conducted as required. The institutional controls help protect against exposure to groundwater and stabilized soil and sediment.

The remedial action for the source control was implemented. The soil excavation and stabilization remedy as a measure that would reduce exposure has been completed at OU 2, was effective and met the RAOs identified in the IRODs.

4.0 BASEWIDE CONCLUSIONS AND RECOMMENDATIONS

The basewide conclusions and recommendations are presented below. These conclusions and recommendations are provided in the form of a basewide protectiveness statement and a summary of the requirements of the next five-year review.

4.1 PROTECTIVENESS STATEMENT

The remedial actions at the OU 1 and OU 2 at NAS Jacksonville continue to be protective of human health and the environment. Remedial actions for OU 2 have been completed and ongoing remedial actions at OU 1 are also protective of human health and the environment. However, remedial actions currently being implemented at OU 1 are expected to require more than five years to complete. The implementation of the long-term groundwater and surface water monitoring program at OU 1 provides a degree of protection of human health and the environment. The implementation of institutional controls (LUCIPs) at each of the OUs also provides a significant degree of protectiveness of human health and the environment.

This five-year review shows that the Navy is meeting the requirements of the RODs for OU 1 and OU 2 at NAS Jacksonville.

4.2 NEXT REVIEW

NAS Jacksonville has OUs and PSCs that require statutory five-year reviews. This report represents the first five-year review conducted at NAS Jacksonville. The next five-year review will be required within five years of the signature date of this review. A summary of the anticipated requirements for the next five-year review is provided below.

The five-year review should include a detailed review of the status of the OU 1 LTMP. After five years of monitoring at OU 1, the LTMP requires that natural attenuation fate and transport modeling be performed to determine if the COCs in groundwater at OU 1 will meet MCLs in the 30 year time frame. This assessment is scheduled for 2004, and the findings and actions based on the assessment should be included in the next review. The next review should also include a detailed review on the status of groundwater monitoring for OU 2 as part of the post closure permit under the RCRA program since monitoring is ongoing. Additionally, the LUCIPs and quarterly inspections for OU 1 and OU 2 should be reviewed for the next review.

4.2.1 Statutory Review

OU 1 and OU 2 will require a statutory review during the next five-year review for NAS Jacksonville because hazardous substances, pollutants, and contaminants remain at these sites that will not allow for unlimited use or unrestricted exposure.

4.2.2 Reviews for Sites with RODs Published Since This Five-Year Review

OU 3 and OU 4 were not included in this review because the RODs for these sites were signed just prior to the production of this review and remedial actions have not been conducted. OU 5 (PSC 51), OU 6 (Hangar 1000), OU 7 (Defense Re-utilization Marketing Office), and OU 8 (Pesticide Shop/Disease Vector Ecology Control Center) are currently in the RI/FS process and RODs have not been signed for these sites at this time. It is anticipated that the RODs for these sites will be completed and the remedial actions will be in process at the time of the next review. The next review should include these sites.

REFERENCES

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APPENDIX A

PUBLIC NOTICE

THE FLORIDA TIMES-UNION
Jacksonville, Fl
Affidavit of Publication

Florida Times-Union

TETRA TECH NUS, INC.
ST. 250
7018 A.C. SKINNER PKWY.
JACKSONVILLE FL 32256

REFERENCE: 0537674
R31404 Notice Of U.S.

State of Florida
County of Duval

Before the undersigned authority personally appeared Wendy Reynolds who on oath says she is a Legal Advertising Representative of The Florida Times-Union, a daily newspaper published in Jacksonville in Duval County, Florida; that the attached copy of advertisement is a legal ad published in The Florida Times-Union. Affiant further says that The Florida Times-Union is a newspaper published in Jacksonville, in Duval County, Florida, and that the newspaper has heretofore been continuously published in Duval County, Florida each day, has been entered as second class mail matter at the post office in Jacksonville, in Duval County, Florida for a period of one year preceeding the first publication of the attached copy of advertisement; and affiant further says that he/she has neither paid nor promised any person, firm or corporation any discount, rebate, commission, or refund for the purpose of securing this advertisement for publication in said newspaper.

PUBLISHED ON: 10/01

Notice of U.S. Navy's Five-Year CERCLA Review for Naval Air Station (NAS) Jacksonville

As part of the Installation Restoration Program (IRP) at NAS Jacksonville and in accordance with the Superfund Amendments and Reauthorization Act of 1986, the Navy is beginning the first statutory five-year review for the station. This review will include the following seven sites on NAS Jacksonville:

- Potential Source of Contamination (PSC) 3, Wastewater Treatment Plant Ex-Sludge Disposal Area.
- PSC 4, Pine Tree Planting Area.
- PSC 26, Old Main Registered Disposal Area.
- PSC 27, Former Transformer Disposal Area.
- PSC 41, Domestic Waste Sludge Drying Beds.
- PSC 42, Polishing Pond.
- PSC 43, Industrial Waste Sludge Drying Beds.

The purpose of the Five-Year Review process is to "determine whether the remedy selected at a site is protective of human health and the environment." During this process, the above-listed sites will be reviewed to determine whether the remedy selected is effective. If it is deemed to be ineffective or to require modifications, such issues will be brought forth in a report that is created following the review.

This document will be maintained in the NAS Jacksonville Information Repository, which is located in the Charles D. Webb Wesconnett Branch of the Jacksonville Public Library, 6887 103rd Street.

Any person wishing to provide comments regarding this notice may respond in writing to :

Tim Curtin
Facilities & Environmental Department
Box 5, Naval Air Station
Jacksonville, FL 32212-5000
(904) 542-2717, ext. 120
(904) 542-3858 (Fax)
curtintl@nasjax.navy.mil (E-mail)

For information about the five-year review, or any environmental cleanup activities at NAS Jacksonville, please call Bill Dougherty at (904) 542-3846.

FILED ON: 10/02/00 Wendy Reynolds

Name: Wendy Reynolds Title: Legal Advertising Representative

In testimony whereof, I have hereunto set my hand and affixed my official seal, the day and year aforesaid.

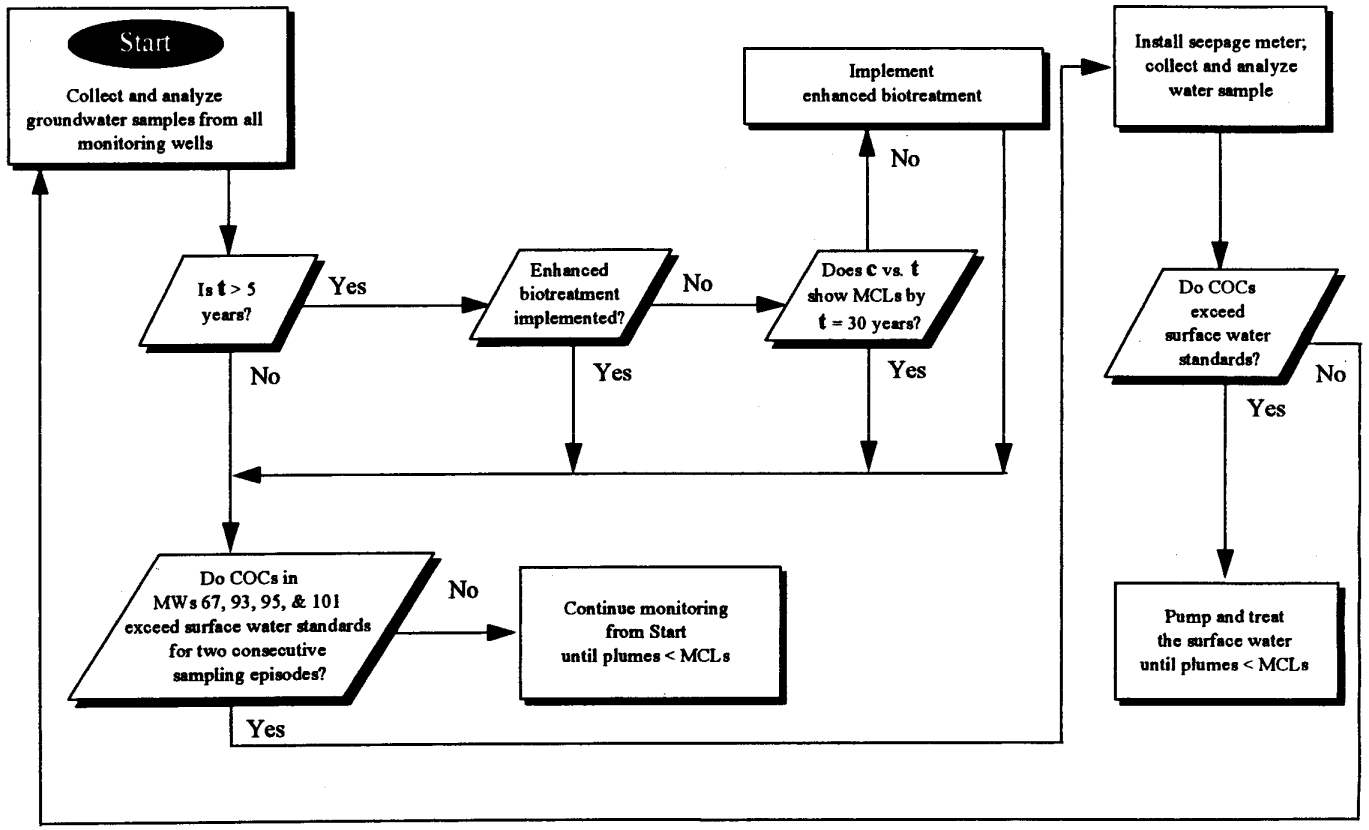
NOTARY: Janice I Weeks

NOTARY PUBLIC STATE OF FLORIDA
OFFICIAL NOTARY SEAL
JANICE I WEEKS
COMMISSION NUMBER
CC855805
MY COMMISSION EXPIRES
AUG. 15,2003

RECEIVED
OCT - 4 2000
TETRA TECH NUS
JACKSONVILLE FL

APPENDIX B

CONTINGENCY PLAN CHART FOR OU 1



NOTES:
NAS = Naval Air Station
MCL = Maximum contaminant level
COC = Contaminant of concern
MW = Monitoring well
< = Less than
> = Greater than
c = Concentration
t = Time since 7/98 (the beginning of long-term monitoring)
vs. = Versus

FIGURE 1-3
CONTINGENCY DECISION-MAKING PROCESS

MONITORING PLAN FOR SELECTED REMEDY OPERABLE UNIT 1

NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

H:\HEIDI\NASJAX\2508-16\FIG1-3.PM5 052798HAS

APPENDIX C

RECOVERY TRENCH BLUEPRINTS

CONC
STEPS
MOBILE
945
CONC
DIRT
P
MW-7
6' CLWB
4" PW
HMW-2
ASPHALT
O/H
4TH
TEE
Estimated Extent of Recoverable LNAPL
10'x12'x8' PREFABRICATED METAL/WOOD BLDG
NEW FENCE (24'x25')
GRAVEL DRIVE
15'
SUMP/PUMP T/CONC EL 25.29
N-1
Sta 0+00
6"ø SCH 80 PVC CONDUIT
11'X6.5' PREFABRICATED METAL BLDG
12"ø SCH 80 PVC CONDUIT
CABLE VAULT
MW-9
N-2
SUMP/PUMP T/CONC EL 25.78
Sta 1+05
NORTH PRODUCT RECOVERY TRENCH
6"ø SCH 80 PVC CONDUIT
SUMP/VAULT T/CONC EL 26.03
10 LF OF 6"ø HDPE HORIZONTAL PIPE
N-3
Sta 2+25
CABLE TELEVISION CUT AND REROUTED NORTH
EV
E
S-1
SUMP/PUMP T/CONC EL 25.45
Sta 0+00
Estimated Extent of Recoverable LNAPL
SOUTH PRODUCT RECOVERY TRENCH
11'X6.5' PREFABRICATED METAL BLDG
10'X12' PREFABRICATED METAL/WOOD BLDG
6"ø SCH 80 PVC CONDUIT
FH
C-1
NEW GATE VALVE
WATER PIT
APPROXIMATE LOCATION OF EXISTING FENCE
GRAVEL DRIVE
10"ø SCH 80 PVC DRAIN
12"ø SCH 80 PVC CONDUIT CABLE VAULT
S-2
SUMP/PUMP T/CONC EL 26.55
Sta 0+95
6"ø SCH 80 PVC CONDUIT
6"ø SCH 80 PVC CONDUIT
40 LF OF 6"ø HDPE HORIZONTAL PIPE
MW-13
MW-14
S-3
SUMP/VAULT T/CONC EL 25.60
Sta 1+80
NEW FENCE
S-4
PRODUCT RECOVERY SUMP/VAULT/PUMP T/CONC EL 26.90
CABLE TELEVISION CUT AND REROUTED NORTH
6" PW
GATE
MW-12
MW-11
BOX
24"ø RCP
CHILD STREET
GRAVEL PATH
MW-29
TP
PVC PIPES
FLUME

NOTES

THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR EQUIPMENT AND INSTALLATION OF ALL PUMPS, CONTROLS AND ACCESSORIES FOR A COMPLETE PRODUCT RECOVERY SYSTEM.

THE ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL ELECTRIC POWER POLES AND ALL POWER SUPPLY TO THE SYSTEM INCLUDING LIGHTING AS INDICATED IN THE ELECTRICAL DRAWINGS.

THE CIVIL CONTRACTOR SHALL PERFORM OTHER REMAINING WORK INCLUDING PIPING, CONCRETE WORK, ROAD PATCH, TRAFFIC CONTROL, FENCING, SYSTEM HOUSING AND DRUM STORAGE HOUSING INCLUDING THE DRUMS AND ALL OTHER ITEMS SPECIFIED FOR CONSTRUCTION IN THE CONTRACT DRAWINGS.

GEORGIA REGISTERED PROFESSIONAL No. 17908 ENGINEER KEN CHEN

NO.	DATE	REVISION	BY	CH	APPROVED
3	06/16/95	REVISED AS BUILT	LGJ		
2	03/03/95	GENERAL REVISIONS	LGJ		
1	10/26/94	GENERAL REVISIONS			

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA

RECOVERY SYSTEM LAYOUT PLAN NAS JACKSONVILLE, FL

PROJECT		
DRAWN	L. JOHNSON	
ENGR/DSGN		
CHECKED		
APPROVED		
APPROVED FOR NAVSTA	DATE	
APPROVED FOR SDIV	DATE	

SIZE E | FSCM NO. | DWG NO. 2 | —

SCALE UNLESS NOTED 1" = 20' | SHEET 2 OF 6

PLOT DATE JUNE 27, 1995 C:\398711\33\9916\06000-03.DWG

APPENDIX D

LNAPL PRODUCT COLLECTION RECORDS

Form B South unit

OPERABLE UNIT NO. 1 - NAS-JAX
LNAPL PRODUCT COLLECTION RECORD

DATE	QUANTITY	DRUM NO.	TOTAL DRUMS FILLED	REMARKS
6/21/99		1	28	5" Product
8/6/99		1	29	5" Product
8/16/99		1	30	3" Product
8/30/99		1	31	3" Product
9/21/99		1	32	3" Product
12/2/99		1	33	5" Product
12/22/99		1	34	4" Product
2/10/00		1	35	5" Product
6/20/00		1	36	6" Product
6/26/00		1	37	6" Product
7/17/00		1	38	6" Product
8/2/00		1	39	3" Product
8/21/00		1	40	3" Product
8/30/00		1	41	6" Product
9/13/00		1	42	5 Product
10/4/00		1	43	3" Product

Form B

South unit

OPERABLE UNIT NO. 1 - NAS-JAX
LNAPL PRODUCT COLLECTION RECORD

DATE	QUANTITY	DRUM NO.	TOTAL DRUMS FILLED	REMARKS
9/1/95		1	1	
12/13/95		1	2	
4/1/96		1	3	
8/12/96		1	4	
12/13/96		1	5	
4/1/97		1	6	
9/8/97		1	7	
12/12/97		1	8	
1/15/98		1	9	
2/3/98		1	10	
3/2/98		1	11	
3/18/98		1	12	
7/24/98		1	13	
9/10/98		1	14	
10/8/98		1	15	3" Product
10/28/98		1	16	3" Product
11/18/98		1	17	3" Product
11/24/98		1	18	3" Product
12/22/98		1	19	3" Product
1/11/99		1	20	3" Product
1/20/99		1	21	3" Product
2/3/99		1	22	3" Product
2/19/99		1	23	3" Product
3/1/99		1	24	3" Product
3/22/99		1	25	3" Product
4/16/99		1	26	3" Product
5/12/99		1	27	5" Product

Form B North unit

OPERABLE UNIT NO. 1 - NAS-JAX
LNAPL PRODUCT COLLECTION RECORD

DATE	QUANTITY	DRUM NO.	TOTAL DRUMS FILLED	REMARKS
7/5/95		1	1	
9/8/95		1	2	
10/20/95		1	3	
12/1/95		1	4	
4/10/96		1	5	
3/13/96		1	6	
7/6/96		1	7	
10/8/96		1	8	
10/21/96		1	9	
11/10/96		1	10	
4/1/97		1	11	
5/2/97		1	12	
7/2/97		1	13	
9/19/97		1	14	
11/3/97		1	15	
12/12/97		1	16	
1/15/98		1	17	
1/30/98		1	18	
2/19/98		1	19	
3/2/98		1	20	
3/20/98		1	21	
4/3/98		1	22	
4/13/98		1	23	
4/20/98		1	24	
4/28/98		1	25	
5/20/98		1	26	
6/4/98		1	27	

Form B

NORTH UNIT

OPERABLE UNIT NO. 1 - NAS-JAX
LNAPL PRODUCT COLLECTION RECORD

DATE	QUANTITY	DRUM NO.	TOTAL DRUMS FILLED	REMARKS
6/15/98		1	28	
7/19/98		1	29	
7/28/98		1	30	2" Product
8/10/98		1	31	2" Product
8/25/98		1	32	2" Product
9/10/98		1	33	3" Product
9/21/98		1	34	3" Product
10/8/98		1	35	3" Product
10/27/98		1	36	3" Product
11/16/98		1	37	3" Product
1/11/99		1	38	3" Product
1/20/99		1	39	3" Product
2/3/99		1	40	3" Product
2/10/99		1	41	2" Product
3/1/99		1	42	3" Product
4/16/99		1	43	3" Product
5/12/99		1	44	5" Product
~~7/8/99~~		1	45	5" Product
7/29/99		1	46	5" Product
8/19/99		1	47	5" Product
9/21/99		1	48	5" Product
10/5/99		1	49	5" Product
12/21/99		1	50	5" Product
2/10/00		1	51	2·8" Product
3/29/00		1	52	5" Product

APPENDIX E

LAND USE CONTROL INSPECTION REPORTS

LUCIP

OU1

Description:
Operable Unit One consists of Potential Source of Contamination (PSC) 26 and PSC 27. PSC 26 is a landfill that was closed in 1979, which had been used to dispose household and industrial waste. Pits were dug on the landfill and industrial liquid waste was disposed into the pits. Radioactive waste was also disposed onsite.

PSC 27 was a transformer storage area where polychlorinated biphenyl contaminated oil was spilled when the storage area was broken into and the transformers vandalized.

The landfill is bordered by weapons bunkers on the west; an unnamed tributary on the east; Mustin Road on the south; and the golf course on the north. Child Street bisects the northern section of the landfill.

Location:

Naval Air Station Jacksonville Site Plan

Site Plan coordinate	Northing	Easting
N7	2,136,173	438,229
N8	2,136,173	439,229
O7	2,135,173	438,229
O8	2,135,173	439,229
P8	2,134,173	439,229
Q8	2,133,173	439,229
R8	2,132,173	439,229

Land Use Control implemented:

Fence and signs around landfill south of Child Street to prevent access.
Restrict construction
Restrict groundwater access
Prevent residential use

Objective:

Prevent trespasser and residential use
Provide worker notification of potential hazard

Decision Document:

Record of Decision signed 23 September 1997

OU2

Description:

Northwest portion of Naval Air Station Jacksonville bordered by patrol road on north and west; Taxiway Charlie and Delta on the east and southeast; and Runway 09 on the south.

Location:

Naval Air Station Jacksonville Site Plan

Site Plan coordinate	Northing	Easting
E6	437,229	2,145,173
F6	437,229	2,144,173
E7	438,229	2,145,173
F7	438,229	2,144,173
E8	439,229	2,145,173
F8	439,229	2,144,173
D9	440,229	2,146,173
E9	440,229	2,145,173
F9	440,229	2,144,173
B10	441,229	2,148,173
C10	441,229	2,147,173
D10	441,229	2,146,173
E10	441,229	2,145,173
F10	441,229	2,144,173
B11	442,229	2,148,173
C11	442,229	2,147,173
D11	442,229	2,146,173

Land Use Control implemented:

Maintain existing fence which restricts airfield trespassing
Maintain industrial use

Objective:

Prevent residential use
Provide worker notification of potential hazard

Decision Document:

Record of Decision signed _____ August 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit One

Date: 19 Jan 1999

Inspector: D. Lancaster

✓ Fence and signs on site. (Maintain fence and warning signs around landfill south of Child Street to prevent unauthorized access.)*

✓ No trees, construction on cap. (Maintain integrity of cap/cover system on landfill south of Child Street.)*

✓ No unauthorized construction. (Restrict construction. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

✓ No water supply wells on site. (Restrict groundwater access. No water supply wells allowed within the restricted area.)*

Comments: SIGNS NEED TO BE CHANGED TO MEET FLORIDA ADMINISTRITIVE CODE REQUIREMENTS.

Facilities Officer Signature: S. Bell

STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 23 September 1997
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit Two

Date: 19 Jan 1999

Inspector: D. Lancaster

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Provide worker notification of potential hazard in sediment and groundwater.)*

✓ No water supply wells on site. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

Comments: _____

Facilities Officer Signature: _____

STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-one

Date: 19 Jan 1999

Inspector: D. Lancaster

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in soil under cover and groundwater.)*

✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: Fence is for perimeter of OU 2

Facilities Officer Signature: [signature]
STEPHEN S. BELL, LCDR, CEC, USN
(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-two

Date: 19 Jan 1999

Inspector: D. Lancaster

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No trees, construction on cap. (Maintain soil cover over solidified material.)*

✓ No unauthorized construction. (Restrict construction on site. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

✓ No water supply wells on site. (Groundwater restriction, prevent direct contact with groundwater.)*

Comments: Fence is for perimeter of OU 2.

Facilities Officer Signature: STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-three

Date: 19 Jan 1999

Inspector: D. Lancaster

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in groundwater.)*

✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: Fence is for perimeter of OU 2.

Facilities Officer Signature: S. Bell

STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit One

Date: 14 May 99

Inspector: Lancaster

✓ Fence and signs on site. (Maintain fence and warning signs around landfill south of Child Street to prevent unauthorized access.)*

✓ No trees, construction on cap. (Maintain integrity of cap/cover system on landfill south of Child Street.)*

✓ No unauthorized construction. (Restrict construction. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

✓ No water supply wells on site. (Restrict groundwater access. No water supply wells allowed within the restricted area.)*

Comments: Signs meeting FAC requirements to be placed at Child St gate & Mustin Rd gate

Facilities Officer Signature: Stephen S. Bell

STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 23 September 1997
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit Two

Date: 14 May 99

Inspector: Lancaster

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Provide worker notification of potential hazard in sediment and groundwater.)*

✓ No water supply wells on site. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

Comments: _____

Facilities Officer Signature: _____
STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-one

Date: 14 May 99

Inspector: Lancaster

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in soil under cover and groundwater.)*

✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: Fence is for 002 perimeter

Facilities Officer Signature: S. Bell
STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-three

Date: 14May99

Inspector: Slancaster

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in groundwater.)*

✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: Fence is for OU2 perimeter

Facilities Officer Signature: S Bell
STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit One

Date: 2 July 99

Inspector: T. Curtin

OK Fence and signs on site. (Maintain fence and warning signs around landfill south of Child Street to prevent unauthorized access.)*

OK No trees, construction on cap. (Maintain integrity of cap/cover system on landfill south of Child Street.)*

OK No unauthorized construction. (Restrict construction. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

OK No water supply wells on site. (Restrict groundwater access. No water supply wells allowed within the restricted area.)*

Comments: _____

Facilities Officer Signature: _____
STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 23 September 1997
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit Two

Date: 2 July 99

Inspector: T. Curtin

OK Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

OK No residential construction on site. (Maintain industrial use.)*

OK No unauthorized construction. (Provide worker notification of potential hazard in sediment and groundwater.)*

OK No water supply wells on site. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

Comments: _____

Facilities Officer Signature: _____
STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-one

Date: 12 July 99

Inspector: T. Curtin

OK Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

OK No residential construction on site. (Maintain industrial use.)*

OK No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in soil under cover and groundwater.)*

OK No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: _____

Facilities Officer Signature: _____
STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-two

Date: 23 July 99

Inspector: T. Curtin

OK Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

OK No residential construction on site. (Maintain industrial use.)*

OK No trees, construction on cap. (Maintain soil cover over solidified material.)*

OK No unauthorized construction. (Restrict construction on site. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

OK No water supply wells on site. (Groundwater restriction, prevent direct contact with groundwater.)*

Comments:_____

_____

_____

Facilities Officer Signature: _____
STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-three

Date: 2 July 99

Inspector: T. Curtin

OK Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

OK No residential construction on site. (Maintain industrial use.)*

OK No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in groundwater.)*

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Comments: _____

_____

_____

Facilities Officer Signature: _____
STEPHEN S. BELL, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit One

Date: 29 Dec 99

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain fence and warning signs around landfill south of Child Street to prevent unauthorized access.)*

✓ No trees, construction on cap. (Maintain integrity of cap/cover system on landfill south of Child Street.)*

✓ No unauthorized construction. (Restrict construction. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

✓ No water supply wells on site. (Restrict groundwater access. No water supply wells allowed within the restricted area.)*

Comments: Gate on Child St does not close correctly but will be moved when fence is moved.

Facilities Officer Signature: _____
STEPHEN S. BELL, CDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 23 September 1997
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit Two

Date: 29 Dec 99

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Provide worker notification of potential hazard in sediment and groundwater.)*

✓ No water supply wells on site. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

Comments: _____

_____

_____

Facilities Officer Signature: _____
STEPHEN S. BELL, CDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-one

Date: 29 Dec 99

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in soil under cover and groundwater.)*

✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: _____

_____

_____

Facilities Officer Signature: _____
STEPHEN S. BELL, CDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-two

Date: 29 Dec 99

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No trees, construction on cap. (Maintain soil cover over solidified material.)*

✓ No unauthorized construction. (Restrict construction on site. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

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Comments: _____

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Facilities Officer Signature: _____
STEPHEN S. BELL, CDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-three

Date: 29 Dec 99

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in groundwater.)*

✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: _____

Facilities Officer Signature: _____
STEPHEN S. BELL, CDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit One

Date: 17 JUL 00

Inspector: Tim Curtin

X Fence and signs on site. (Maintain fence and warning signs around landfill south of Child Street to prevent unauthorized access.)*

X No trees, construction on cap. (Maintain integrity of cap/cover system on landfill south of Child Street.)*

X No unauthorized construction. (Restrict construction. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

X No water supply wells on site. (Restrict groundwater access. No water supply wells allowed within the restricted area.)*

Comments: Growth of saplings is beginning on cap. Increase number of signs on perimeter fence.

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 23 September 1997
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit Two

Date: 17 Jul 00

Inspector: Tim Curtin

X Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

X No residential construction on site. (Maintain industrial use.)*

X No unauthorized construction. (Provide worker notification of potential hazard in sediment and groundwater.)*

X No water supply wells on site. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

Comments: _____

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_____

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-one

Date: 17 JUL 00

Inspector: Tim Curtin

_X_ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

_X_ No residential construction on site. (Maintain industrial use.)*

_X_ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in soil under cover and groundwater.)*

_____ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: _____

_____

_____

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-two

Date: 17JUL 00

Inspector: Tim Curtin

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__X__ No trees, construction on cap. (Maintain soil cover over solidified material.)*

__X__ No unauthorized construction. (Restrict construction on site. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

__X__ No water supply wells on site. (Groundwater restriction, prevent direct contact with groundwater.)*

Comments:_____

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_____

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-three

Date: 17 JUL 00

Inspector: Tim Curtin

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Comments: _____

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Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Revision 0
October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit One

Date: 10-30-00

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain fence and warning signs around landfill south of Child Street to prevent unauthorized access.)*

✓ No trees, construction on cap. (Maintain integrity of cap/cover system on landfill south of Child Street.)*

✓ No unauthorized construction. (Restrict construction. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

✓ No water supply wells on site. (Restrict groundwater access. No water supply wells allowed within the restricted area.)*

Comments: _____

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Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 23 September 1997
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit Two

Date: 10-30-00

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

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✓ No water supply wells on site. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

Comments: _____

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Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-one

Date: 10-30-00

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

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✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: _____

_____

_____

Facilities Officer Signature: R.O. Fetter

R.O. FETTER, ~~LCDR, CEC~~, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-two

Date: 10-30-00

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No trees, construction on cap. (Maintain soil cover over solidified material.)*

✓ No unauthorized construction. (Restrict construction on site. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

✓ No water supply wells on site. (Groundwater restriction, prevent direct contact with groundwater.)*

Comments: _____

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-three

Date: 10-30-00

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

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✓ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in groundwater.)*

✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: _____

_____

_____

Facilities Officer Signature: R.O. FETTER

R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit One

Date: 20 Feb 2001

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain fence and warning signs around landfill south of Child Street to prevent unauthorized access.)*

✓ No trees, construction on cap. (Maintain integrity of cap/cover system on landfill south of Child Street.)*

✓ No unauthorized construction. (Restrict construction. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

✓ No water supply wells on site. (Restrict groundwater access. No water supply wells allowed within the restricted area.)*

Comments:_____

_____

_____

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 23 September 1997
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Operable Unit Two

Date: 20 Feb 2001

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Provide worker notification of potential hazard in sediment and groundwater.)*

✓ No water supply wells on site. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

Comments: _____

_____

_____

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Eighteen

Date: 20 Feb 2001

Inspector: Tim Curtin

✓ Sign on site. (Maintain existing sign stating radioactive contamination onsite and point of contact.)*

✓ Radiological completion report for PSC 18 available in IR office. (Maintain documentation in the Environmental Division regarding the radioactive contamination left in place around raw water pipe.)*

Comments: _____

_____

_____

Facilities Officer Signature: _____
R.O. FETTER, ~~LCDR~~, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Radiological Affairs Support Office letter Ser 02/02f/00669 of 14 October 1997
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-one

Date: 20 Feb 2001

Inspector: Tim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No unauthorized construction. (Restrict construction on site which may impact groundwater. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed. Provide worker notification of potential hazard in soil under cover and groundwater.)*

✓ No water supply wells on site. (Groundwater restriction, no water supply wells allowed within the restricted area.)*

Comments: _____

_____

_____

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

Naval Air Station Jacksonville
Land Use Control Implementation Plan
Potential Source of Contamination Forty-two

Date: 20 Feb 2001

Inspector: Jim Curtin

✓ Fence and signs on site. (Maintain existing fence which restricts airfield trespassing.)*

✓ No residential construction on site. (Maintain industrial use.)*

✓ No trees, construction on cap. (Maintain soil cover over solidified material.)*

✓ No unauthorized construction. (Restrict construction on site. Workers must be notified that contamination exists and OSHA regulations apply if excavation activities are proposed on the site. Obtain concurrence from USEPA and FDEP prior to design. No residential usage allowed.)*

✓ No water supply wells on site. (Groundwater restriction, prevent direct contact with groundwater.)*

Comments:_____

_____

_____

Facilities Officer Signature: _____
R.O. FETTER, LCDR, CEC, USN

(NAS Jacksonville Installation Restoration Manager coordinates inspections and forward discrepancies to NAS Facilities Officer for correction.)*

***Per Decision Document:**
Record of Decision signed 20 October 1998
Land Use Control Implementation Plan October 1998

APPENDIX F

LNAPL CALCULATIONS

Recovered LNAPL from North Trench

Date	Drum #	Product Thickness in inches	Remarks
7/5/95	1	5	* assumed recovered free product
9/8/95	2	5	* assumed recovered free product
10/20/95	3	5	* assumed recovered free product
12/1/95	4	5	* assumed recovered free product
4/10/96	5	5	* assumed recovered free product
3/13/96	6	5	* assumed recovered free product
7/6/96	7	5	* assumed recovered free product
10/8/96	8	5	* assumed recovered free product
10/21/96	9	5	* assumed recovered free product
11/10/96	10	5	* assumed recovered free product
4/1/97	11	5	* assumed recovered free product
5/2/97	12	5	* assumed recovered free product
7/2/97	13	5	* assumed recovered free product
9/19/97	14	5	* assumed recovered free product
11/3/97	15	5	* assumed recovered free product
12/12/97	16	5	* assumed recovered free product
1/15/98	17	5	* assumed recovered free product
1/30/98	18	5	* assumed recovered free product
2/19/98	19	5	* assumed recovered free product
3/2/98	20	5	* assumed recovered free product
3/20/98	21	5	* assumed recovered free product
4/3/98	22	5	* assumed recovered free product
4/13/98	23	5	* assumed recovered free product
4/20/98	24	5	* assumed recovered free product
4/28/98	25	5	* assumed recovered free product
5/20/98	26	5	* assumed recovered free product
6/4/98	27	5	* assumed recovered free product
6/15/98	28	5	* assumed recovered free product
7/19/98	29	5	* assumed recovered free product
7/28/98	30	2	
8/10/98	31	2	
8/25/98	32	2	
9/10/98	33	3	
9/21/98	34	3	
10/8/98	35	3	
10/27/98	36	3	
11/16/98	37	3	
1/11/99	38	3	
1/20/99	39	3	
2/3/99	40	3	
2/10/99	41	2	
3/1/99	42	3	
4/16/99	43	3	
5/12/99	44	5	
7/8/99	45	5	
7/29/99	46	5	
8/19/99	47	5	
9/21/99	48	5	
10/5/99	49	5	

12/21/99	50	5	
2/10/00	51	32	
3/29/00	52	5	

255 Total number of inches of LNAPL recovered
33 Number of inches of product that can be contained in a 55 gallon drum
7.7 Number of drums filled with LNAPL (181 inc gallons recovered from north trench
425 Number of gallons of LNAPL recovered (5.5 * 55 gallons)

Recovered LNAPL from South Trench

Date	Drum #	Product Thickness in inches	Remarks
9/1/95	1	5	* assumed recovered free product
12/13/95	2	5	* assumed recovered free product
4/1/96	3	5	* assumed recovered free product
8/12/96	4	5	* assumed recovered free product
12/13/96	5	5	* assumed recovered free product
4/1/97	6	5	* assumed recovered free product
9/8/97	7	5	* assumed recovered free product
12/12/97	8	5	* assumed recovered free product
1/15/98	9	5	* assumed recovered free product
2/3/98	10	5	* assumed recovered free product
3/2/98	11	5	* assumed recovered free product
3/18/98	12	5	* assumed recovered free product
7/24/98	13	5	* assumed recovered free product
9/10/98	14	5	* assumed recovered free product
10/8/98	15	3	
10/28/98	16	3	
11/18/98	17	3	
11/24/98	18	3	
12/22/98	19	3	
1/11/99	20	3	
1/20/99	21	3	
2/3/99	22	3	
2/19/99	23	3	
3/1/99	24	3	
3/22/99	25	3	
4/16/99	26	3	
5/12/99	27	5	
6/21/99	28	5	
8/6/99	29	5	
8/16/99	30	3	
8/30/99	31	3	
9/21/99	32	3	
12/2/99	33	5	
12/22/99	34	4	
2/10/00	35	5	
6/20/00	36	6	
6/26/00	37	6	
7/17/00	38	5	
8/2/00	39	3	
8/21/00	40	3	
8/30/00	41	6	
9/13/00	42	5	
10/4/00	43	3	

181 Total number of inches of LNAPL recovered
33 Number of inches of product that can be contained in a 55 gallon drum
5.5 Number of drums filled with LNAPL (181 inches of LNAPL/ 33)
302 Number of gallons of LNAPL recovered (5.5 * 55 gallons)

APPENDIX G

CHEMICALS OF CONCERN TABLES
AND
OU 1 CONCENTRATION VERSUS TIME PLOTS

Table 2-4
Summary of Chemicals of Concern

Fourth Quarterly Monitoring Report
Operable Unit 1
Naval Air Station Jacksonville
Jacksonville, Florida

Compound	GCTLs	MW-12				MW-18				MW-19			
		Feb 99	May 99	Aug 99	Nov 99	Feb 99	May 99	Aug 99	Nov-99	Feb 99	May 99	Aug 99	Nov 99
Vinyl chloride	1.0	**8.60**	**7.90**	**7.20**	**8.40**	**19.80**	**25.20**	**12.30**	**13.50**	**20.00**	**19.80**	**15.70**	**15.80**
1,1-Dichloroethene	7.0	ND	ND	ND	ND	**13.80**	**16.00**	**7.90**	**9.70**	3.90	3.40	2.8 J	4.00
1,2-Dichloroethane	3.0	1.5M J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1.0	**19.70**	**16.40**	**14.20**	**16.10**	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	3.00	**4.90**	**5.40**	**3.90**	**3.80**	**56.50**	**71.00**	**69.30**	**67.60**	**355.00 E**	**298 E**	**274.00**	**322 E**
trans-1,2-Dichloroethene	100.00	0.79 J	0.64 J	0.68 J	0.59 J	6.30	8.90	6.50	5.10	**121 E**	59.80	44.20	57.80
cis-1,2-Dichloroethene	70.00	8.30	6.50	7.20	11.40	**95.20**	**114.00**	62.00	66.10	**374 E**	**216 E**	**204.00**	**243 E**
bis(2-ethylhexyl)phthalate	6.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	6.8	ND	0.58 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 2-4 (Cont'd)
Summary of Chemicals of Concern

Compound	GCTL	MW-22				MW-67				MW-89			
		Feb 99	May 99	Aug 99	Nov 99	Feb 99	May 99	Aug 99	Nov 99	Feb 99	May 99	Aug 99	Nov 99
Vinyl chloride	1.0	ND	ND	ND	ND	1.00	**2.60**	**2.60**	**3.10**	**137 E**	**528.00**	**575 E**	**322 E**
1,1-Dichloroethene	7.0	ND	ND	ND	ND	ND	ND	ND	ND	**27.00**	**80 E**	**110 E**	**90.2 E**
1,2-Dichloroethane	3.0	ND	ND	ND	ND	ND	ND	ND	ND	**5.40**	ND	**13.40**	**13.20**
Benzene	1.0	ND	ND	ND	ND	ND	ND	ND	ND	**25.10**	**77.70**	**64.90**	**54.80**
Trichloroethylene	3.0	**5.70**	**7.50**	**7.50**	**6.40**	2.40	**4.20**	**4.90**	2.70	**439 E**	**1,390.00**	**1540 E**	**1660 E**
trans-1,2-Dichloroethene	100.00	ND	ND	ND	ND	1.50	4.70	6.00	2.00	2.60	ND	6.20	5.50
cis-1,2-Dichloroethene	70.00	2.40	2.60	2.80	2.50	7.50	40.10	47.60	19.00	**141 E**	**344.00**	**429 E**	**433 E**
bis(2-ethylhexyl)phthalate	6.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	6.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1 J	0.41 J	ND

Table 2-4 (Cont'd)
Summary of Chemicals of Concern

Fourth Quarterly Monitoring Report
Operable Unit 1
Naval Air Station Jacksonville
Jacksonville, Florida

Compound	GCTL	MW-93				MW-95				MW-97			
		Feb 99	May 99	Aug 99	Nov 99	Feb 99	May 99	Aug 99	Nov 99	Feb 99	May 99	Aug 99	Nov 99
Vinyl chloride	1.0	ND	ND	ND	ND	ND	ND	ND	ND	**1.90**	**1.80**	**2.70**	ND
1,1-Dichloroethene	7.0	ND	ND	ND	ND	ND	ND	ND	ND	0.55 J	ND	ND	ND
1,2-Dichloroethane	3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	3.0	ND	ND	ND	ND	ND	ND	ND	0.73 J	**53.40**	**36.90**	**55.30**	**5.10**
trans-1,2-Dichloroethene	100.00	ND	ND	ND	ND	ND	ND	ND	ND	19.30	12.30	21.60	1.60
cis-1,2-Dichloroethene	70.00	ND	ND	ND	ND	ND	ND	ND	ND	**103.00 E**	62.80	**105 E**	7.90
bis(2-ethylhexyl)phthalate	6.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	6.8	ND	ND	ND	ND	ND	ND	ND	6.5 J	ND	ND	ND	ND

Table 2-4 (Cont'd)
Summary of Chemicals of Concern

Compound	GCTL	MW-98				MW-100				MW-101			
		Feb 99	May 99	Aug 99	Nov 99	Feb 99	May 99	Aug 99	Nov 99	Feb 99	May 99	Aug 99	Nov 99
Vinyl chloride	1.0	ND	ND	ND	ND	**1.30**	**1.30**	ND	0.94 J	**13.80**	**25.20**	**11.40**	**4.90**
1,1-Dichloroethene	7.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	3.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	3.0	ND	0.51 J	1.8 J	1.4 J	**10.20**	**11.30**	**9.40**	**8.90**	ND	ND	ND	ND
trans-1,2-Dichloroethene	100.00	ND	ND	ND	ND	10.20	9.20	9.50	7.50	ND	ND	ND	ND
cis-1,2-Dichloroethene	70.00	ND	1.50	2.90	ND	**90.60**	**75.40**	**75.40**	**70.00**	1.50	3.90	0.77	1.50
bis(2-ethylhexyl)phthalate	6.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	6.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 2-4 (Cont'd)
Summary of Chemicals of Concern

Fourth Quarterly Monitoring Report
Operable Unit 1
Naval Air Station Jacksonville
Jacksonville, Florida

Compound	GCTL	MW-102			
		Feb 99	May 99	Aug 99	Nov 99
Vinyl chloride	1.0	**53.70**	**62.70**	**62.80**	**68.40**
1,1-Dichloroethene	7.0	1.20 J	ND	1 J	1.7 J
1,2-Dichloroethane	3.0	ND	ND	ND	ND
Benzene	1.0	ND	ND	ND	ND
Trichloroethylene	3.0	ND	ND	ND	0.63
1,2-trans-Dichloroethene	100.00	4.30	3.1 J	1.10	2.20
1,2-cis-Dichloroethene	70.00	**181 E**	**202.00**	**174 E**	**215 E**
bis(2-Ethylhexyl)phthalate	6.0	ND	ND	ND	ND
Naphthalene	6.8	ND	ND	ND	ND

Notes: All units are micrograms per liter (ug/l).
GCTL - Groundwater Cleanup Target Levels as presented in the "Monitoring Plan for Selected Remedy, Operable Unit 1",(HLA, 1998)
J = Concentration listed represents an estimated value due to analyte detection at a concentration less than the Rported Detection Limit (RDL) or the Practical Quantitation Limit (PQL) and greater than the Method Detection Limit (MDL).
E = Identified compound whose concentration exceeds the upper level of the calibration range of the instrument.
ND = Non Detect.
Bolded value = Concentration exceeds GCTLs.

Table 2-4
Summary of Chemicals of Concern

First Semi-Annual Monitoring Report
Operable Unit 1
Naval Air Station Jacksonville
Jacksonville, Florida
June-00

Compound	GCTLs	MW-12	MW-18	MW-19	MW-22	MW-67	MW-84	MW-85	MW-89	MW-93	MW-95
VOCs											
Vinyl chloride	1.0	**6.00**	**19.00**	**16.00**	ND	**4.00**	ND	ND	**720**	ND	ND
1,1-Dichloroethene	7.0	ND	**11.00**	4.00	ND	ND	ND	ND	**120**	ND	ND
1,2-Dichloroethane	3.0	0.9 J	ND	ND	ND	ND	ND	ND	**10**	ND	ND
Benzene	1.0	**16.00**	ND	ND	ND	ND	ND	ND	**65**	ND	ND
Trichloroethylene	3.00	**4.00**	**58.00**	**300**	**8.00**	**3.00**	ND	ND	**3200**	ND	ND
trans-1,2-Dichloroethene	100.00	0.8 J	6	38.00	0.6 J	6	ND	ND	6.00	ND	ND
cis-1,2-Dichloroethene	70.00	8.00	**83.00**	**210**	3.00	45	ND	ND	**750**	ND	ND

Compound	GCTLs	MW-97	MW-98	MW-100	MW-101	MW-102
VOCs						
Vinyl chloride	1.0	ND	ND	**4.00**	**10.0**	**70.0**
1,1-Dichloroethene	7.0	ND	ND	ND	ND	1
1,2-Dichloroethane	3.0	ND	ND	ND	ND	ND
Benzene	1.0	ND	ND	ND	ND	ND
Trichloroethylene	3.00	2.00	1.00	**6.00**	ND	ND
trans-1,2-Dichloroethene	100.00	ND	ND	8.00	ND	0.7J
cis-1,2-Dichloroethene	70.00	3.00	2.00	**85**	0.8 J	**140**

Notes: All units are micrograms per liter (µg/L).
GCTL = Groundwater Cleanup Target Levels as presented in the "Monitoring Plan for Selected Remedy, Operable Unit 1",(HLA, 1998)
J = Concentration listed represents an estimated value due to analyte detection at a concentration less than the Reported Detection Limit (RDL) or the Practical Quantitation Limit (PQL) and greater than the Method Detection Limit (MDL).
VOC = Volatile Organic Compound
ND = Non Detect.
Bolded value = Concentration exceeds GCTLs.

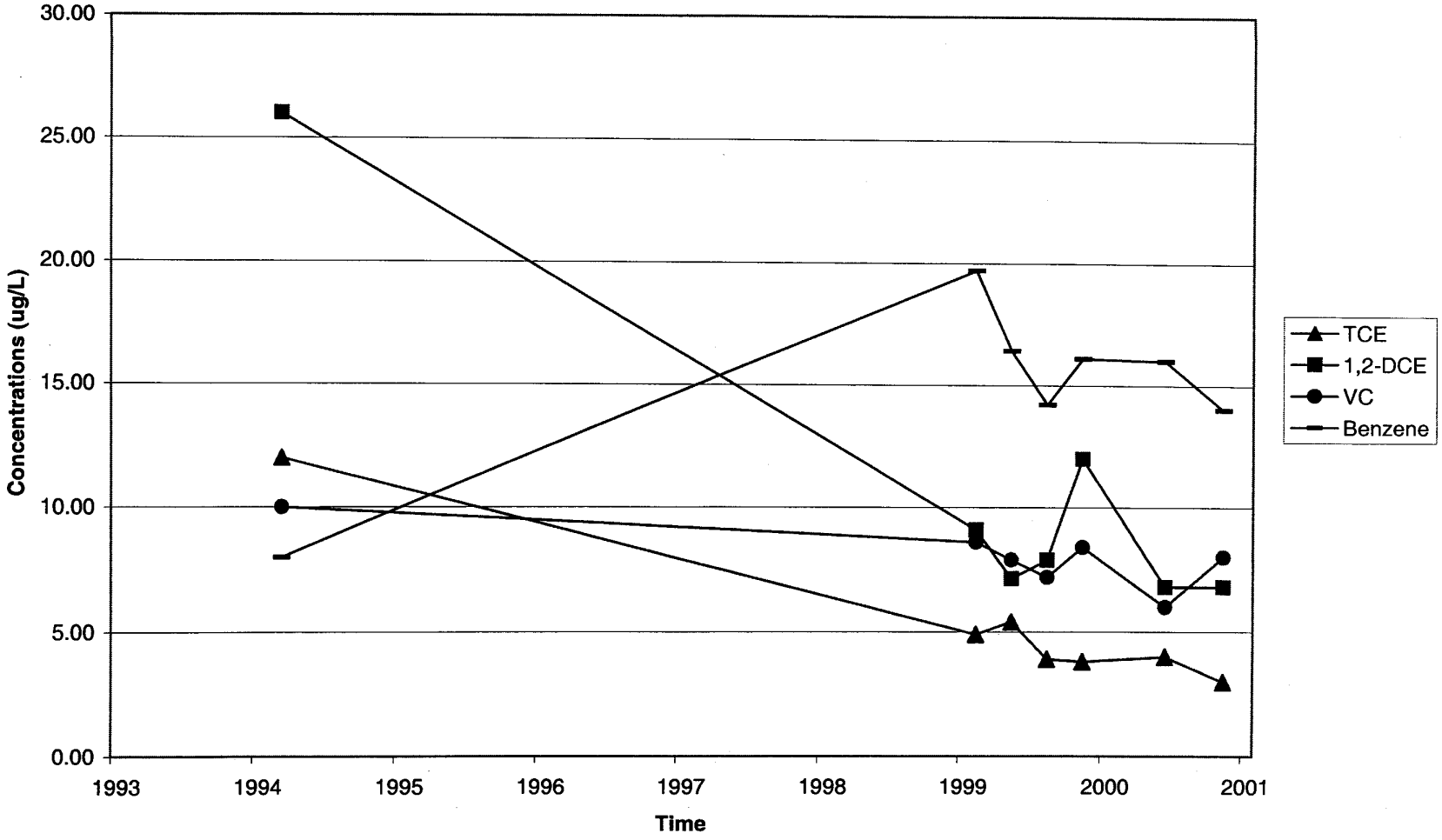
Table 2-4
Summary of Chemicals of Concern

Second Semi-Annual Monitoring Report
Operable Unit 1
Naval Air Station Jacksonville
Jacksonville, Florida
November-2000

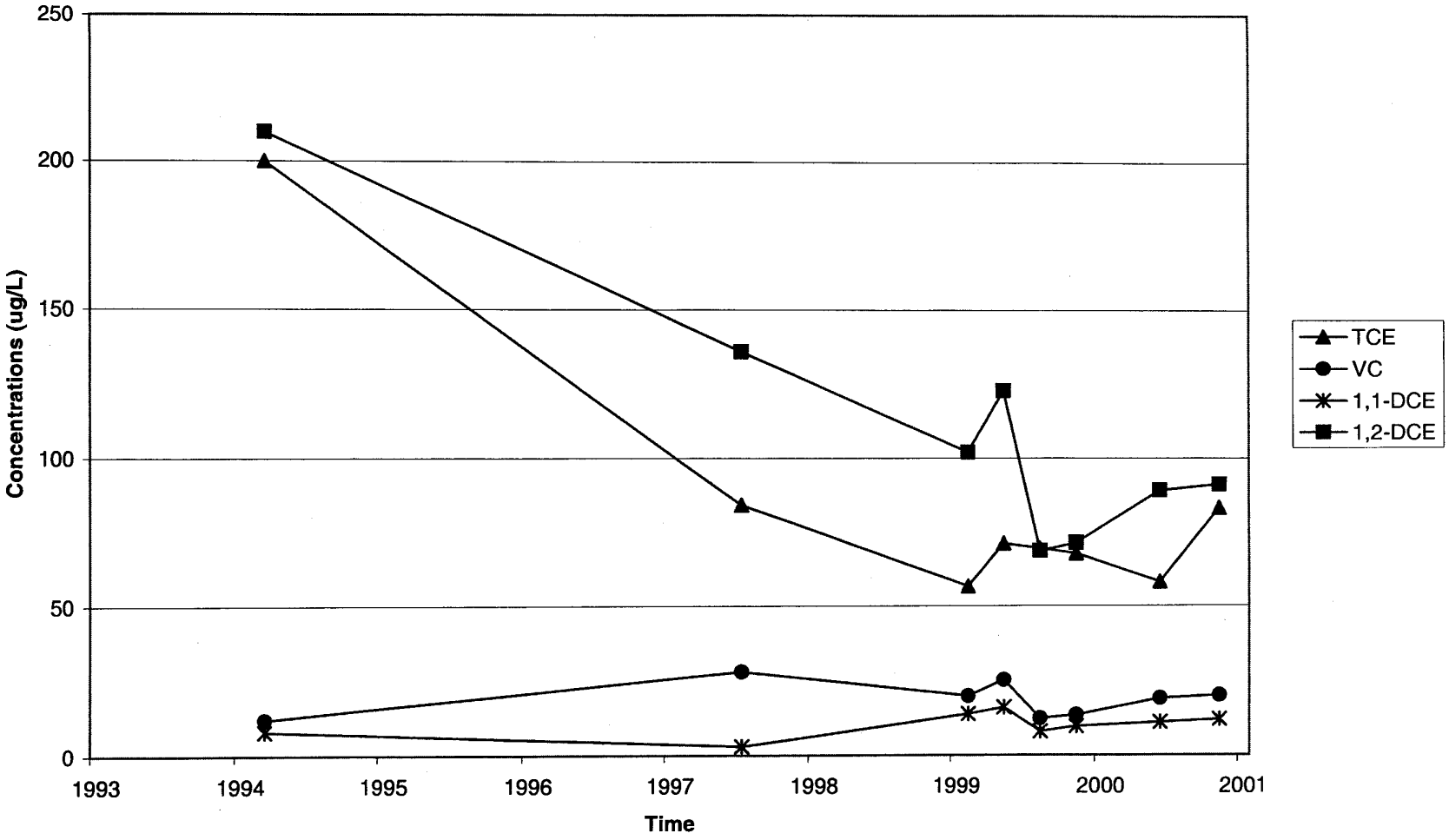
Compound	GCTLs	MW-12	MW-18	MW-19	MW-22	MW-67	MW-89	MW-93	MW-95	MW-97	MW-98	MW-100	MW-101	MW-102
Volatile Organic Compounds														
Vinyl chloride	1.0	**8**	**20**	**10**	ND	**5**	**1300**	ND	ND	**3**	ND	ND	**2**	**32**
1,1-Dichloroethene	7.0	ND	**12**	3	ND	ND	**150**	ND	ND	0.7 J	ND	ND	ND	ND
1,2-Dichloroethane	3.0	0.7 J	ND	ND	ND	ND	**14**	ND	ND	ND	ND	ND	ND	ND
Benzene	1.0	**14**	ND	ND	ND	ND	**82**	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	3.00	**3**	**83**	**390**	**6**	**4**	**4200**	0.5 J	ND	**55**	1	**10**	0.9 J	1
trans-1,2-Dichloroethene	100.00	0.8 J	6	24	ND	6	6	ND	ND	23	ND	9	ND	ND
cis-1,2-Dichloroethene	70.00	6	**85**	**170**	3	54	**1000**	ND	ND	**120**	3	**76**	0.3 J	32

Notes: All units are micrograms per liter (µg/L).
GCTL = Groundwater Cleanup Target Levels as presented in the "Monitoring Plan for Selected Remedy, Operable Unit 1",(HLA, 1998)
J = Concentration listed represents an estimated value due to analyte detection at a concentration less than the Reported Detection Limit (RDL) or the Practical Quantitation Limit (PQL) and greater than the Method Detection Limit (MDL).
ND = Non Detect.
Bolded value = Concentration exceeds GCTLs.

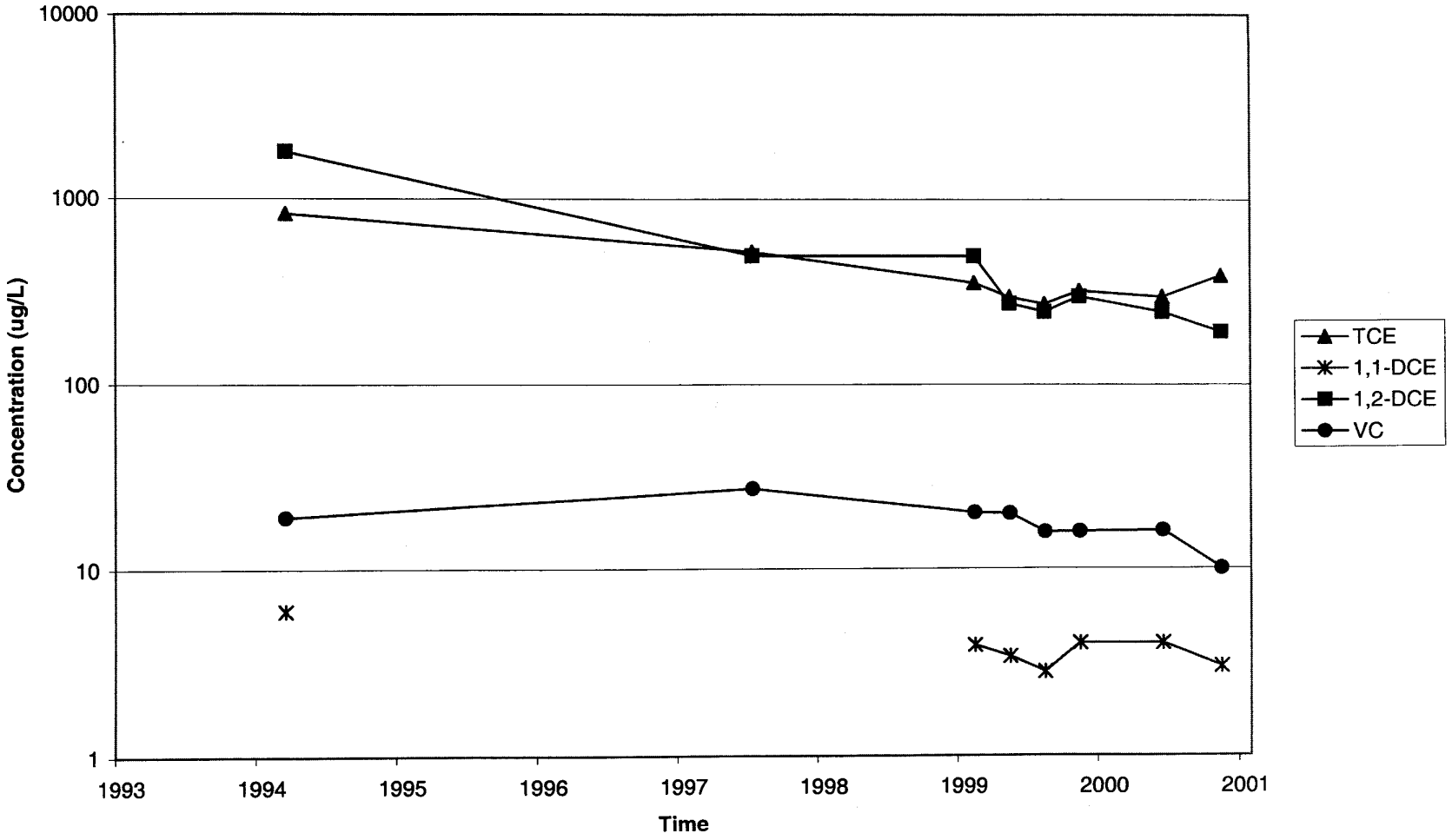
Intermediate Zone Well MW-12
VOC Concentration Vs. Time



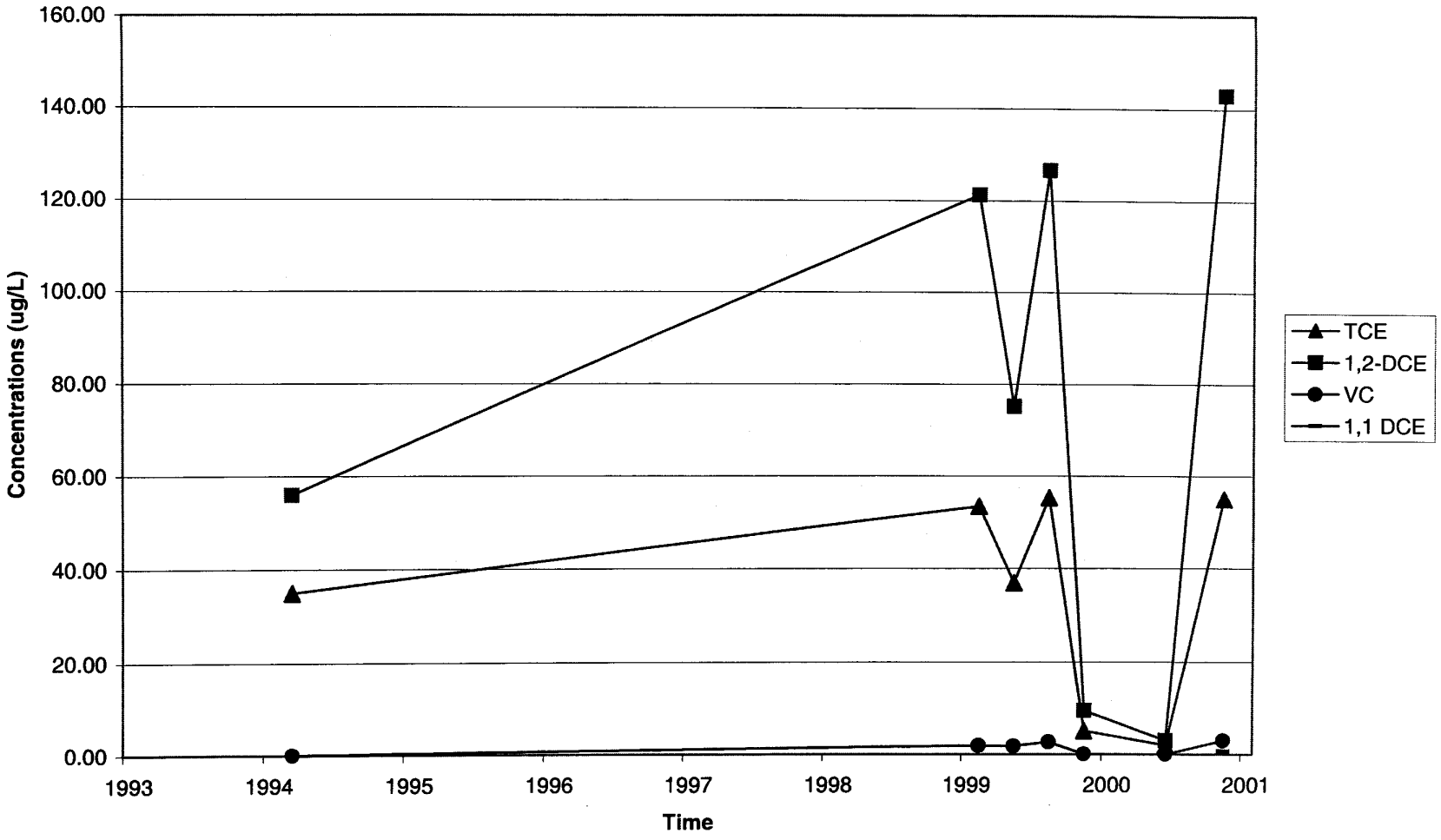
Intermediate Zone Well MW-18
VOC Concentration Vs. Time



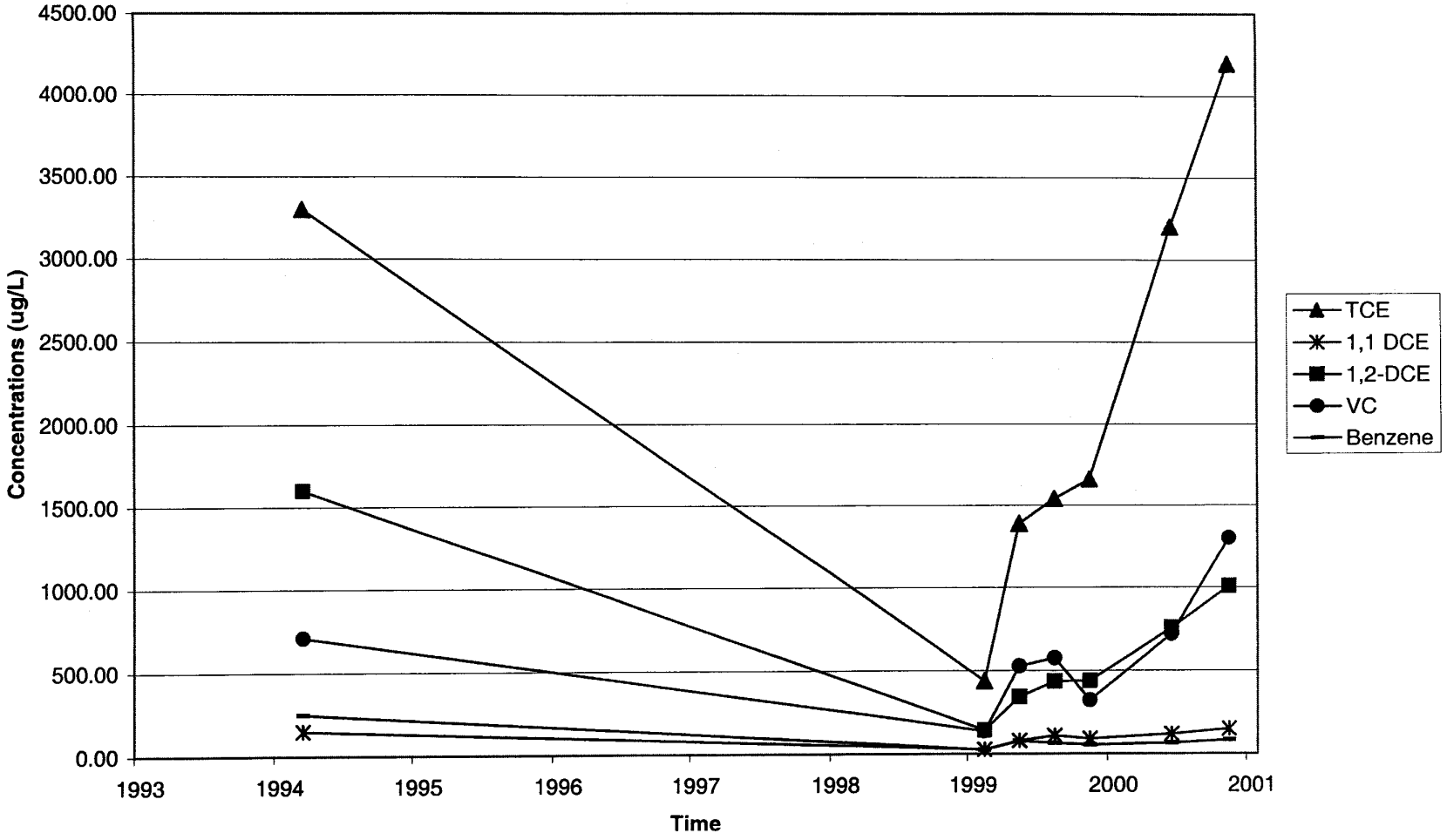
Intermediate Zone Well MW-19
VOC Concentration Vs. Time



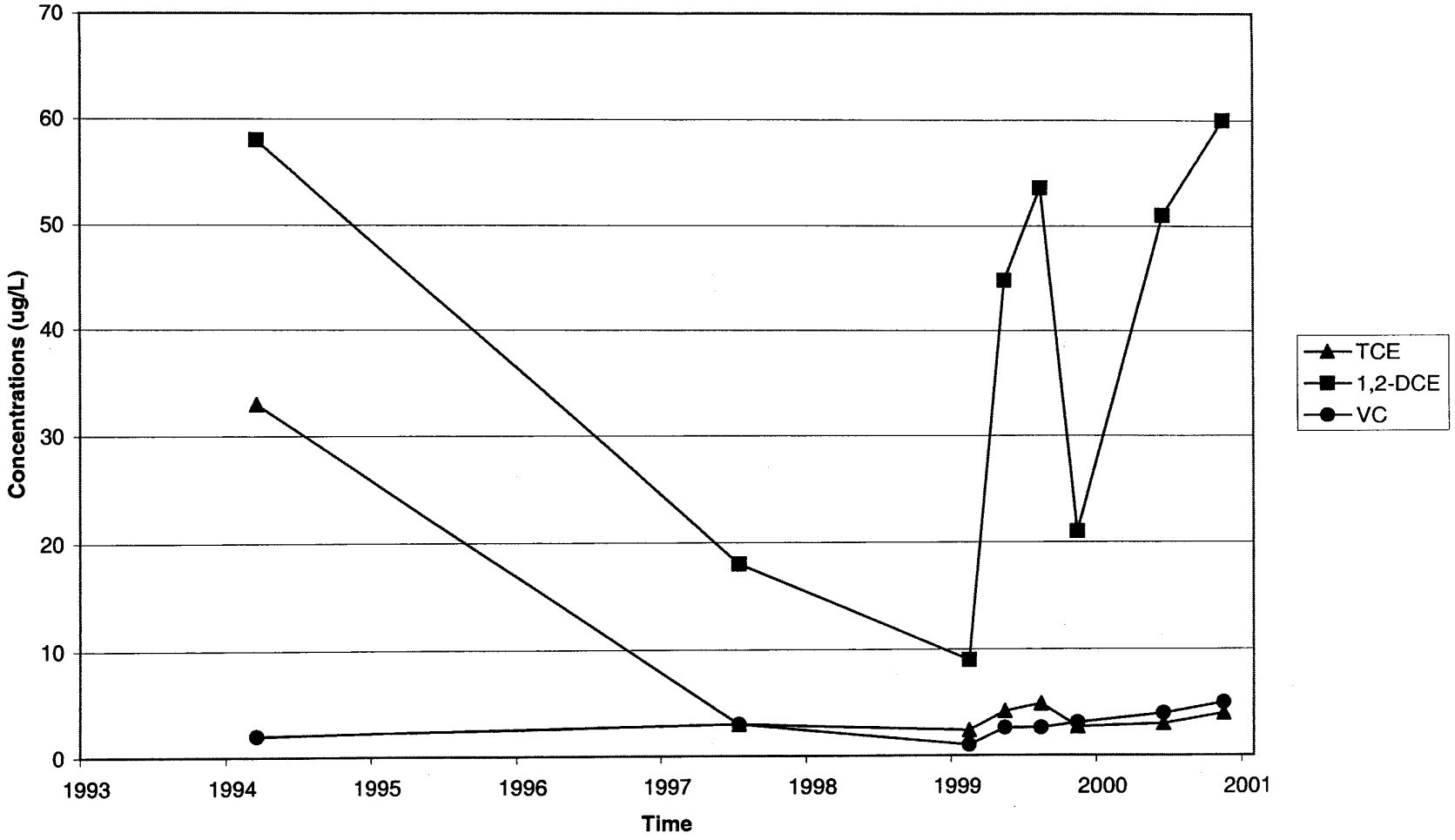
Intermediate Zone Well MW-97
VOC Concentration Vs. Time



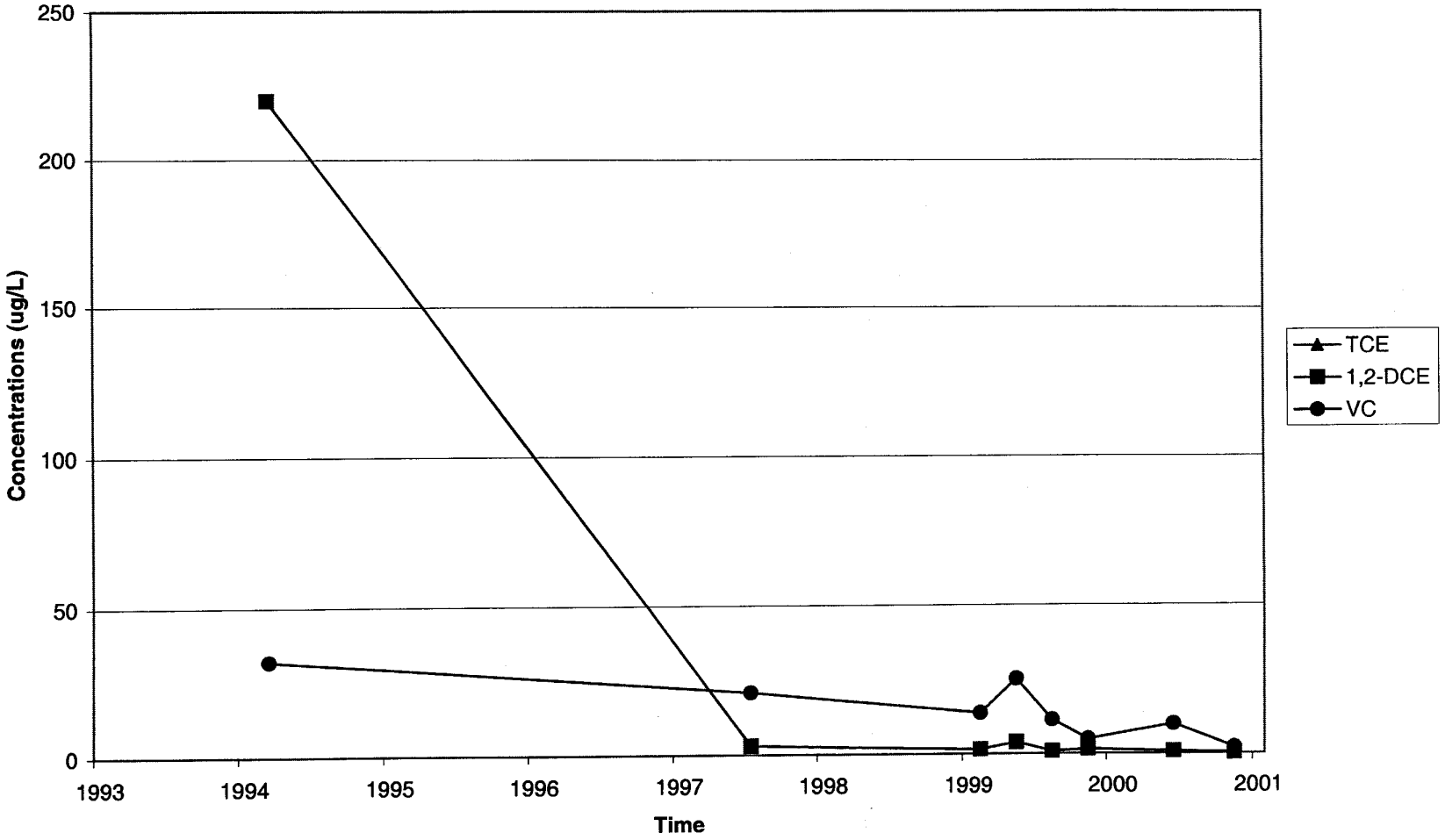
Shallow Zone Well MW-89
VOC Concentration Vs. Time



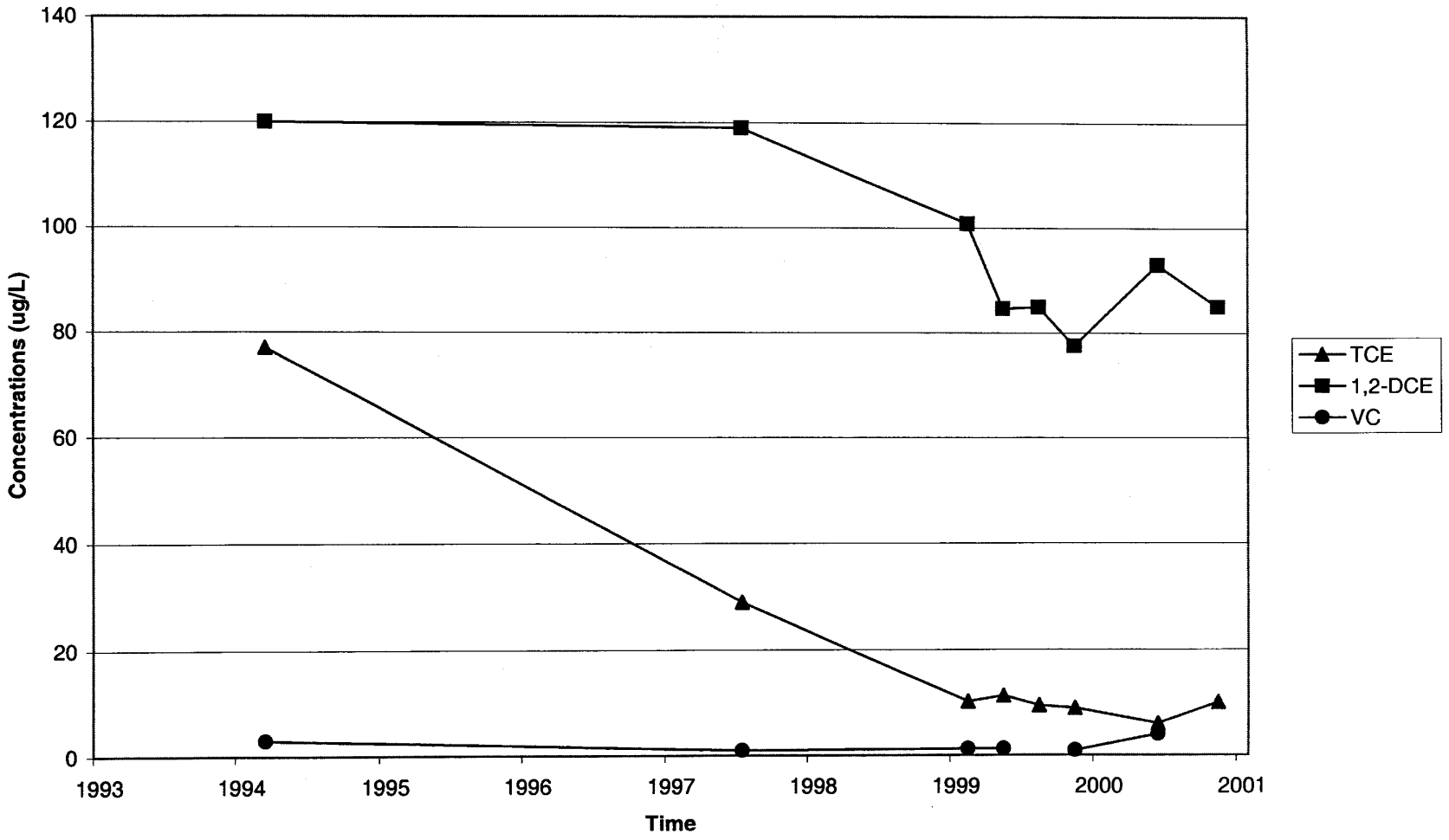
Shallow Zone Well MW-67
VOC Concentration Vs. Time



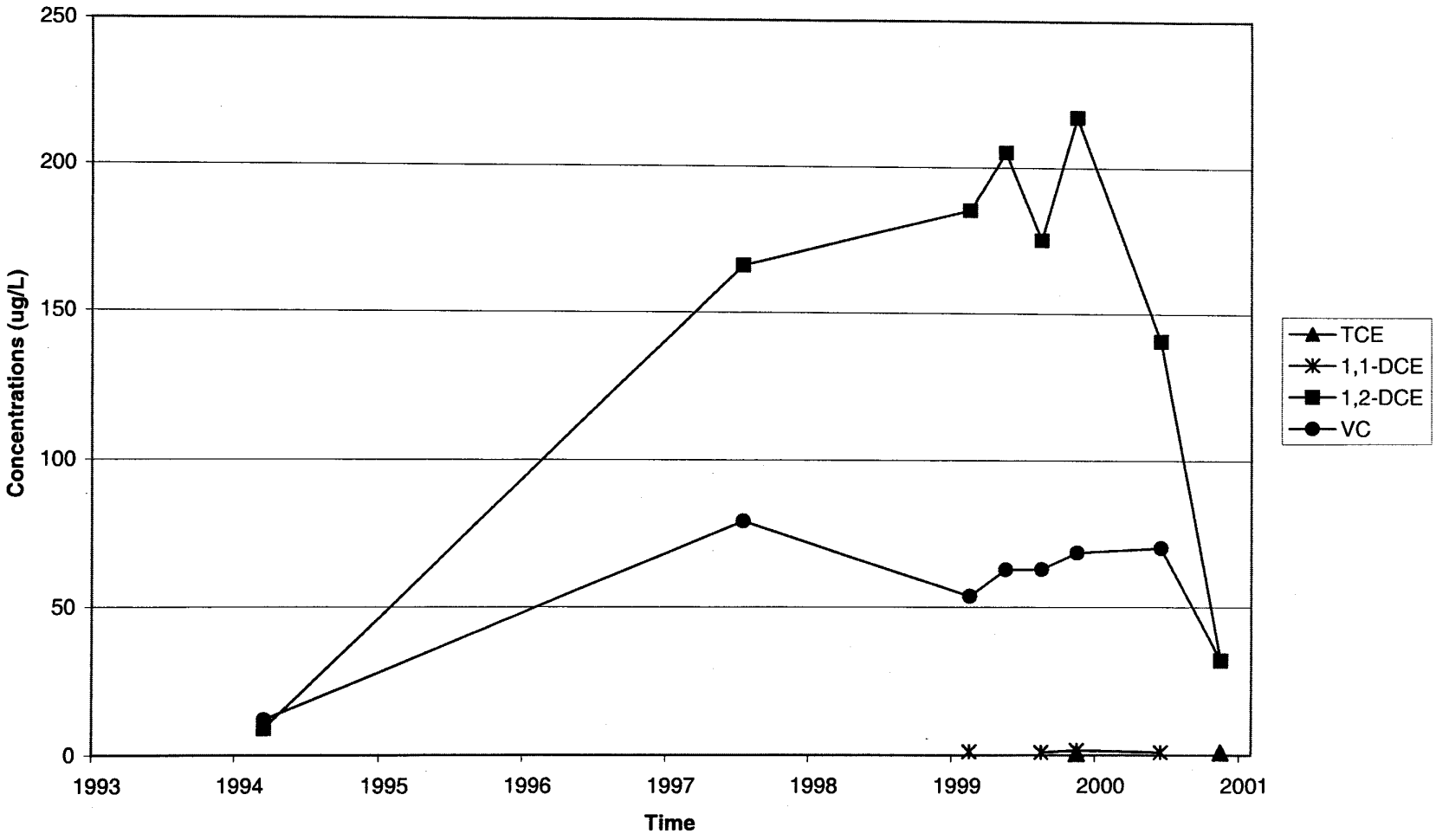
Shallow Zone Well MW-101
VOC Concentration Vs. Time



Intermediate Zone Well MW-100
VOC Concentration Vs. Time



Intermediate Zone Well MW-102
VOC Concentration Vs. Time



APPENDIX H

OU 2

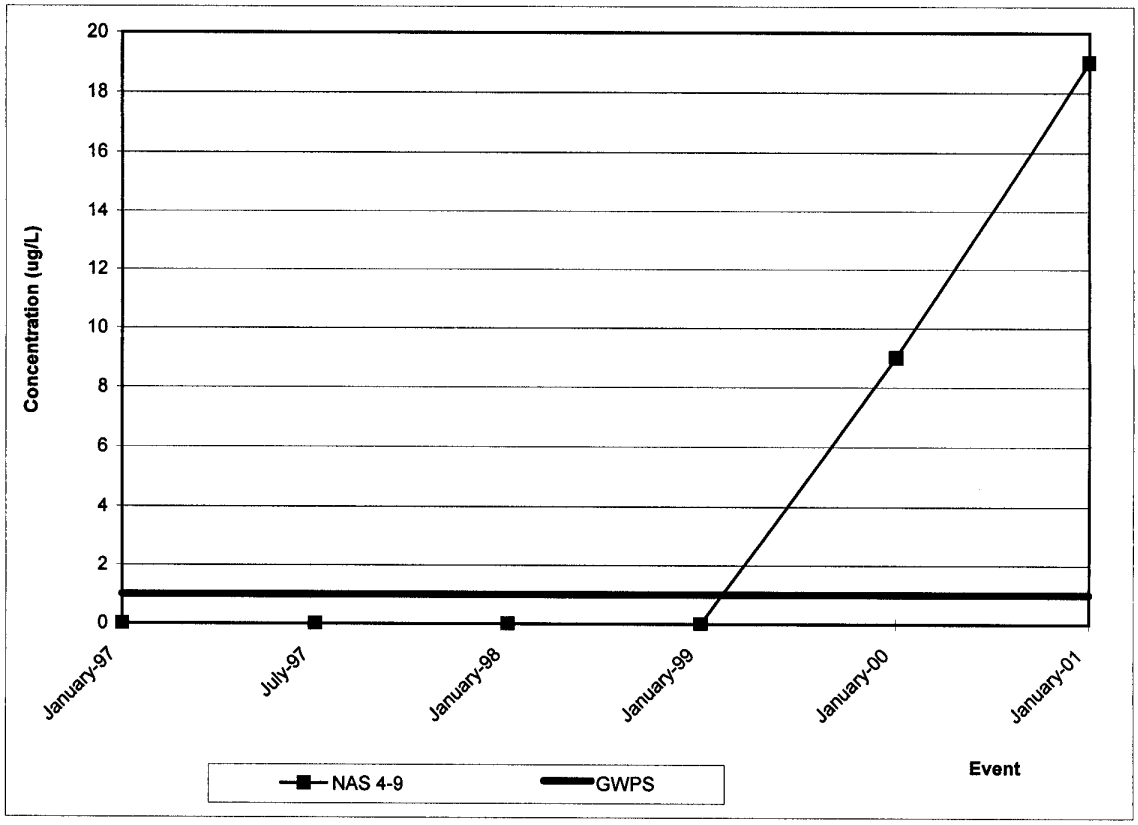
JANUARY 2001 MONITORING EVENT GRAPHS

Provided by Tetra Tech EMI, Inc.

CONCENTRATIONS OF CONTAMINANTS OVER TIME
BENZENE
Background Well (NAS 4-9)
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-9	GWPS
January-97	0	1
July-97	0	1
January-98	0	1
January-99	0	1
January-00	9	1
January-01	19	1

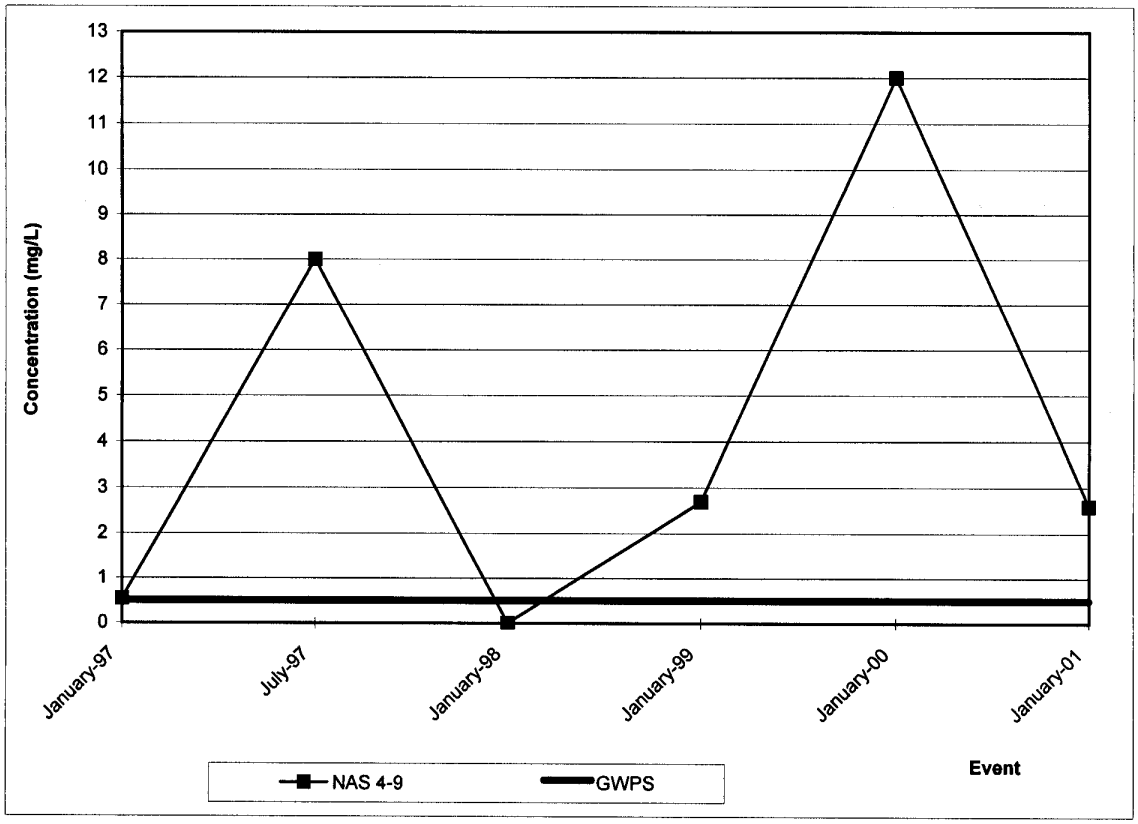
Notes: Results Reported in ug/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
IRON
Background Well (NAS 4-9)
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-9	GWPS
January-97	0.54	0.5
July-97	8	0.5
January-98	0	0.5
January-99	2.7	0.5
January-00	12	0.5
January-01	2.6	0.5

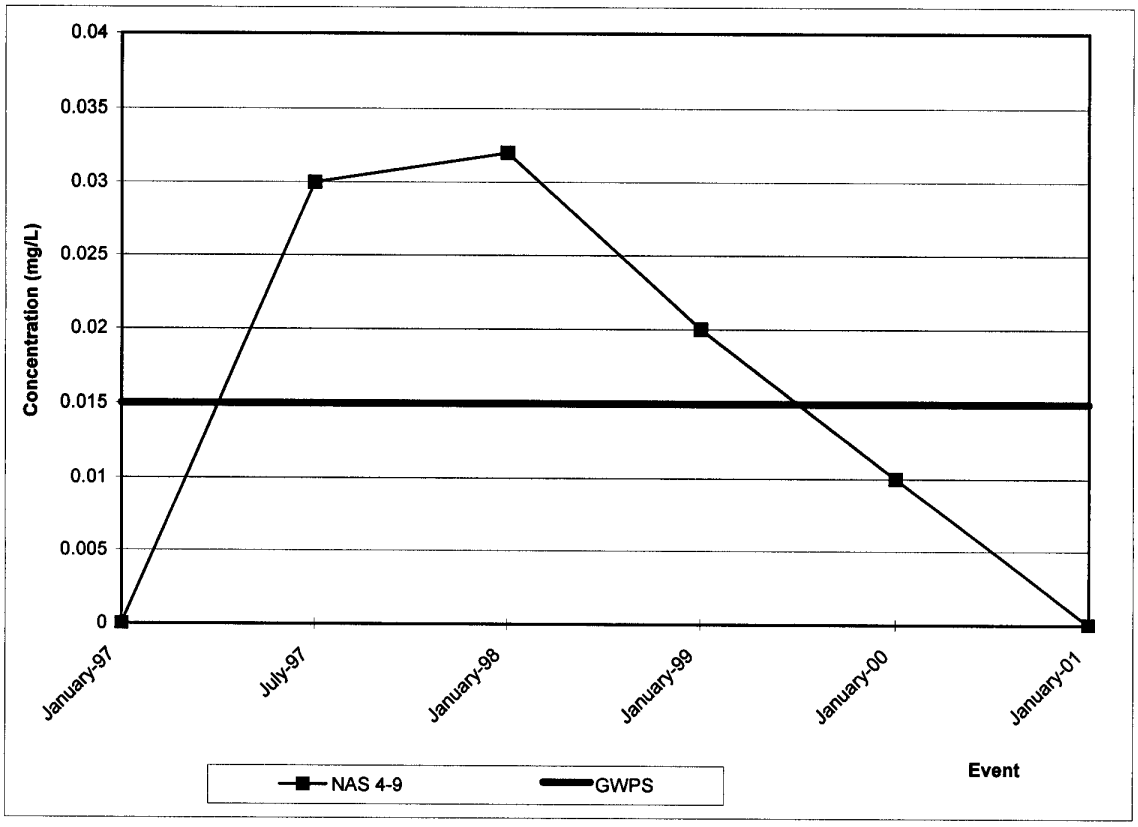
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
LEAD
Background Well (NAS 4-9)
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-9	GWPS
January-97	0	0.015
July-97	0.03	0.015
January-98	0.032	0.015
January-99	0.02	0.015
January-00	0.01	0.015
January-01	0	0.015

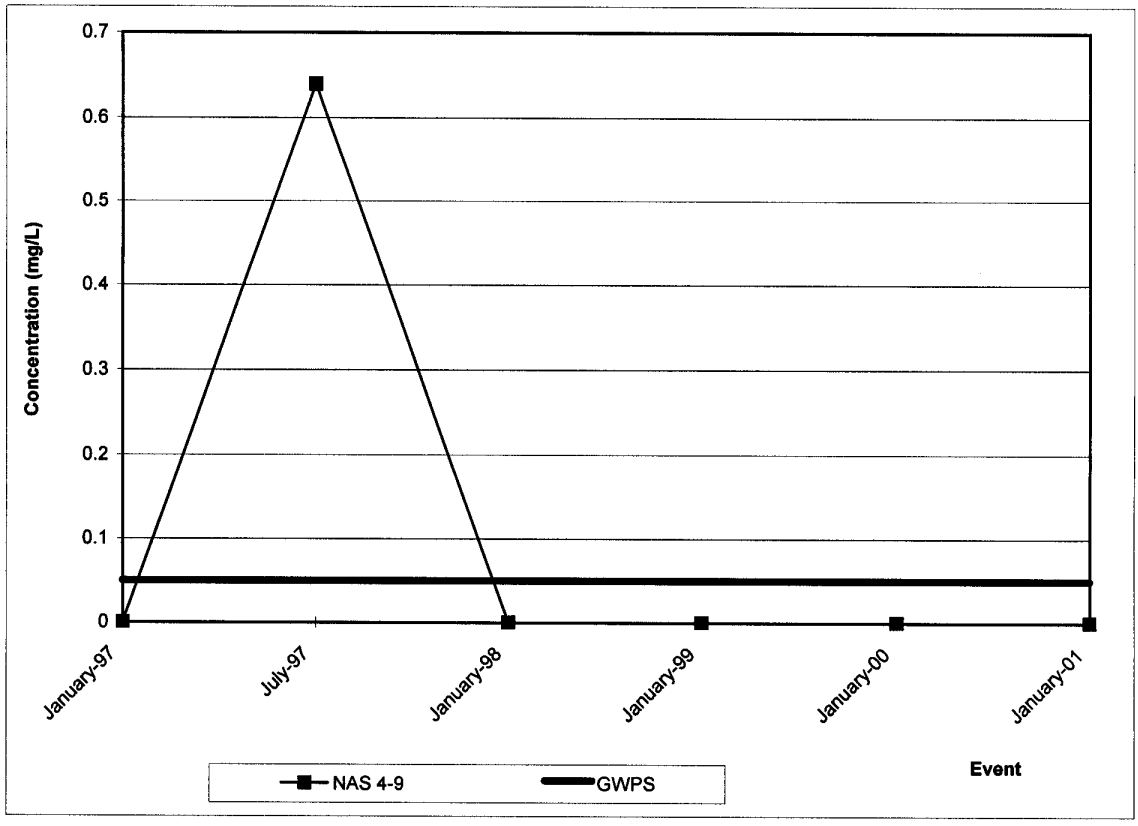
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
ARSENIC
Background Well (NAS 4-9)
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-9	GWPS
January-97	0	0.05
July-97	0.64	0.05
January-98	0	0.05
January-99	0	0.05
January-00	0	0.05
January-01	0	0.05

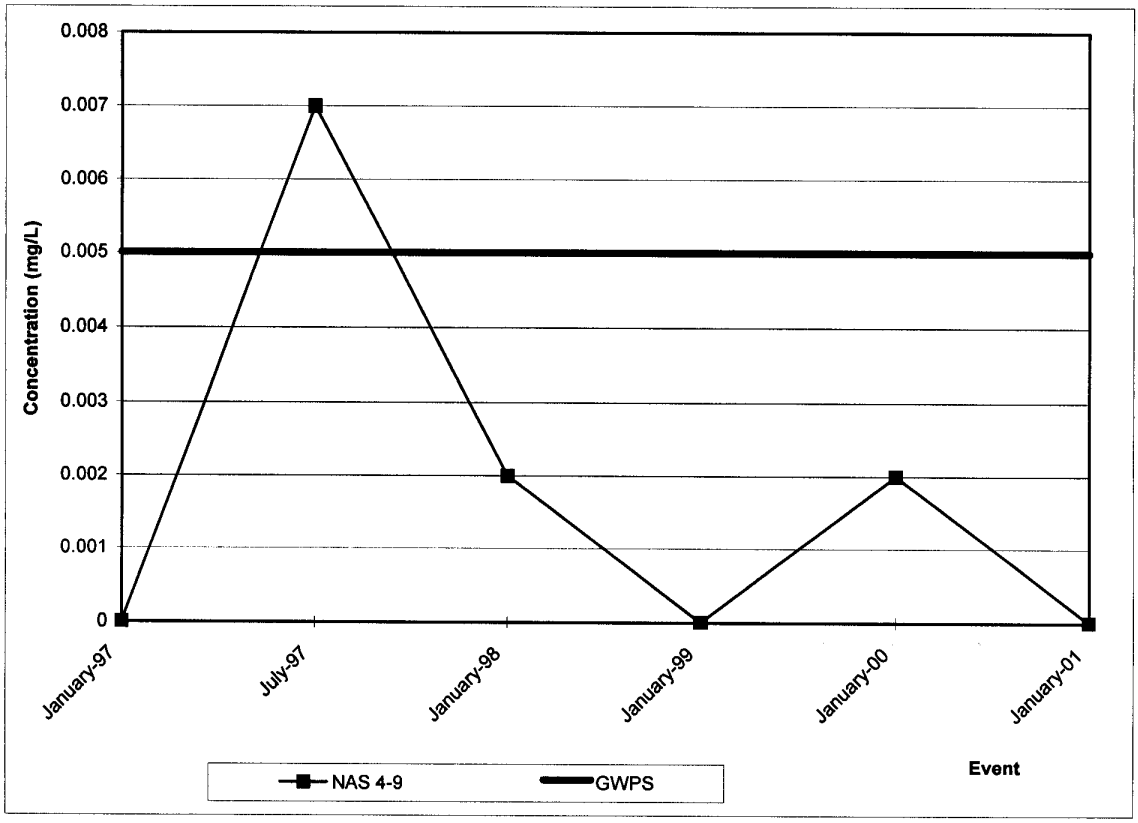
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
CADMIUM
Background Well (NAS 4-9)
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-9	GWPS
January-97	0	0.005
July-97	0.007	0.005
January-98	0.002	0.005
January-99	0	0.005
January-00	0.002	0.005
January-01	0	0.005

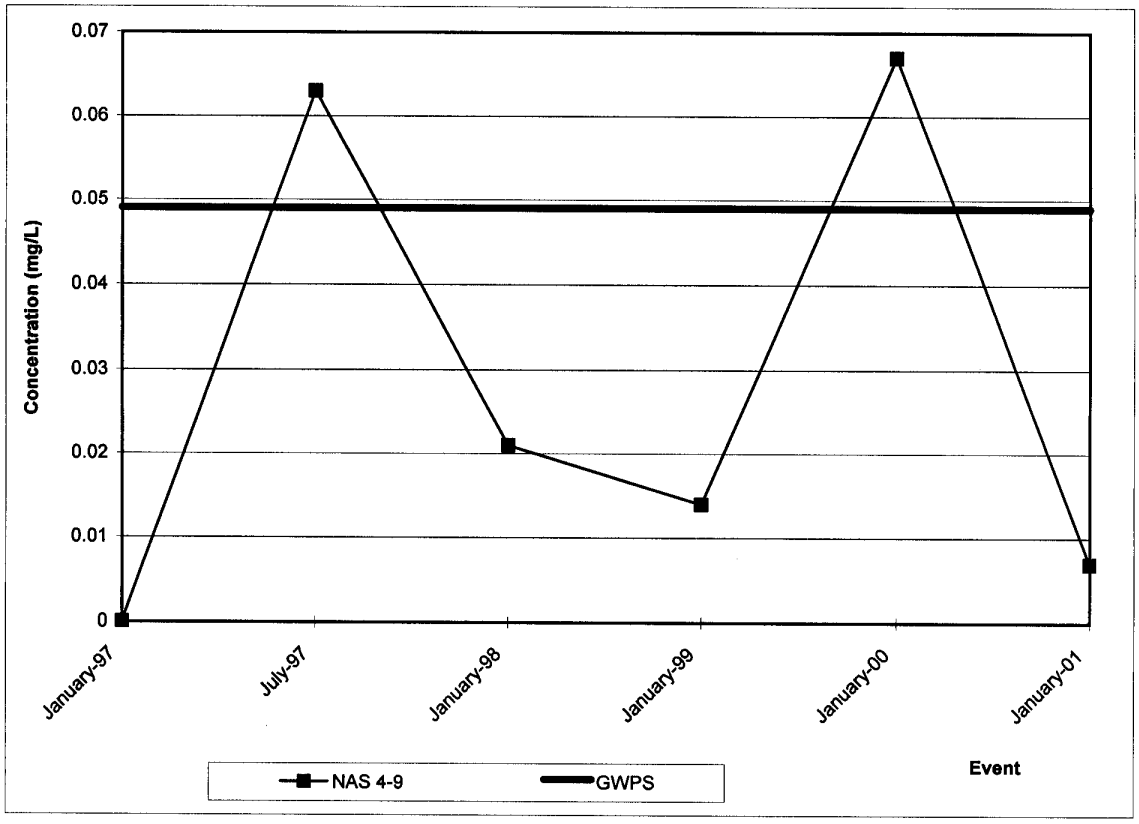
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
VANADIUM
Background Well (NAS 4-9)
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-9	GWPS
January-97	0	0.049
July-97	0.063	0.049
January-98	0.021	0.049
January-99	0.014	0.049
January-00	0.067	0.049
January-01	0.0069	0.049

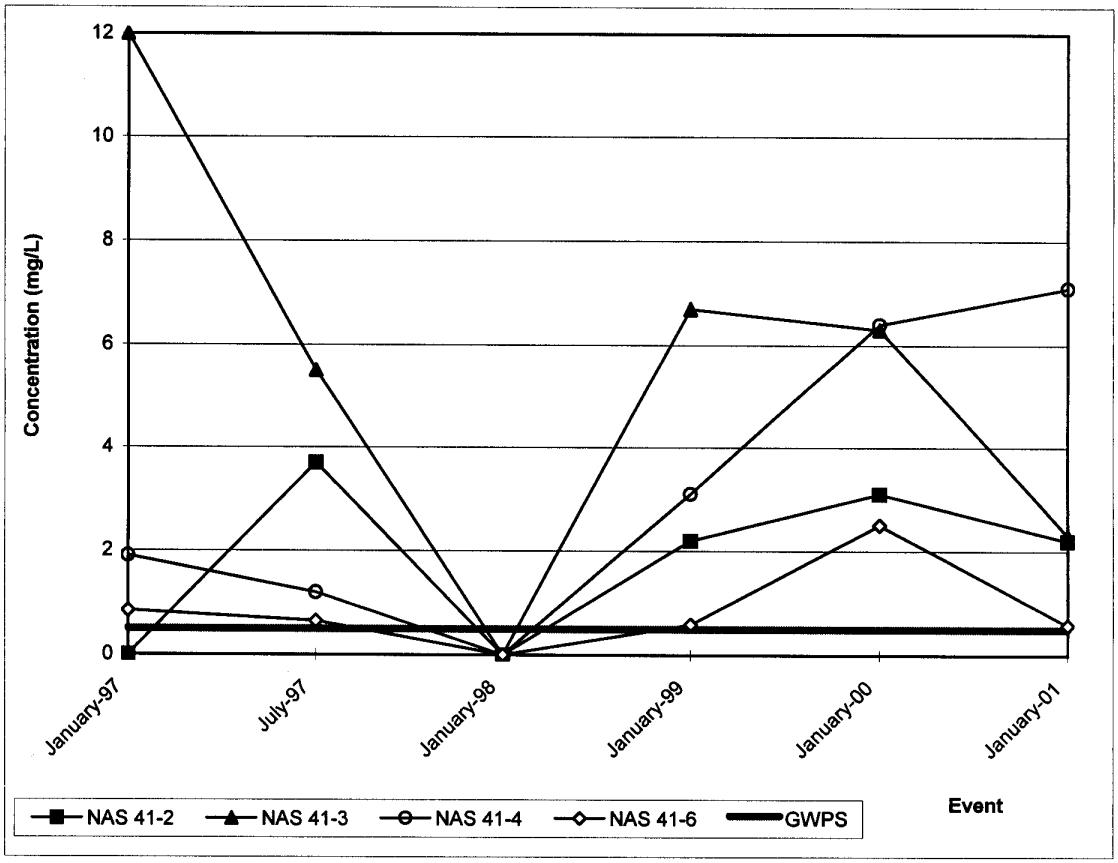
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
IRON
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	12	1.9	0.85	0.5
July-97	3.7	5.5	1.2	0.65	0.5
January-98	0	0	0	0	0.5
January-99	2.2	6.7	3.1	0.59	0.5
January-00	3.1	6.3	6.4	2.5	0.5
January-01	2.2	2.3	7.1	0.58	0.5

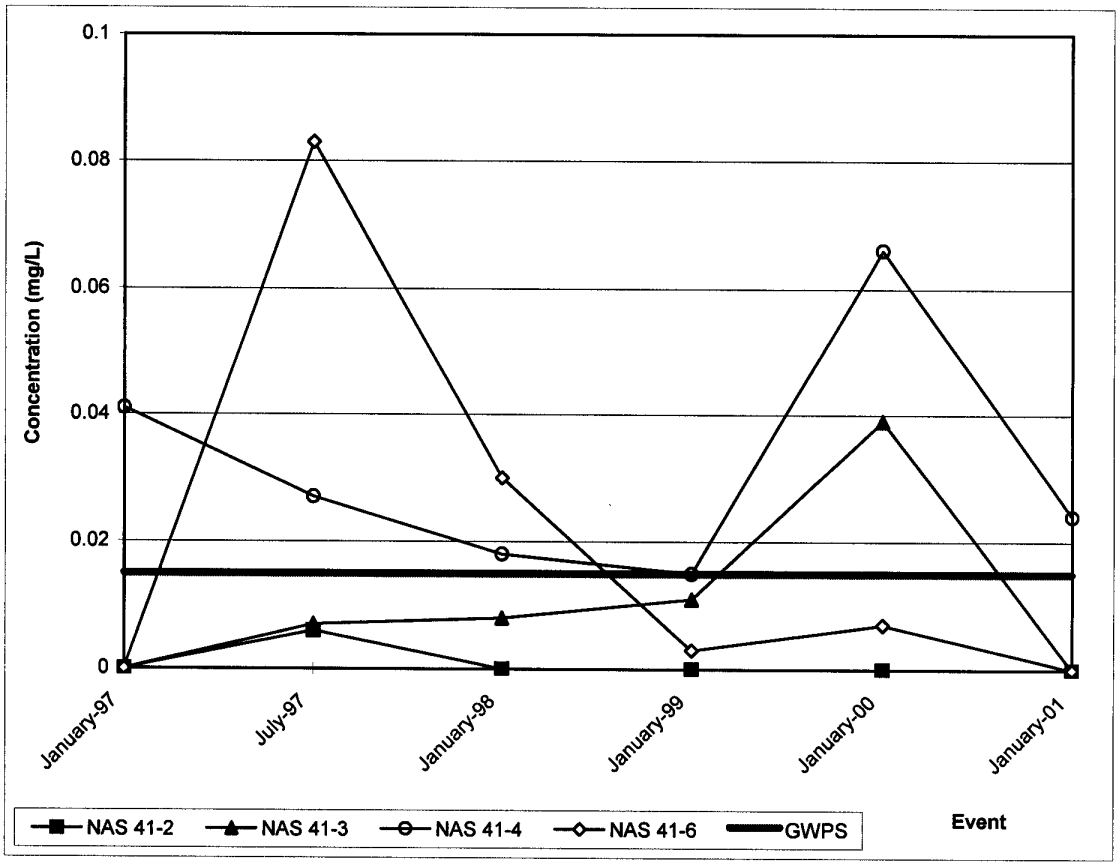
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
LEAD
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	0	0.041	0	0.015
July-97	0.006	0.007	0.027	0.083	0.015
January-98	0	0.008	0.018	0.03	0.015
January-99	0	0.011	0.015	0.003	0.015
January-00	0	0.039	0.066	0.007	0.015
January-01	0	0	0.024	0	0.015

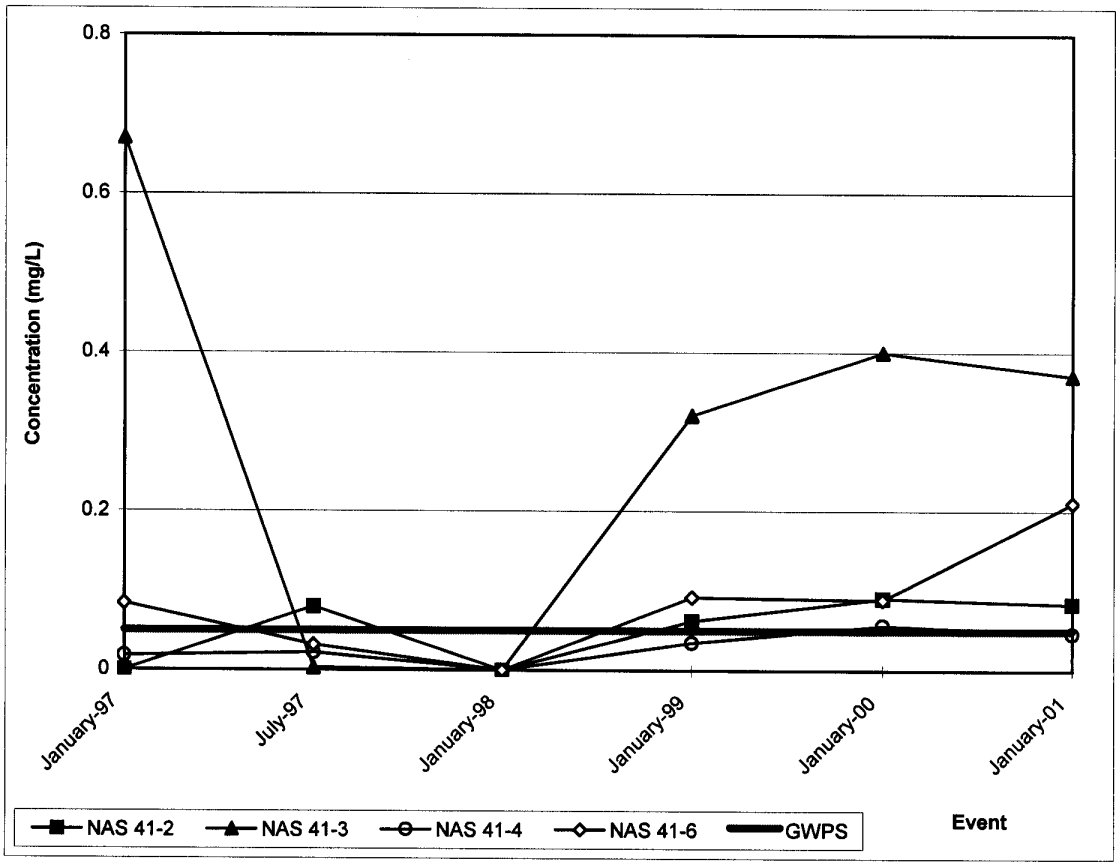
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
MANGANESE
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	0.67	0.018	0.084	0.05
July-97	0.08	0.003	0.022	0.032	0.05
January-98	0	0	0	0	0.05
January-99	0.062	0.32	0.035	0.092	0.05
January-00	0.091	0.4	0.057	0.089	0.05
January-01	0.084	0.37	0.047	0.21	0.05

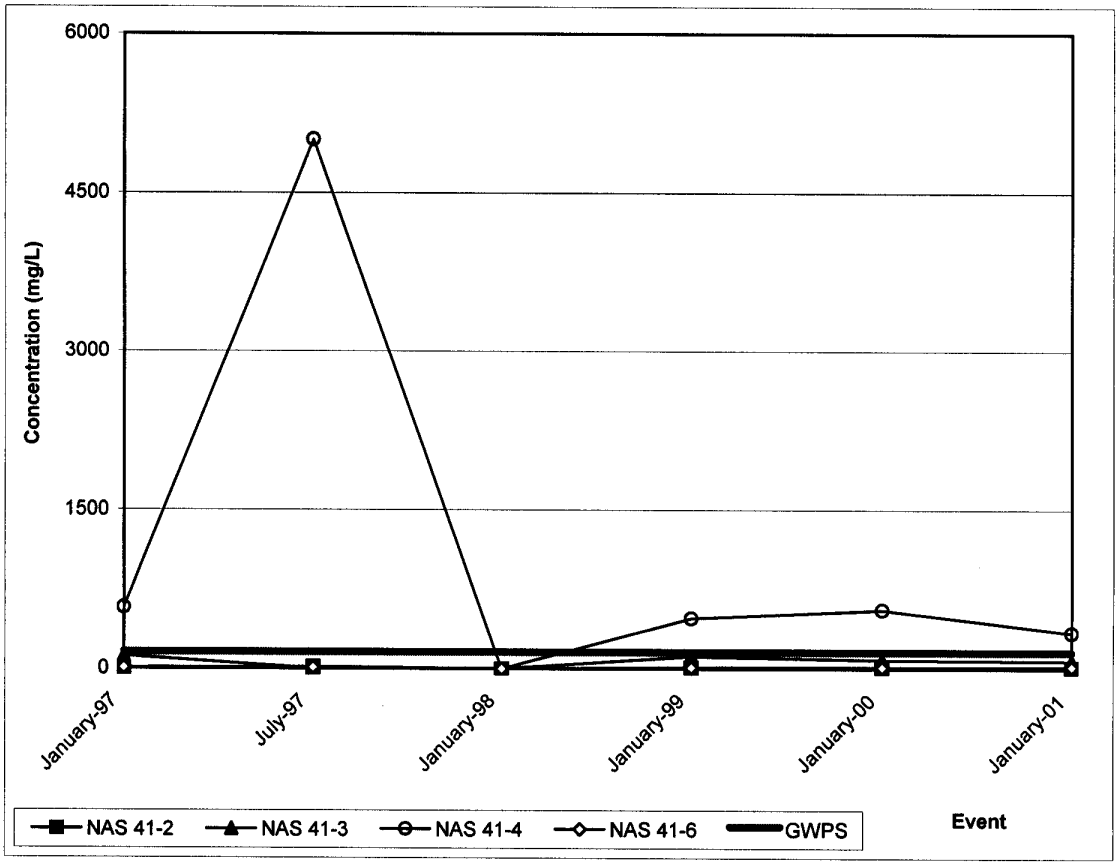
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
SODIUM
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	120	580	9.5	160
July-97	18	1.9	5000	10	160
January-98	0	0	0	0	160
January-99	13	120	480	10	160
January-00	18	85	560	15	160
January-01	17.5	77	345	20.9	160

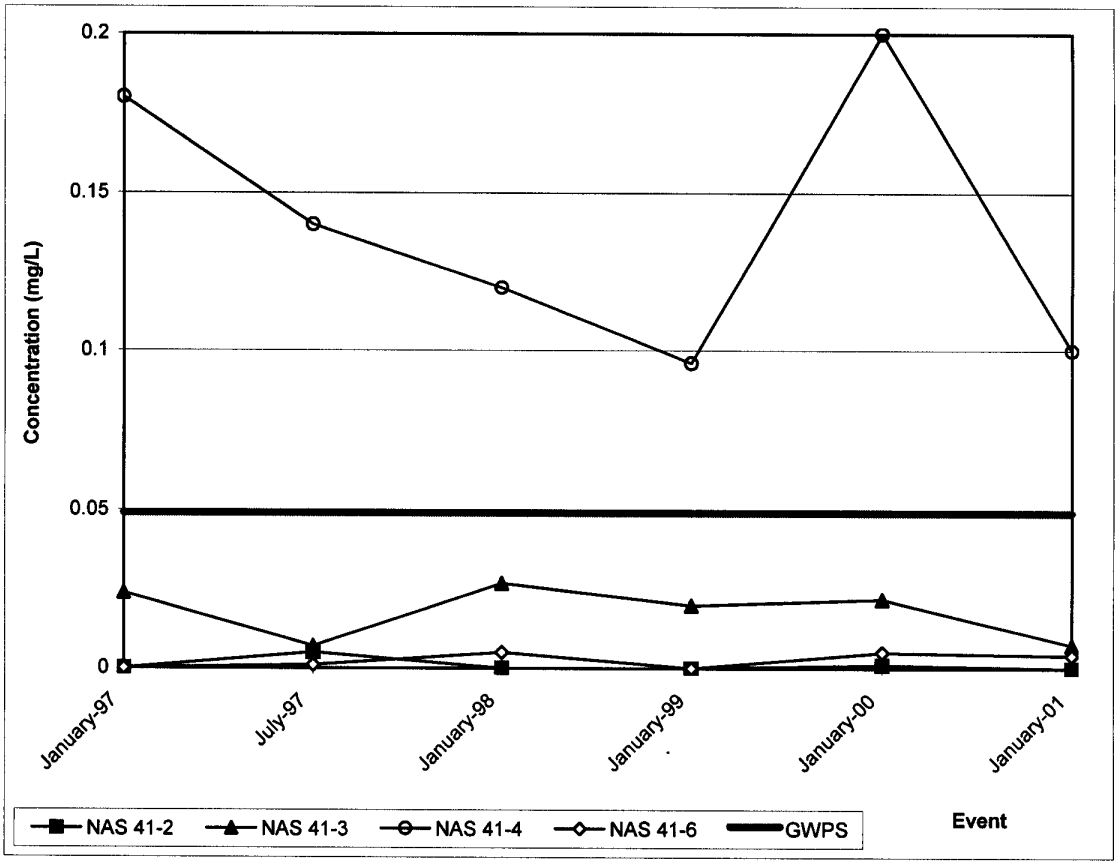
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
VANADIUM
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Events	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	0.024	0.18	0	0.049
July-97	0.005	0.007	0.14	0.001	0.049
January-98	0	0.027	0.12	0.005	0.049
January-99	0	0.02	0.096	0	0.049
January-00	0.001	0.022	0.2	0.005	0.049
January-01	0	0.0074	0.1	0.0041	0.049

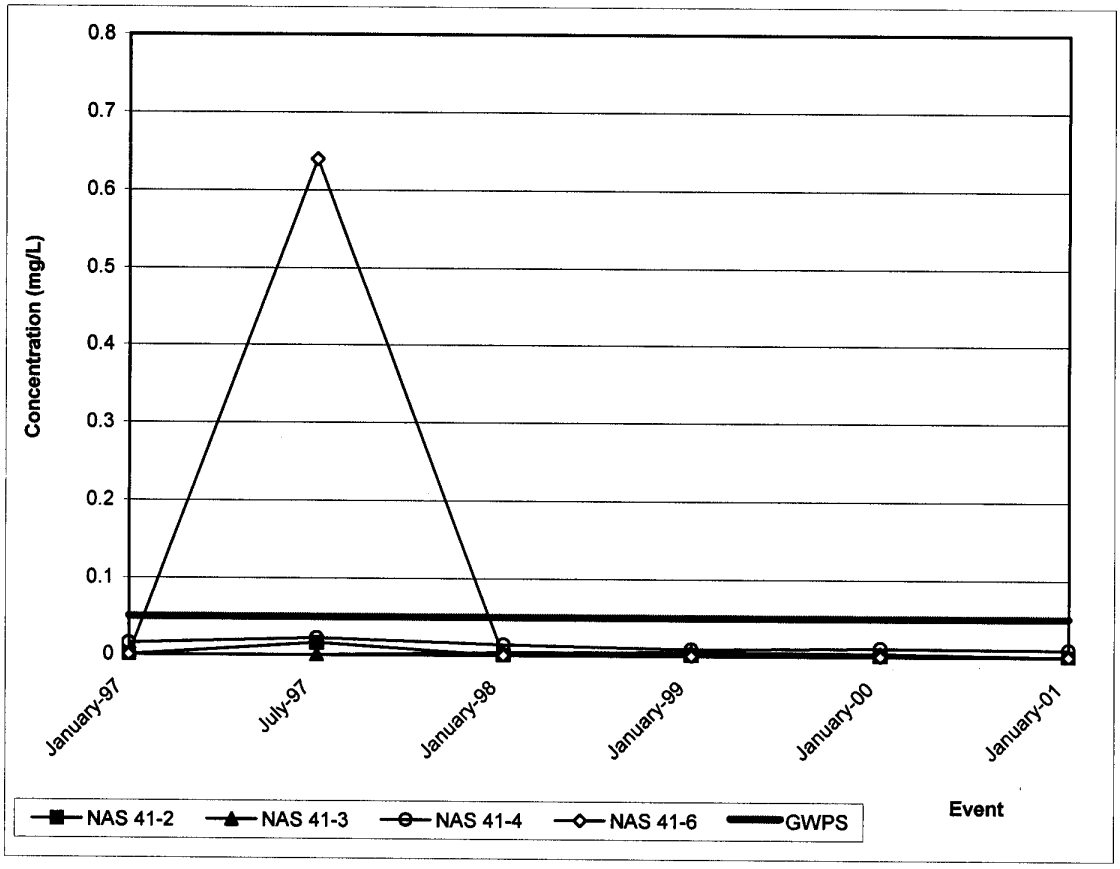
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
ARSENIC
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	0	0.015	0	0.05
July-97	0.016	0	0.022	0.64	0.05
January-98	0	0.004	0.014	0	0.05
January-99	0.002	0.005	0.009	0	0.05
January-00	0.002	0.004	0.011	0	0.05
January-01	0	0	0.0093	0	0.05

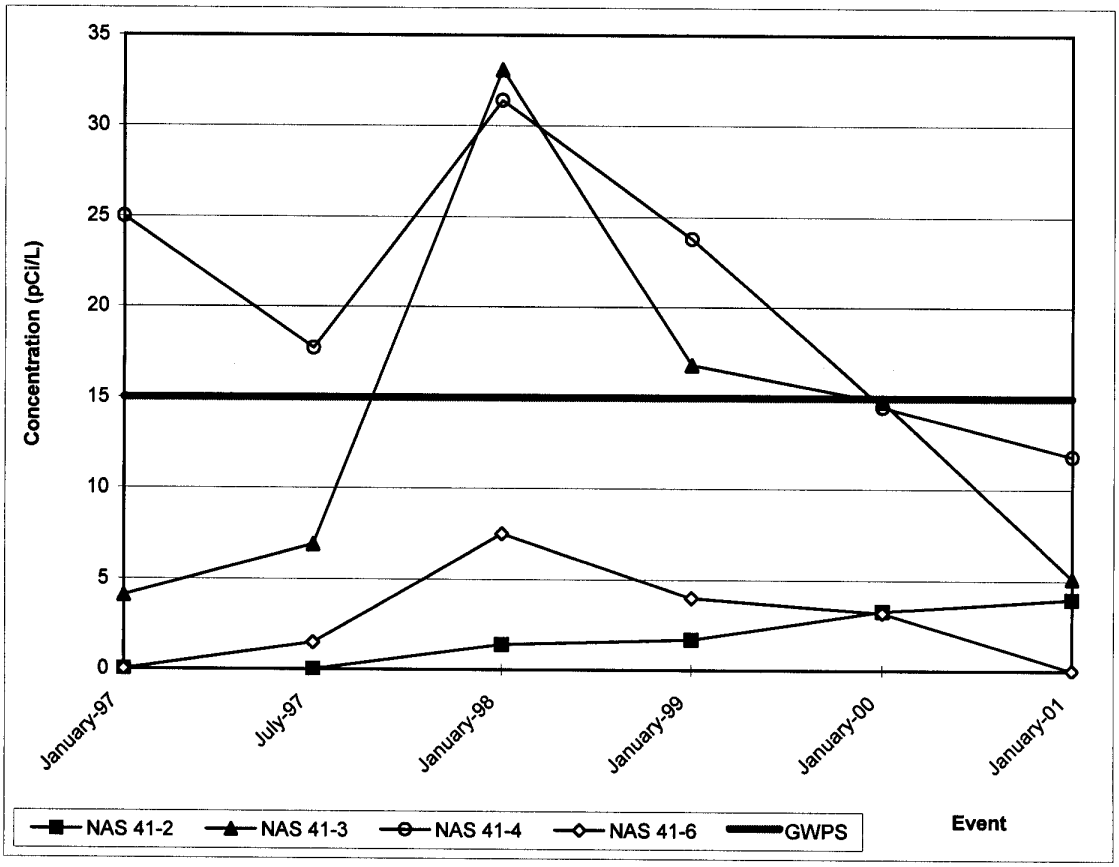
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
GROSS ALPHA
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	4.1	25	0	15
July-97	0	6.9	17.7	1.5	15
January-98	1.4	33.1	31.4	7.5	15
January-99	1.7	16.8	23.8	4	15
January-00	3.3	14.8	14.5	3.2	15
January-01	3.98	5.12	11.8	0	15

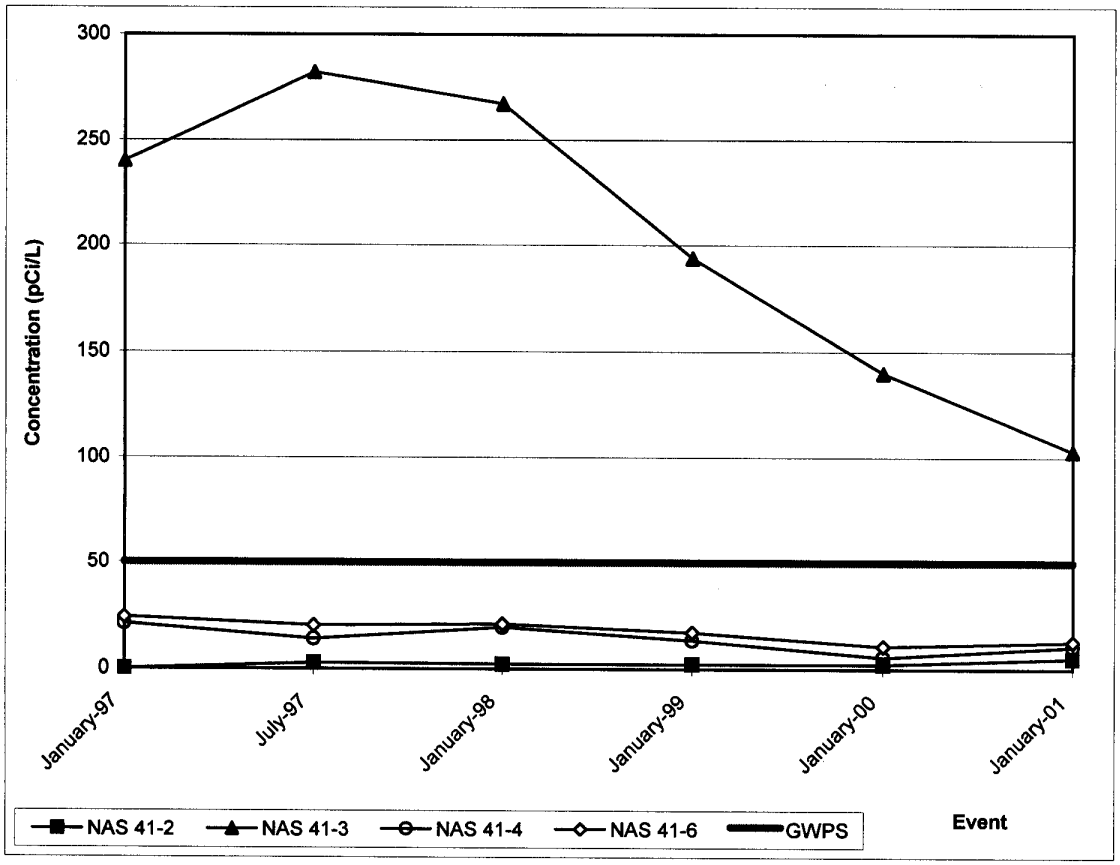
Notes: Results Reported in pCi/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
GROSS BETA
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	240	21	24	50
July-97	2.7	282	14	20.2	50
January-98	2.3	267	19.3	20.9	50
January-99	2.3	194	13.3	17.1	50
January-00	2.3	140	5.6	10.7	50
January-01	5.14	103	10.5	12.8	50

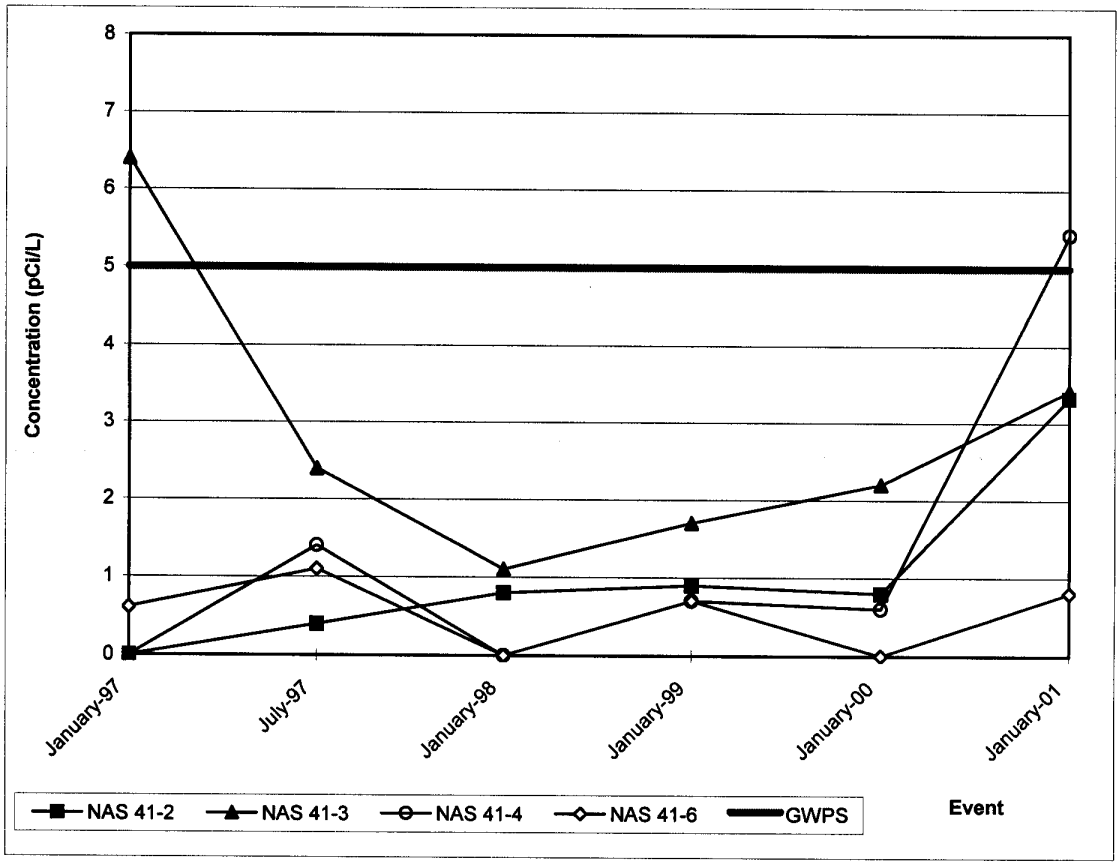
Notes: Results Reported in pCi/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
RADIUM-226
Domestic Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 41-2	NAS 41-3	NAS 41-4	NAS 41-6	GWPS
January-97	0	6.4	0	0.61	5
July-97	0.4	2.4	1.4	1.1	5
January-98	0.8	1.1	0	0	5
January-99	0.9	1.7	0.7	0.7	5
January-00	0.8	2.2	0.6	0	5
January-01	3.32	3.42	5.43	0.801	5

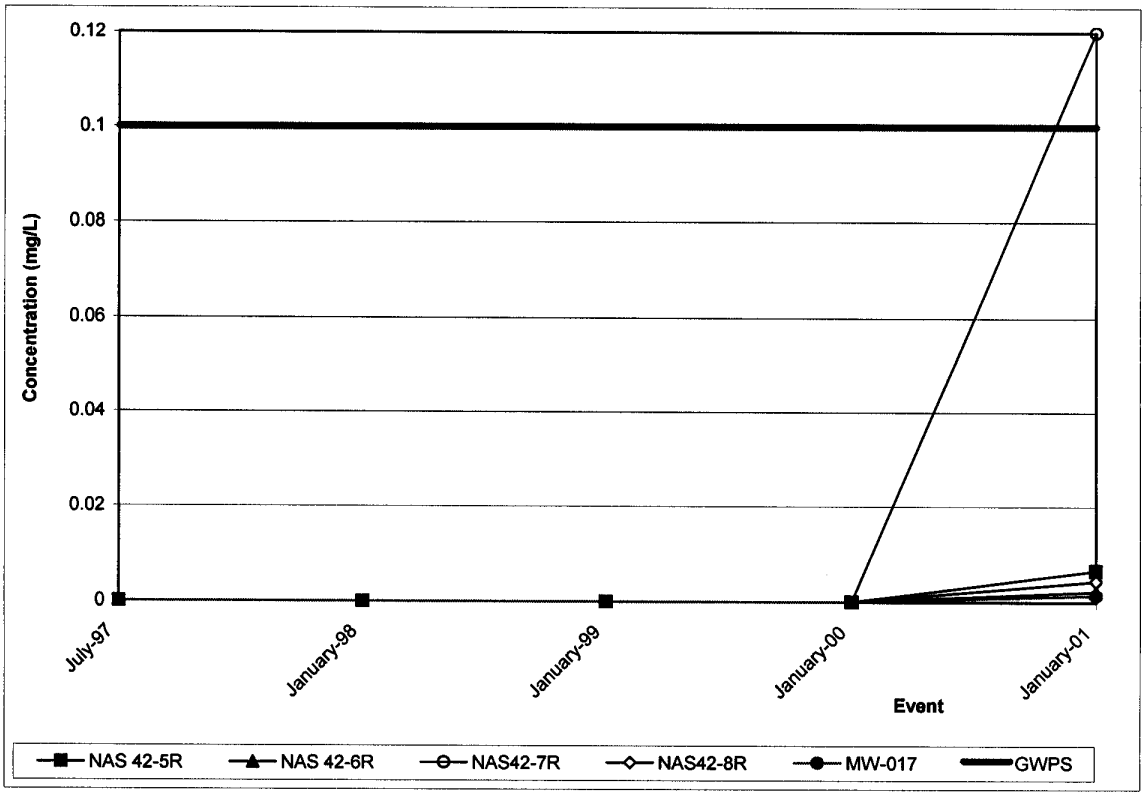
Notes: Results Reported in pCi/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
CHROMIUM
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0	0	0	0	0	0.1
January-98	0	0	0	0	0	0.1
January-99	0	0	0	0	0	0.1
January-00	0	0	0	0	0	0.1
January-01	0.0066	0.0022	0.12	0.0044	0.0014	0.1

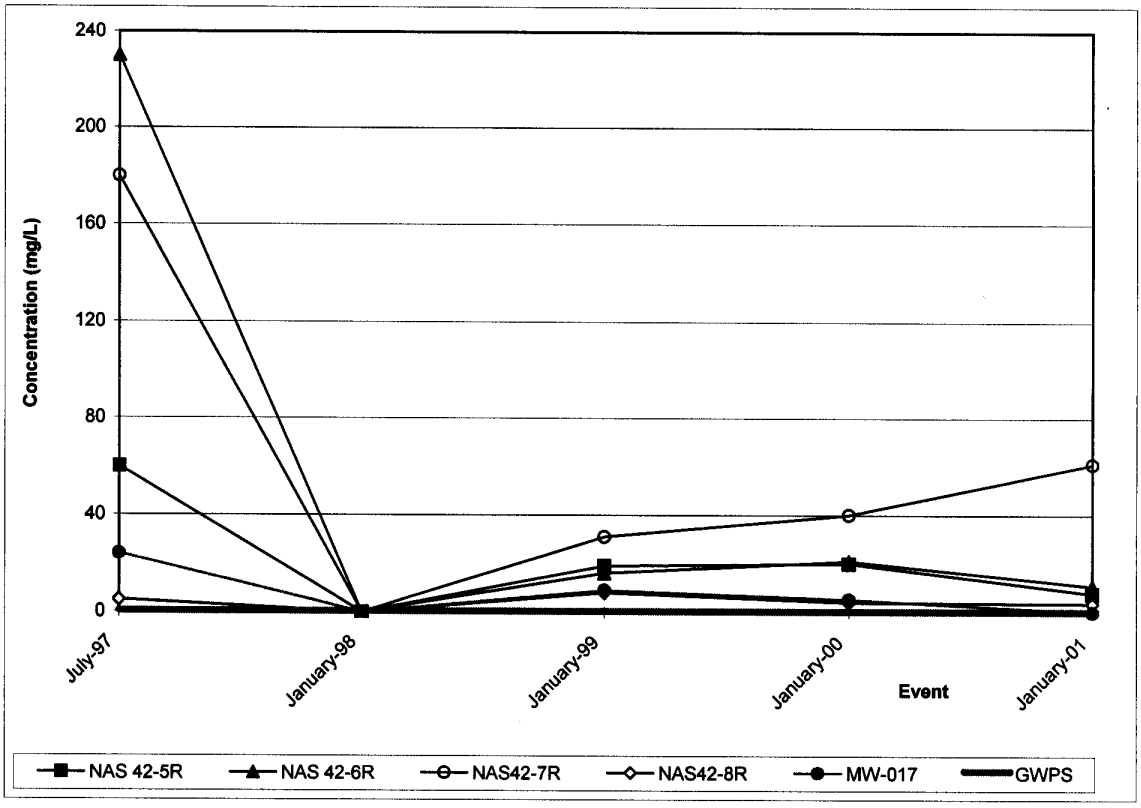
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
IRON
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	60	230	180	5	24	0.5
January-98	0	0	0	0	0	0.5
January-99	19	16	31	7.9	9	0.5
January-00	20	21	40	4.2	5.3	0.5
January-01	7.8	10.8	60.9	3.9	0.3	0.5

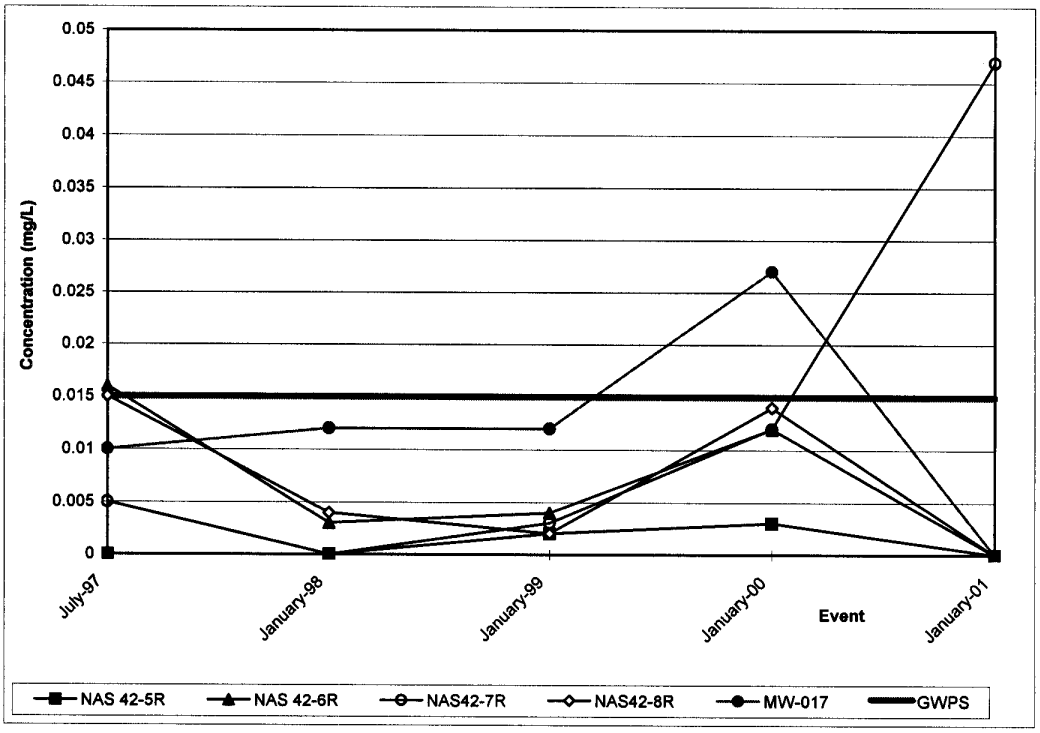
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
LEAD
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0	0.016	0.005	0.015	0.01	0.015
January-98	0	0.003	0	0.004	0.012	0.015
January-99	0.002	0.004	0.003	0.002	0.012	0.015
January-00	0.003	0.012	0.012	0.014	0.027	0.015
January-01	0	0	0.047	0	0	0.015

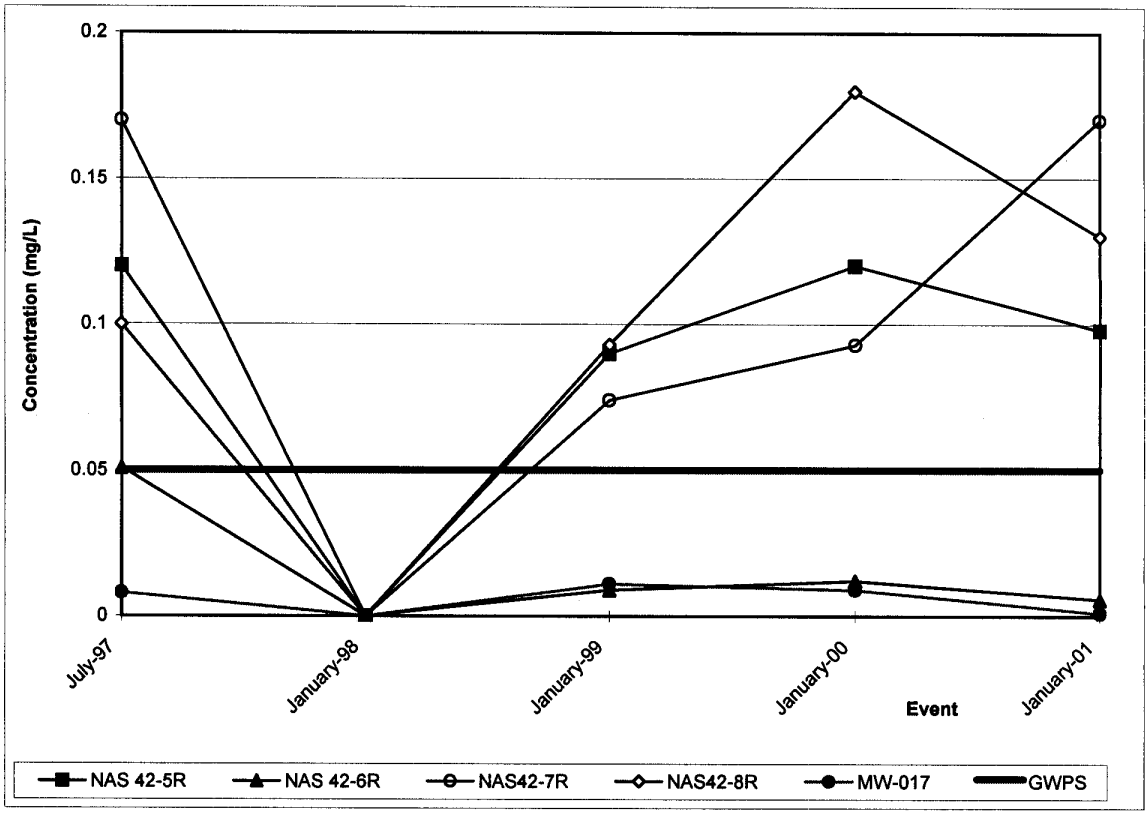
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
MANGANESE
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0.12	0.051	0.17	0.1	0.008	0.05
January-98	0	0	0	0	0	0.05
January-99	0.09	0.009	0.074	0.093	0.011	0.05
January-00	0.12	0.012	0.093	0.18	0.009	0.05
January-01	0.098	0.0057	0.17	0.13	0.00095	0.05

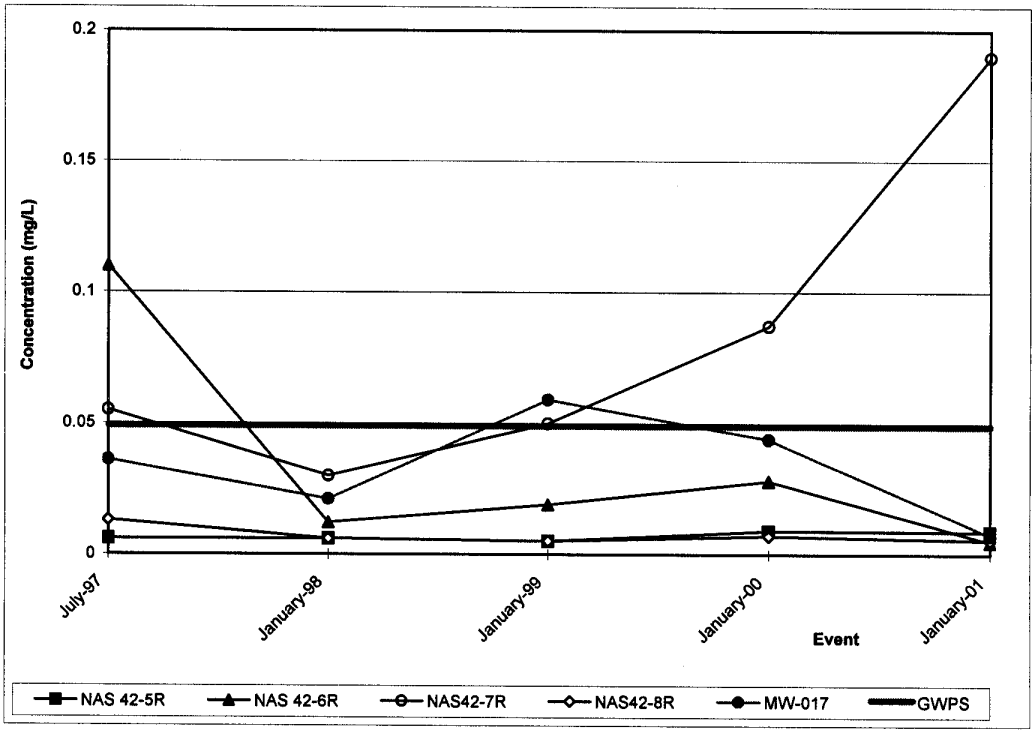
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
VANADIUM
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0.006	0.11	0.055	0.013	0.036	0.049
January-98	0.006	0.012	0.03	0.006	0.021	0.049
January-99	0.005	0.019	0.05	0.005	0.059	0.049
January-00	0.009	0.028	0.087	0.007	0.044	0.049
January-01	0.0086	0.0047	0.19	0.0054	0.0072	0.049

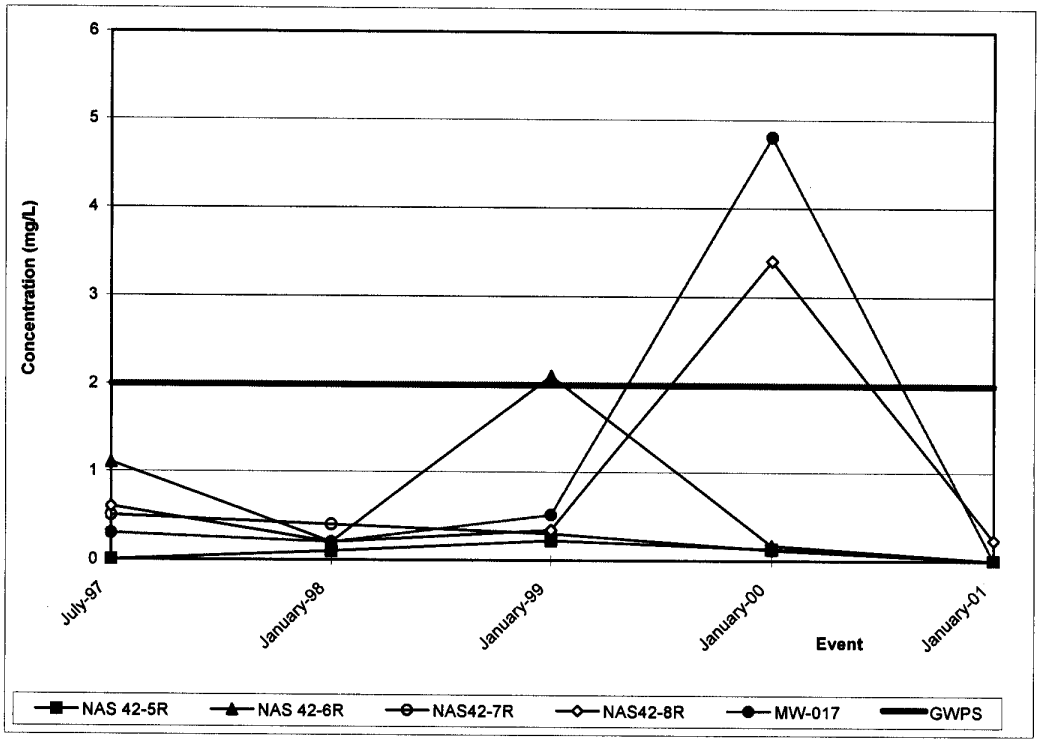
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
FLUORIDE
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0	1.1	0.5	0.6	0.3	2
January-98	0.1	0.2	0.4	0.2	0.2	2
January-99	0.22	2.1	0.3	0.34	0.51	2
January-00	0.13	0.17	0.12	3.4	4.8	2
January-01	0	0	0	0.23	0	2

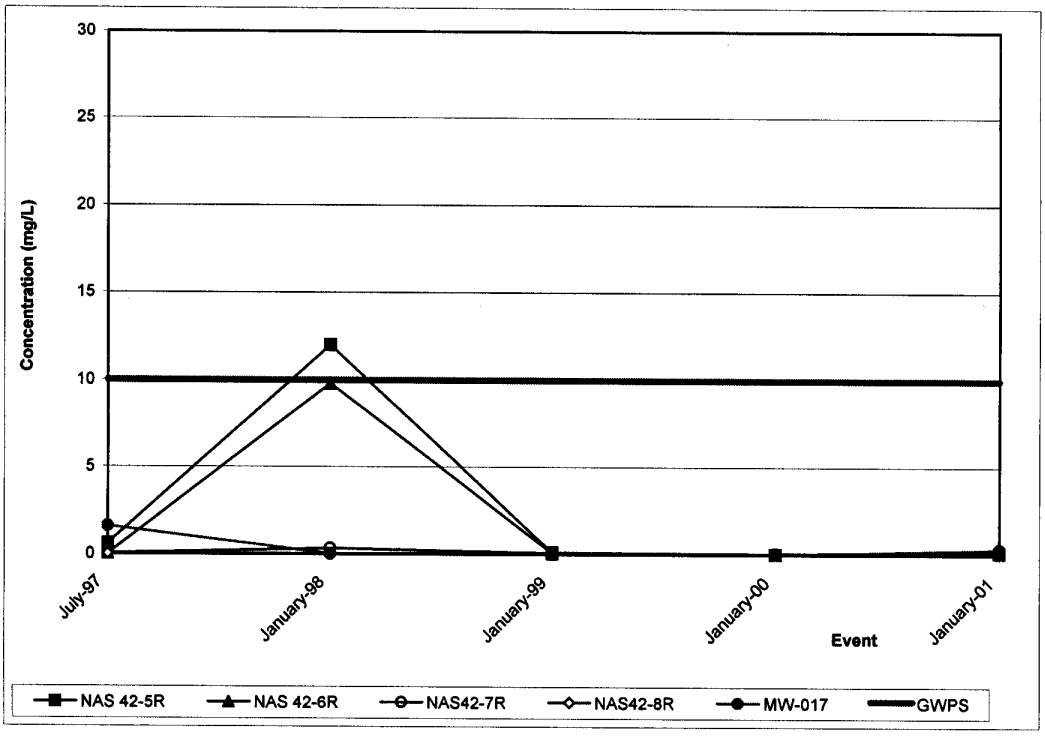
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
NITRATE
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0.6	0	0.03	0.02	1.6	10
January-98	12	9.8	0.33	0.02	0.02	10
January-99	0.1	0.07	0.07	0	0.07	10
January-00	0	0	0.05	0	0	10
January-01	0.1	0.12	0.15	0.2	0.3	10

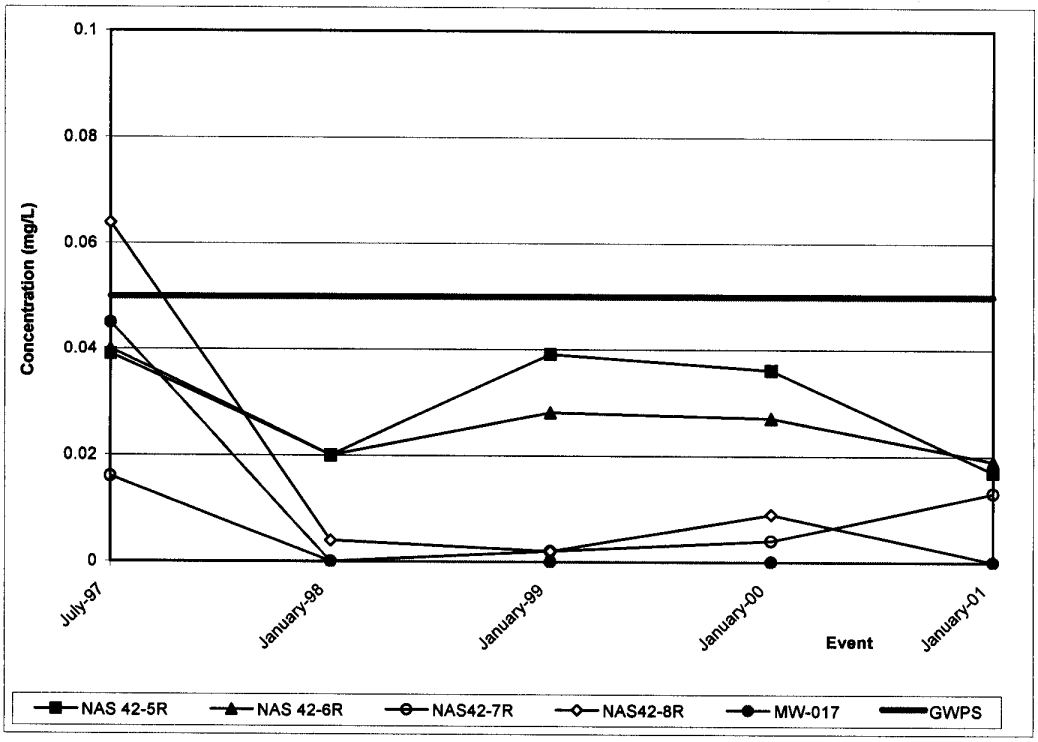
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
ARSENIC
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0.039	0.04	0.016	0.064	0.045	0.05
January-98	0.02	0.02	0	0.004	0	0.05
January-99	0.039	0.028	0.002	0.002	0	0.05
January-00	0.036	0.027	0.004	0.009	0	0.05
January-01	0.017	0.019	0.013	0	0	0.05

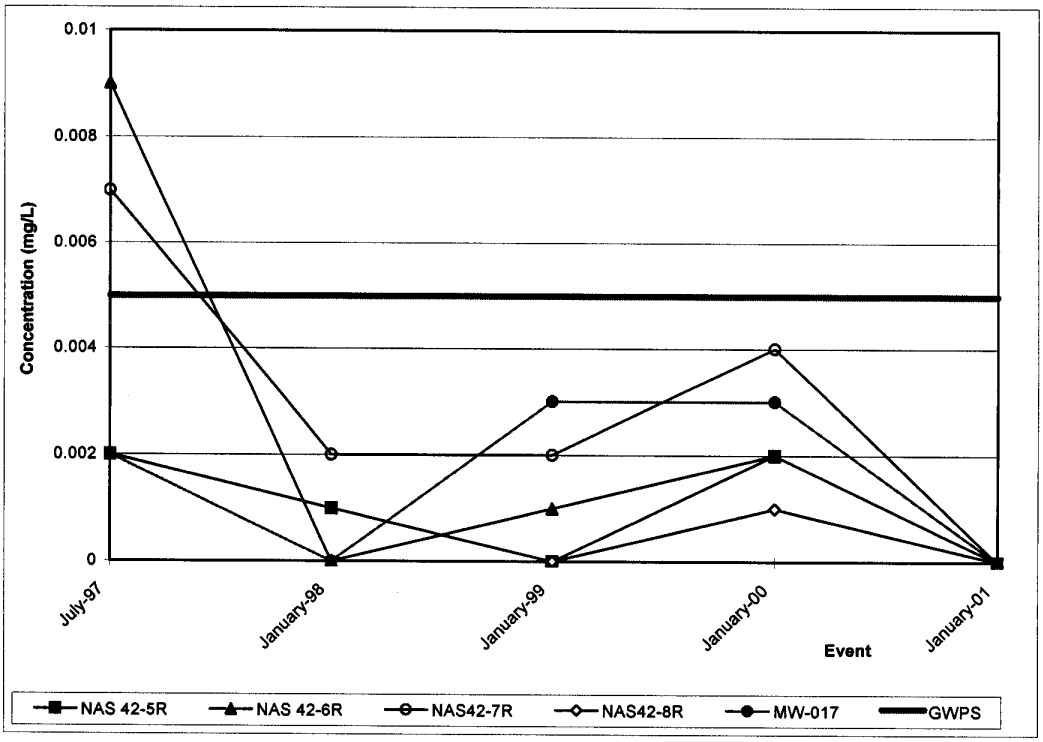
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
CADMIUM
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0.002	0.009	0.007	0.002	0.002	0.005
January-98	0.001	0	0.002	0	0	0.005
January-99	0	0.001	0.002	0	0.003	0.005
January-00	0.002	0.002	0.004	0.001	0.003	0.005
January-01	0	0	0	0	0	0.005

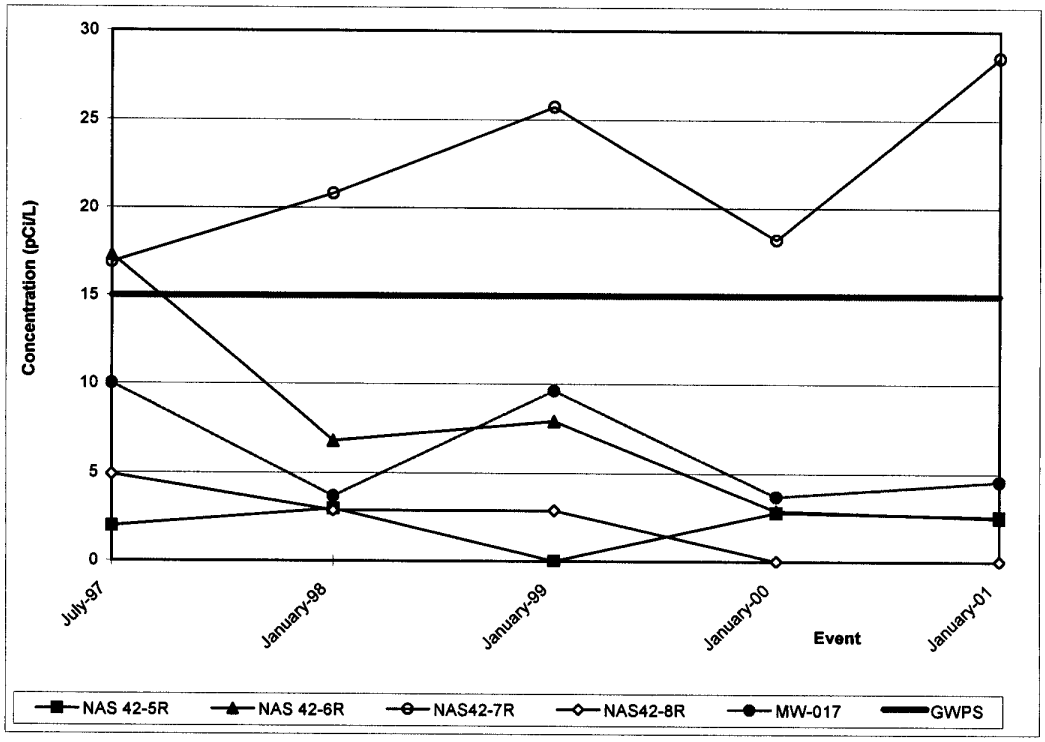
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
GROSS ALPHA
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	2	17.3	16.9	4.9	10	15
January-98	3	6.8	20.8	2.9	3.7	15
January-99	0	7.9	25.7	2.9	9.6	15
January-00	2.8	2.9	18.2	0	3.7	15
January-01	2.58	2.49	28.5	0	4.55	15

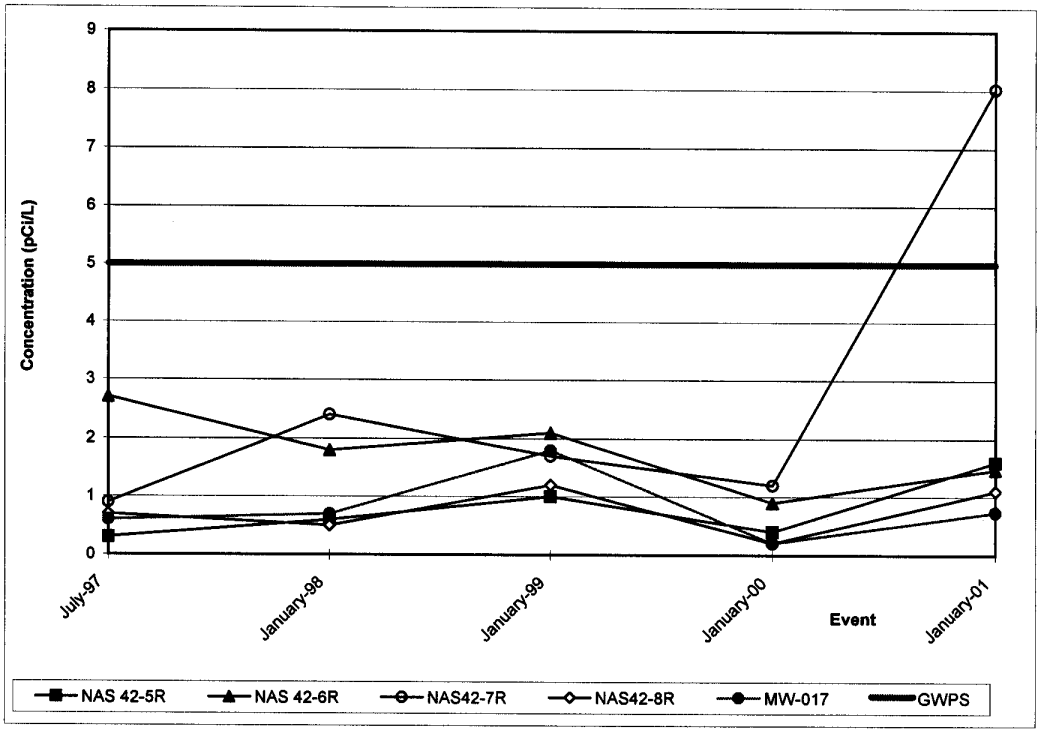
Notes: Results Reported in pCi/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
RADIUM-226
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	0.3	2.7	0.9	0.7	0.6	5
January-98	0.6	1.8	2.4	0.5	0.7	5
January-99	1	2.1	1.7	1.2	1.8	5
January-00	0.4	0.9	1.2	0.2	0.2	5
January-01	1.60	1.47	8.02	1.10	0.735	5

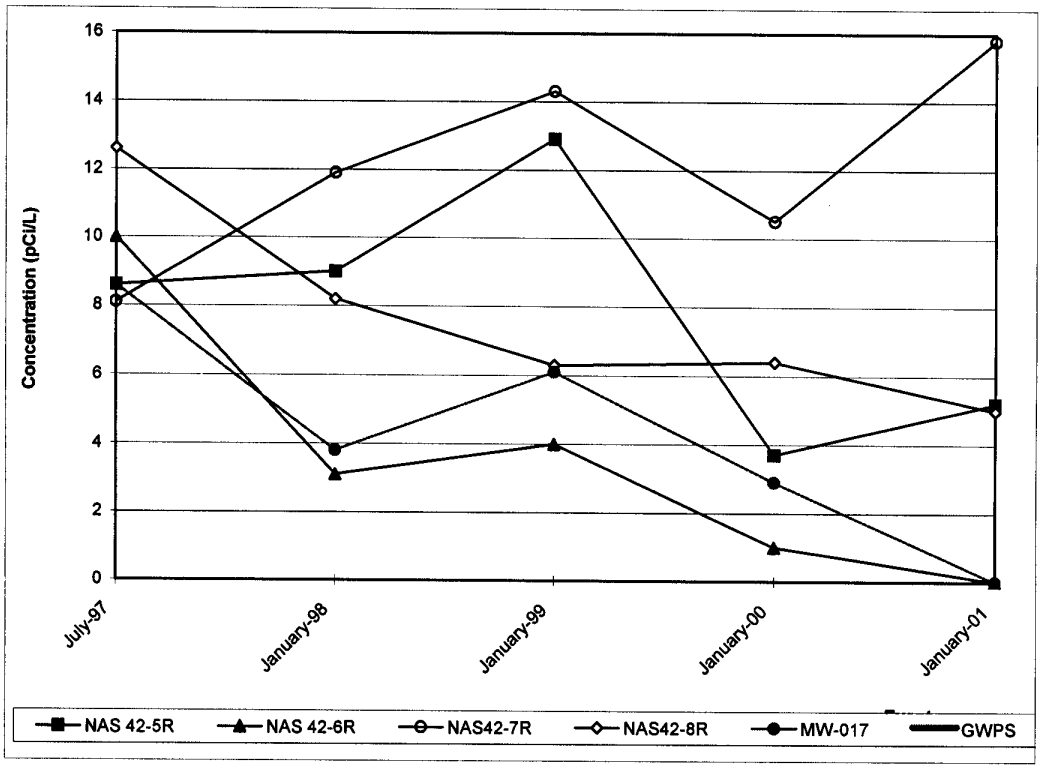
Notes: Results Reported in pCi/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
GROSS BETA
Polishing Pond
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 42-5R	NAS 42-6R	NAS42-7R	NAS42-8R	MW-017	GWPS
July-97	8.6	10	8.1	12.6	8.6	50
January-98	9	3.1	11.9	8.2	3.8	50
January-99	12.9	4	14.3	6.3	6.1	50
January-00	3.7	1	10.5	6.4	2.9	50
January-01	5.21	0	15.8	5.00	0	50

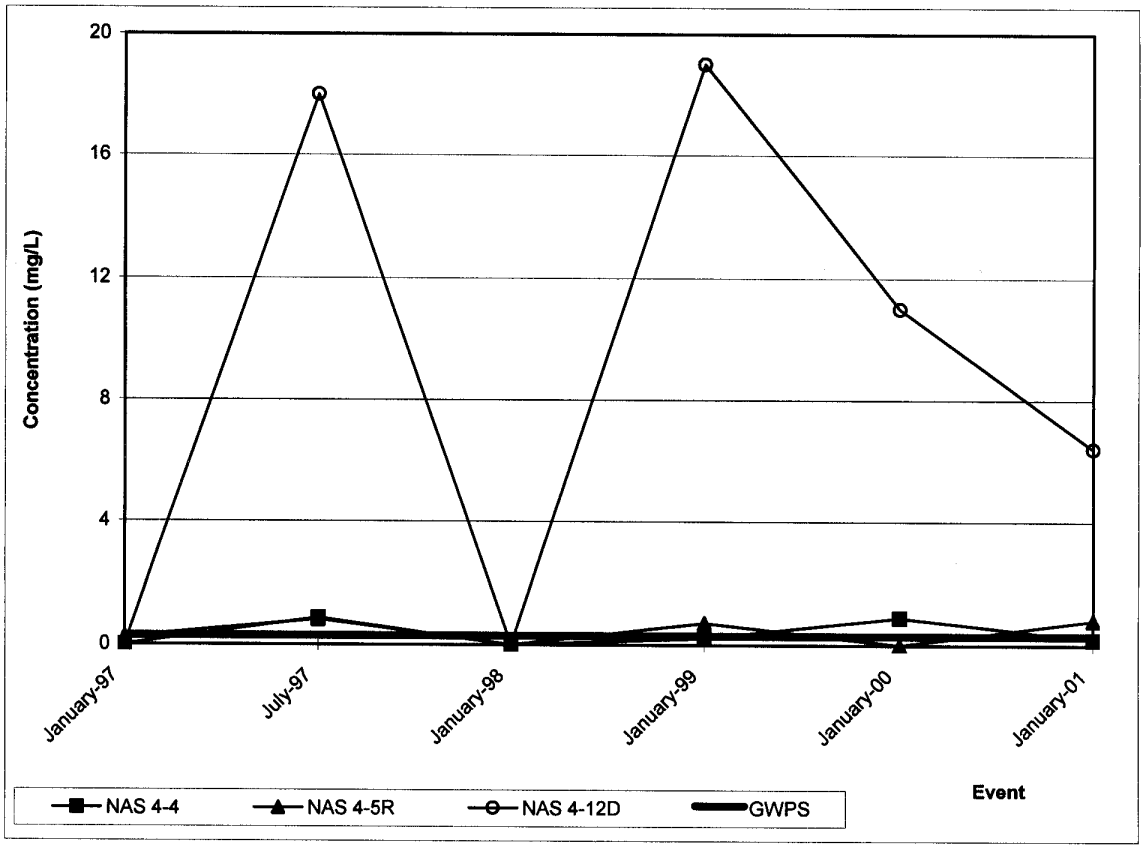
Notes: Results Reported in pCi/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
IRON
Industrial Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-4	NAS 4-5R	NAS 4-12D	GWPS
January-97	0	0.25	0	0.3
July-97	0.87	0.82	18	0.3
January-98	0	0	0	0.3
January-99	0.22	0.71	19	0.3
January-00	0.89	0	11	0.3
January-01	0.18	0.8	6.4	0.3

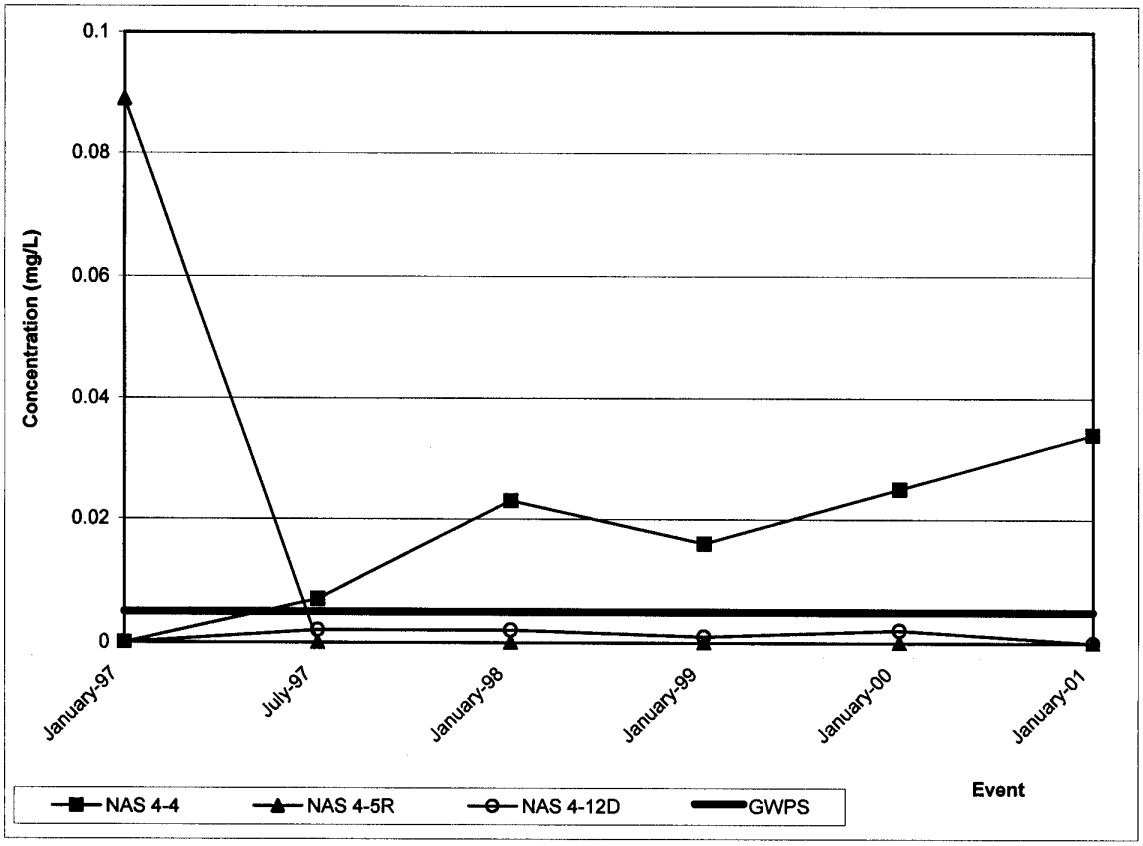
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
CADMIUM
Industrial Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-4	NAS 4-5R	NAS 4-12D	GWPS
January-97	0	0.089	0	0.005
July-97	0.007	0	0.002	0.005
January-98	0.023	0	0.002	0.005
January-99	0.016	0	0.001	0.005
January-00	0.025	0	0.002	0.005
January-01	0.034	0	0	0.005

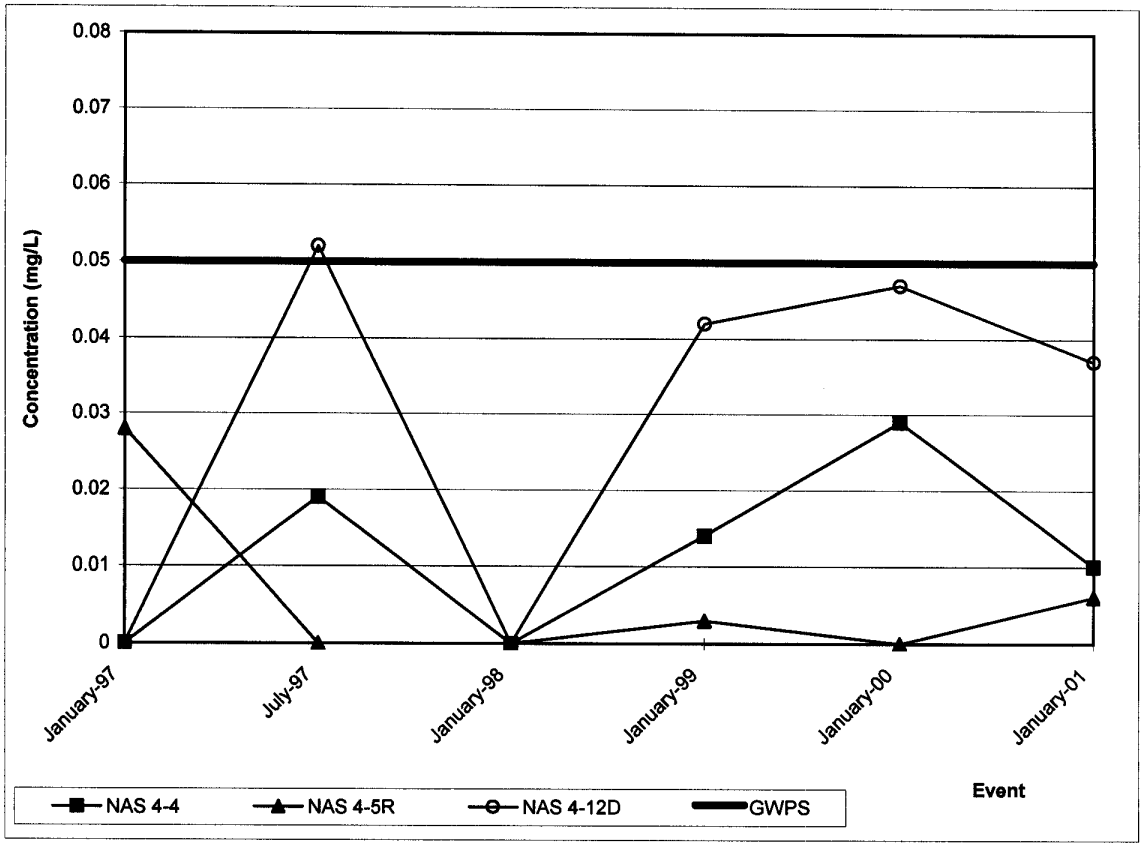
Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
MANGANESE
Industrial Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-4	NAS 4-5R	NAS 4-12D	GWPS
January-97	0	0.028	0	0.05
July-97	0.019	0	0.052	0.05
January-98	0	0	0	0.05
January-99	0.014	0.003	0.042	0.05
January-00	0.029	0	0.047	0.05
January-01	0.01	0.0061	0.037	0.05

Notes: Results Reported in mg/L
0 Indicates Below Detection Limit



CONCENTRATIONS OF CONTAMINANTS OVER TIME
RADIUM-226
Industrial Sludge Drying Beds
Naval Air Station, Jacksonville, Florida
March 13, 2001

Sampling Event	NAS 4-4	NAS 4-5R	NAS 4-12D	GWPS
January-97	0	0	0	5
July-97	0.5	0.3	1.3	5
January-98	0	0.4	0.9	5
January-99	0	0.4	0.6	5
January-00	0	0	0.4	5
January-01	1.98	7.00	1.81	5

Notes: Results Reported in pCi/L
0 Indicates Below Detection Limit