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NAS JACKSONVILLE
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FINAL FIVE YEAR REVIEW FOR OPERABLE UNITS 1, 2, 3, 4, 5, 6, 7 AND 8 REVISION 2
NAS JACKSONVILLE FL (PUBLIC DOCUMENT)
05/26/2011
TETRA TECH NUS

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055

Rev. 2
05/26/11

Five-Year Review

Operable Units 1, 2, 3, 4, 5, 6, 7, and 8

Naval Air Station Jacksonville
Jacksonville, Florida

Contract Task Order 0152

May 2011

NAVFAC
Naval Facilities Engineering Command
NAVFAC SOUTHEAST
NAS Jacksonville
Jacksonville, Florida 32212-0030

TETRA TECH NUS, Inc.

Rev. 2
05/26/11

FIVE-YEAR REVIEW

OPERABLE UNITS 1, 2, 3, 4, 5, 6, 7, AND 8

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Southeast
Building 903, NAS Jacksonville
Jacksonville, Florida 32212-0030

Submitted by:
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CONTRACT TASK ORDER 0152

MAY 2011

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Five-Year Review Summary Form

SITE IDENTIFICATION			
Site Name *(from WasteLAN)*: Naval Air Station Jacksonville			**EPA ID *(from WasteLAN)*:** *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 OUs*? (highlight): Y N		**Construction completion date:** To be determined	
Has site been put into reuse? (highlight): Y N			
REVIEW STATUS			
Lead agency: Department of the Navy, Naval Facilities Engineering Command Southeast			
Author name: Adrienne Wilson		**Author title:** Remedial Project Manager	
Author affiliation: Department of the Navy, Naval Facilities Engineering Command Southeast			
Review period: May 2005 to January 2010		**Date(s) of site inspection: August 25-26, 2010**	
	Type of review (highlight): 1. Pre-SARA 2. Post-SARA 3. NPL-Removal Only 4. Regional Discretion 5. NPL State/Tribe-lead		**Review number (1, 2, etc.):** 3
Triggering action: Interim Remedial Action at Operable Unit 1			
Trigger action date *(from WasteLAN)*: *March 1, 2006***			
Due date *(five years after triggering action date)*: *March 1, 2011***			

* ["OU" refers to operable unit.]

** This five year review is due on March 1, 2011, five years after the prior five year review was approved by USEPA. Due dates for future five year reviews will be triggered off of the remedial action start date, which would make the next five year review due by March 6, 2015.

Issues:
Issues discovered for NAS Jacksonville during the Five-Year Review were as follows:

OU 1

1. A proposed boundary expansion was completed to encompass monitoring well MW109S and a Land Use Control Remedial Design (LUC RD) was prepared. The LUC RD has been submitted to USEPA and FDEP but it has not yet been approved.
2. Trigger levels for contingent action (TLCAs) for OU 1 surface water have not been established for 1,2-dichloroethane (DCA), trans-1,2-dichloroethene (DCE), and vinyl chloride and are recommended.

OU 2

1. No issues regarding OU 2 were discovered during the Five-Year Review.

OU 3

Optimization efforts are currently underway at OU 3. The NAS Jacksonville Partnering Team is pursuing the development of an updated ROD focused on a risk based OU 3 wide approach that will eliminate issues associated with the current remedies in place that are focused on individual source areas, and to more fully evaluate the indoor air vapor intrusion pathway and the potential for ecological risks posed to the St. Johns River. An RI/FS Addendum is currently being developed that will support the updated ROD. As a result of the optimization study, actions are currently being taken that will address the findings of the Five Year review as it relates to the current ROD for OU 3. These issues include the following:

Monitoring well networks at Buildings 106 and 780 are insufficient.

1. Remediation systems at PSC 48 and Building 780 have been shut down as a result of the optimization study, but documentation is incomplete
2. Areas C and D are not being monitored quarterly as stipulated in the ROD, but will be included in the updated ROD.
3. Monitoring well networks at Areas C and D do not encompass all of the groundwater contamination (e.g., the COC concentrations in the perimeter wells exceed GCTLs). Contamination has migrated beneath the St. Johns River. Additional optimization efforts have shown that COCs are attenuating prior to discharge to the river.
4. The RAO of reducing VOCs in groundwater to the ARARs/action levels within five years has not been achieved at Areas C and D. The results of the optimization study have shown that prior treatment has been effective at reducing COC concentrations in groundwater, but it is anticipated that ARARs have been achieved within the five year period specified. Alternative remedies will be evaluated in the updated ROD.
5. Monitoring well network at Area G does not encompass all of the groundwater contamination (e.g., the COC concentrations in the perimeter wells exceed GCTLs). The remedial action objective for Area G is not being met via natural attenuation. This finding is also currently be investigated and will be included in the RI/FS Addendum and updated ROD.
6. There are no groundwater use restrictions in place at OU 3 for Buildings 106 and 780, Areas B, C, D, F and G. A LUCRD is pending regulatory approval for these groundwater use restrictions. LUC requirements will also be addressed in the updated ROD.
7. Reported groundwater contamination exists to the west of Building 106, which is outside the existing boundary of OU 3. Currently this area is being investigated.
8. Remedial design efforts at Area F encountered much lower levels of contamination than originally reported. As a result, the optimization efforts resulted in a recommendation to not implement the remedy for Area F (chemical oxidation). Area E assessment has not been completed.
9. Groundwater contamination has been identified infiltrating a second (eastern) storm sewer downgradient of Areas F and G. Work is ongoing to characterize the nature of the contamination and the potential impacts to the St. Johns River.
10. Vapor intrusion pathway for indoor building exposure has not been completely evaluated for all buildings in OU 3 based on new USEPA and Navy policy and guidance.

11. The base enforces dig restrictions over the entire OU 3. Additional sampling is being considered to reduce the size of the area that may be included in the LUC RD, to be prepared after completion of the RI/FS Addendum.

OU 4

1. LUCs are being implemented; however, a LUC RD was not completed. A LUC RD has been developed is pending regulatory approval.

OU 5

1. No issues regarding OU 5 (PSC 51) were discovered during the Five-Year Review.

OU 6

1. No issues regarding OU 6 were discovered during the Five-Year Review.

OU 7

1. Implementation of the soil removal aspects of the remedy have been delayed by the discovery of potential UXO at the site. As a result, the GW remedy has yet to be implemented. Resumption of remedy implementation is anticipated to begin in 2011.

OU 8

1. No issues regarding OU 8 were discovered during the Five-Year Review.

Recommendation and Required Actions:

The following actions for NAS Jacksonville are recommended to be protective of human health and the environment:

OU 1

1. Approval of LUC RD by USEPA and FDEP.
2. Florida Administrative Code (FAC) 62-777 provides freshwater surface water cleanup target levels (CTLs) for 1,2-DCA, trans-1,2-DCE, and vinyl chloride. Evaluate the CTLs and determine if the CTLs should be used as TLCAs for OU 1. If the determination is that the CTLs will be adopted, then an Explanation of Significant Difference will be completed as appropriate.

OU 2

1. No issues regarding OU 2 were discovered during the Five-Year Review.

OU 3

1. Issues 1 – 6, 9 through 12 should be addressed as a part of the investigation for the RI/FS Addendum for OU 3.
2. For issue 7, a LUC RD has been developed to address groundwater use restrictions for all of OU 3 but required regulatory approval.
3. For issue 8, redraw the existing boundary of OU 3 to include identified groundwater contamination in the updated ROD.

OU 4

1. Continue LUC inspections in accordance with an approved LUC RD.

OU 5

1. No issues were discovered at OU 5 during the Five-Year Review

OU 6

1. No issues were discovered at OU 6 during the Five-Year Review,

OU 7

1. After UXO clearance has been obtained, resumption and completion of the remedies specified for OU 7 is recommended.

OU 8

1. No issues were discovered at OU 8 during the Five-Year Review.

Basewide (All OUs)

Continue inspections as required by land use control implementation plans (LUCIPs).

Protectiveness Statement(s):

OU 1

1. The remedy at OU 1 currently protects human health and the environment for the short term because LUCs are in place to prevent any potential ecological or human health exposure to contaminated media. The MNA effectiveness determination after collection of five years of data has been completed at this site and MNA for the groundwater component of the remedy was found to be meeting the RAOs, therefore the remedy for the short and long terms are protective for the groundwater component of the remedy. However, in order for the surface water component of the remedy to be protective in the long term the following actions need to be taken. Evaluate if FAC 62-777 freshwater CTLs for 1,2-DCA, trans 1,2-DCE, and vinyl chloride should be used as target concentration action levels for OU 1.

OUs 2, 4, and 5

The remedies at these sites are protective of human health and the environment.

OU 3

1. Protectiveness for OU 3 cannot be determined and is being deferred until further actions currently underway are completed supporting the development of an RI/FS Addendum and updated ROD for OU 3. A protectiveness determination will be made via an addendum to this Five Year Review after completion of the updated ROD anticipated to be prepared by September 30, 2013.

OU 6

1. The remedy at OU 6 is protective for short term and for long term it is expected to be protective and will be determined when we have reviewed 5 years of groundwater monitoring data. The institutional controls, groundwater monitoring, and surface water monitoring at OU 6 provide an acceptable degree of protection of human health and the environment as long as they are conducted as required.

OU 7

1. The remedy at OU 7 is protective is expected to be protective of human health and the environment upon completion, and in the interim exposure pathways that could result in unacceptable risks are being controlled. After implementation the protectiveness of the MNA component of the remedy will be evaluated after review of 5 years of groundwater monitoring data.

OU 8

1. The remedy at OU 8 is protective for short term and for long term it is expected to be protective and will be re-evaluated after review of 5 years of groundwater monitoring data. The institutional controls, groundwater monitoring, at OU 8 provide an acceptable degree of protection of human health and the environment as long as they are conducted as required.

Other Comments

USEPA's dioxin reassessment has been developed and undergone review over many years with the participation of scientific experts in USEPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current cancer guidelines and incorporated the latest data and physiological/biochemical research into the assessment. The results of the assessment have currently not been finalized and have not been adopted into state or federal standards. USEPA anticipates that a final revision to the dioxin toxicity numbers may be released by the end of 2010. In addition, USEPA/OSWER has proposed to revise the interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds, based on technical assessment of scientific and environmental data. However, USEPA has not made any final decisions on interim PRGs at this time. Therefore, the dioxin toxicity reassessment for this Site will be updated during the next Five Year Review.

Overall

This Five-Year Review shows that that the Navy is meeting the requirements of the Records of Decisions (RODs) for OUs 2, 4, 5, 6, and 8. The NAS Jacksonville Partnering Team is evaluating the environmental conditions at OU 3 and is preparing to implement additional remedial actions to protect

human health and environment. In addition, the five-year review shows that remedies for OU 1 remains protective in the short term, and the remedy for OU 7 is expected to be protective upon completion.

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

_____ _____

Jeffrey Maclay
Captain, U. S. Navy
Commanding Officer
NAS Jacksonville

Date

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ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
Aerostar	Aerostar Environmental Services, Inc.
AGM	ARCADIS Geraghty & Miller, Inc.
Apex	Apex Environmental
ARAR	Applicable or Relevant and Appropriate Requirement
AS	Air Sparging
AS/SVE	Air Sparge with Soil Vapor Extraction
AST	Aboveground Storage Tank
BEI	Bechtel Environmental, Inc.
BFA	Barnes, Ferland and Associates, Inc.
bgs	Below Ground Surface
BMP	Best Management Practices
CCI	CH2M Hill Constructors, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIPP	Cured-in-place pipe
COC	Contaminant of Concern
COEI	Constituent of Ecological Interest
COI	Constituent of Interest
COPC	Contaminant of Potential Concern
CPT	Core Penetrometer Test
CTL	Cleanup Target Level
CTO	Contract Task Order
DCA	Dichloroethane
DCE	Dichloroethene
DPT	Direct Push Technology
DRMO	Defense Reutilization and Marketing Office
DSDB	Domestic Waste Sludge Drying Bed
DVECC	Disease Vector Ecology and Control Center
EECA	Engineering Evaluation and Cost Analysis
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study

ACRONYMS (Continued)

FFTA	Fire Fighting Training Area
FRCSE	Fleet Readiness Center Southeast
FS	Feasibility Study
FSWS	Florida Surface Water Standards
GAC	Granular Activated Carbon
gal	Gallon(s)
GCTL	Groundwater Cleanup Target Level
GWPS	Groundwater Protection Standard
GWT	Groundwater Extraction Treatment
HASP	Health and Safety Plan
HLA	Harding Lawson & Associates
HRC®	Hydrogen Release Compound
HSWA	Hazardous and Solid Waste Amendments of 1984
IAS	Initial Assessment Study
IR	Installation Restoration
IRA	Interim Remedial Action
IROD	Interim Record of Decision
ISCO	In-situ Chemical Oxidation
ISDB	Industrial Waste Sludge Drying Bed
LNAPL	Light Non-aqueous Phase Liquid
LTMP	Long-term Monitoring Plan
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUC RD	Land Use Control Remedial Design
µg/L	Micrograms per Liter
ManTech	ManTech Environmental Corporation
MCLs	Maximum Contaminant Levels
MCW	Multi-chamber Well
mg/L	Milligrams per Liter
MIP	Membrane Interface Probe
MNA	Monitored Natural Attenuation
MOA	Memorandum of Agreement
msl	Mean Sea Level
NADEP	Naval Aviation Depot
NAS	Naval Air Station

ACRONYMS (Continued)

NAT	Navy Aviation Trades
NAVFAC SE	Naval Facilities Engineering Command Southeast
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NECE	Naval Entomology Center of Excellence
NFA	No Further Action
NFRAP	No Further Remedial Action Planned
NOAA	National Oceanic and Atmospheric Administration
NP	Nanoscale Particle
NPL	National Priorities List
ODA	Oil Disposal Area
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polynuclear Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PCP	Post-closure Permit
POC	Point-of-Compliance
PP	Polishing Pond
PPE	Personal Protective Equipment
ppb	Parts per Billion
ppt	Parts Per Thousand
PRG	Preliminary Remedial Goal
PSC	Potential Source of Contamination
QAPP	Quality Assurance Project Plan
RA	Risk Assessment
RAC	Remedial Action Contractor
RAD	Radiological
RAO	Remedial Action Objective
RASI	Radiological Assessment Services, Inc.
RBC	Risk-based Criteria
RBCA	Risk-based Corrective Action
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision

ACRONYMS (Continued)

SCTL	Soil Cleanup Target Level
SQAG	Sediment Quality Assessment Guideline
SSFP	Scoping Study Field Program
SVE	Soil Vapor Extraction
SVOC	Semivolatile Organic Compound
SWPPP	Storm Water Pollution Prevention Program
TAL	Target Analyte List
TBC	To Be Considered
TCA	Trichloroethane
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TLCA	Trigger Levels for Contingent Action
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbon
Tetra Tech	Tetra Tech NUS, Inc.
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound
WWTP	Wastewater Treatment Plant
yd^3	Cubic Yards

1.0 INTRODUCTION

Tetra Tech NUS, Inc. (Tetra Tech) has been contracted by the Department of the Navy, Naval Facilities Engineering Command Southeast (NAVFAC SE) to perform a Five-Year Review for eight Operable Unit (OU) sites at Naval Air Station (NAS) Jacksonville, Florida.

The purpose of this Five-Year Review is to determine whether the remedies at the eight OU sites 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 issues found during the review, if any, and presents recommendations to address them.

1.1 FIVE-YEAR REVIEW PROCESS

This Five-Year Review was prepared pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The United States Environmental Protection Agency (USEPA) is responsible for implementing statutory Five-Year Reviews. CERCLA § 121 states:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

This requirement is further interpreted in the NCP; 40 Code of Federal Regulations (CFR) § 300.430(f)(4)(ii) states:

> *"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."*

For federal facility sites under the jurisdiction, custody, or control of the Department of Defense, Executive Order 12580 relieves the USEPA of this responsibility and delegates the responsibility to the Department

of Defense. The 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 Facility Agreement (FFA).

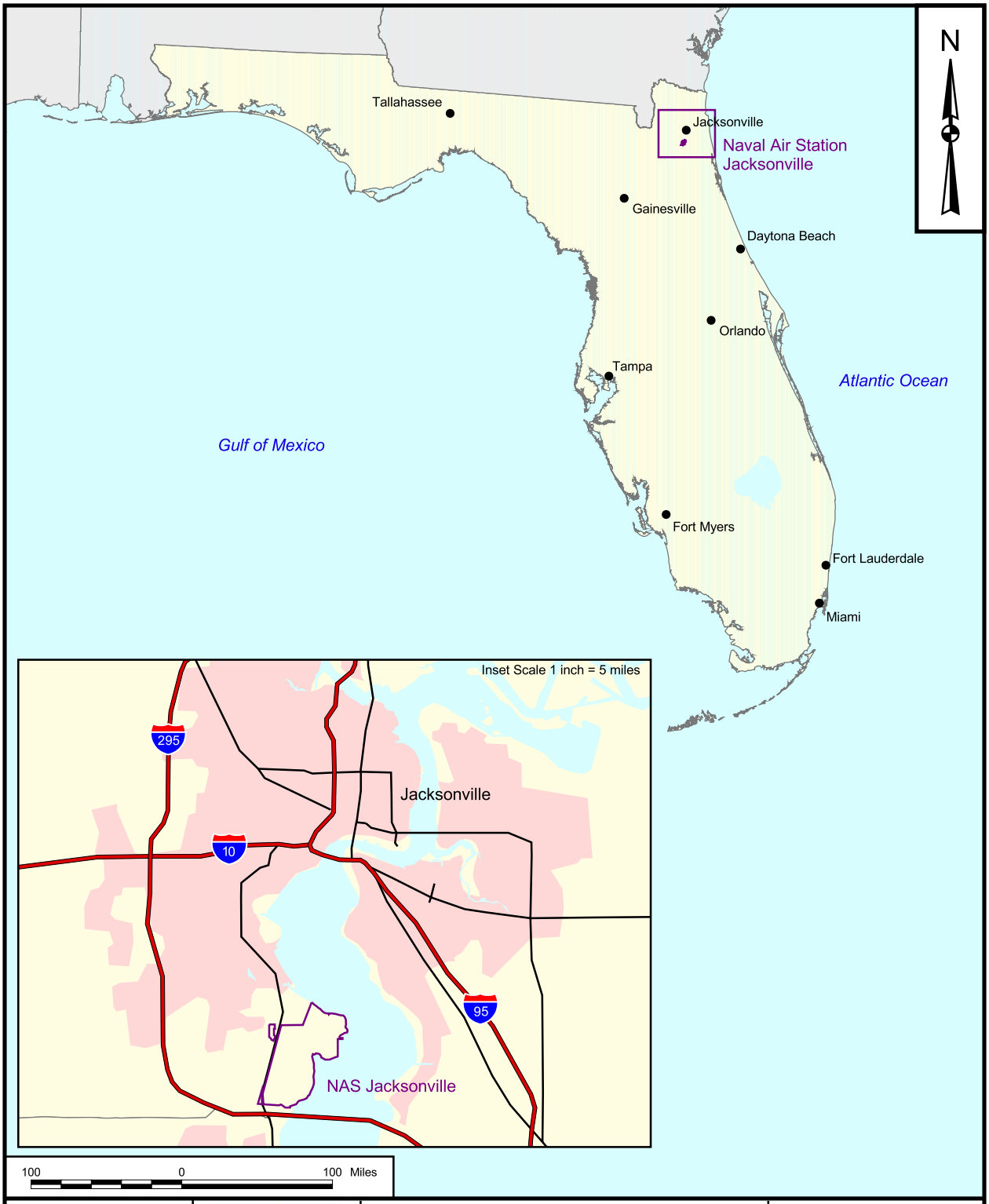
1.1.1 Administrative Components

This is the third Five-Year Review for NAS Jacksonville. The first Five-Year Review addressed OU 1 and OU 2 and was prepared in 2001. The triggering action for the initial statutory review was the start date for construction of the OU 1 Light Non-Aqueous Phase Liquid (LNAPL) System, which was March 6, 1995. The second Five-Year Review addressed OUs 1 through 4. This five-year review consisted of a review of the previous five-year review; evaluation of the issues raised in the previous review, actions taken, and results; site inspections; personnel interviews; and a technical assessment of each site and the remedial actions underway. This Five-Year Review addresses OUs 1 through 8, all of which now have signed Records of Decision (RODs) in place. This Five-Year Review is being conducted because hazardous substances, pollutants, and contaminants from past storage, handling, and disposal practices remain at OUs 1 through 8 above levels that allow for unlimited use and unrestricted exposure.

Sections 2.0 through 9.0 of this report are the Five-Year Reviews for OU 1 through OU 8, respectively. Each section includes the site's chronology; background and summary of the remedial actions performed; and the Five-Year Review findings, assessment, deficiency list, recommendations, and protectiveness statements. Section 10.0 provides a general summary, conclusions, and protectiveness statement for the NAS Jacksonville facility. Figure 1-1 shows the location of NAS Jacksonville, and Figure 1-2 shows the station and the OUs of concern.

Tetra Tech conducted this Five-Year Review in conjunction with the NAS Jacksonville Partnering Team, which consists of the following personnel:

- Adrienne Wilson, NAVFAC SE Remedial Project Manager
- Peter Dao, USEPA Region IV Remedial Project Manager
- David Grabka, FDEP Remedial Project Manager
- Tim Curtin, NAS Jacksonville Installation Restoration (IR) Manager
- Mark Peterson, Tetra Tech Task Order Manager
- Casey Hudson, CH2M Hill Constructors, Inc. (CCI)
- Hal Davis, United States Geological Survey (USGS)



DRAWN BY	DATE			CONTRACT NO.
A. JANOCHA	1/20/03			7302
CHECKED BY	DATE			OWNER NO.
J. JOHNSON	2/10/05			CT0 0342
REVISED BY	DATE			APPROVED BY / DATE
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SCALE				DRAWING NO. / REV
AS NOTED				FIGURE 1 - 1 / 0

NAVFAC

FACILITY LOCATION MAP
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

P:\GIS\JACKSONVILLE_NAS\APR\OU3.APR FACILITY LOCATION LAYOUT 2/21/05 AJ

DRAWN BY	DATE			CONTRACT NO.
J. LAMEY	7/28/04		OU LOCATION MAP	7302
CHECKED BY	DATE		NAS JACKSONVILLE	OWNER NO.
J. JOHNSON	2/10/05		JACKSONVILLE, FLORIDA	CTO 0342
REVISED BY	DATE			APPROVED BY / DATE
SCALE				DRAWING NO. / REV
AS NOTED		NAVFAC		FIGURE 1 - 2 / 0

P:\GIS\JACKSONVILLE_NAS\APR\OU3_TAGS.APR OU LOCATION MAP 2/22/05 CF

1.1.2 Community Involvement

A public notice of announcing the initiation of this five-year review was published in the Florida Times-Union on September 26, 2010. At the conclusion of the review, a fact sheet is planned for production and distribution to the Restoration Advisory Board and any other interested persons or organizations.

1.2 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 United States Navy (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.

1.2.1 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 at NAS Jacksonville, and the station became the headquarters for the Chief of Naval Operational Training. 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.

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 IR program. As a result of IR activities, 58 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 was included in the USEPA-issued permit. The site was placed on the National Priorities List (NPL) in November 1989. Subsequently, an FFA was signed that decreed that the cleanup of these PSCs would be conducted under the CERCLA, with RCRA as an applicable or relevant and appropriate requirement (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 manages over three tank sites as provided for by Florida Administrative Code (FAC) Section 62-770.

1.2.2 Land Use

NAS Jacksonville occupies approximately 3,800 acres in south-central Duval County, Florida and is located approximately 9 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 Timuquana 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, and commercial developments.

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, and the SH-60F Seahawk helicopter. The Fleet Readiness Center Southeast (FRCSE), located on NAS Jacksonville, is the largest industrial employer in northeast Florida and performs maintenance, repair, and overhaul of Navy aircraft.

Support facilities include an airfield for air operations and 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 Fleet and Family Service Center, and recreational facilities.

1.2.3 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 northeastern Florida with NAS Jacksonville located within the Pamlico terrace [10-25 feet 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).

1.2.4 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 drop below freezing only a few nights each year.

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 8 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.

1.2.5 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).

1.2.6 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 feet 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.

1.2.7 Regional Hydrology

1.2.7.1 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. Based on salinity measurements obtained 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.

1.2.7.2 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 divide the aquifer into distinct permeable units in some areas. 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 feet 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 feet 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 Recent data indicates that groundwater in the Floridan aquifer in the vicinity of NAS Jacksonville has a flat gradient with a possible slight east/southeast flow trend (Sepulveda and Spechler, 2004). Floridan aquifer wells in the vicinity of NAS Jacksonville are under sufficient artesian pressure to flow at the surface.

1.3 ARAR AND SITE-SPECIFIC ACTION LEVEL CHANGES

The ARARs identified in each of the RODs were reviewed to determine if they had been updated. The only significant change that has occurred in the past five years is that the state of Florida promulgated new Cleanup Target Levels (CTLs) for groundwater, surface water, and soil in April 2005. The new CTLs are used, where applicable, to evaluate data generated in monitoring reports, and were used in this Five-Year Review.

1.4 NEXT REVIEW

Starting in fiscal year 2011, all Federal Facility five-year reviews will be due on the date five years from the remedial action start date. This five-year review is due on March 1, 2011, five years after the prior five-year review was approved by USEPA, but due dates for future FYRs will be triggered off of the remedial action start date which would make the fourth one due by March 6, 2015.

2.0 OPERABLE UNIT 1

OU 1 is comprised of PSC 26 and PSC 27. PSC 26 is a landfill known as the Old Main Registered Disposal Area. PSC 27 is a polychlorinated biphenyl (PCB) transformer storage area known as the Former Transformer Storage Area. Because PSC 26 and PSC 27 are located adjacent to each other and share the same fate and transport mechanism for contaminants, the sites are collectively known as OU 1.

2.1 SITE CHRONOLOGY

Historical events and relevant dates in the OU1 chronology are summarized in Table 2-1.

2.2 BACKGROUND

2.2.1 Physical Characteristics of OU 1

The PSC 26 landfill covers more than 30 acres while PSC 27 is less than an acre in size (Figure 2-1). Child Street bisects the northeastern portion of OU 1. The site is bordered by a forested area and golf course on the north, base housing to the east, a wooded area on the south, and a restricted weapons storage area on the west. Drainage ditches within the forested area south of the main landfill are also included as part of OU 1. These ditches drain south into an unnamed stream east of OU 1. The stream flows southward for approximately 2,500 feet before it reaches the St. Johns River (Figure 2-2).

2.2.2 Land and Resource Use at OU 1

The land use at OU 1 is considered industrial. The landfill is fenced to prevent unauthorized access. The station has agreed to the following land use controls (LUCs):

- Maintain the fence and signs around the landfill south of Child Street to prevent access.
- Restrict construction.
- Restrict groundwater access.
- Prevent residential use.

TABLE 2-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 1
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

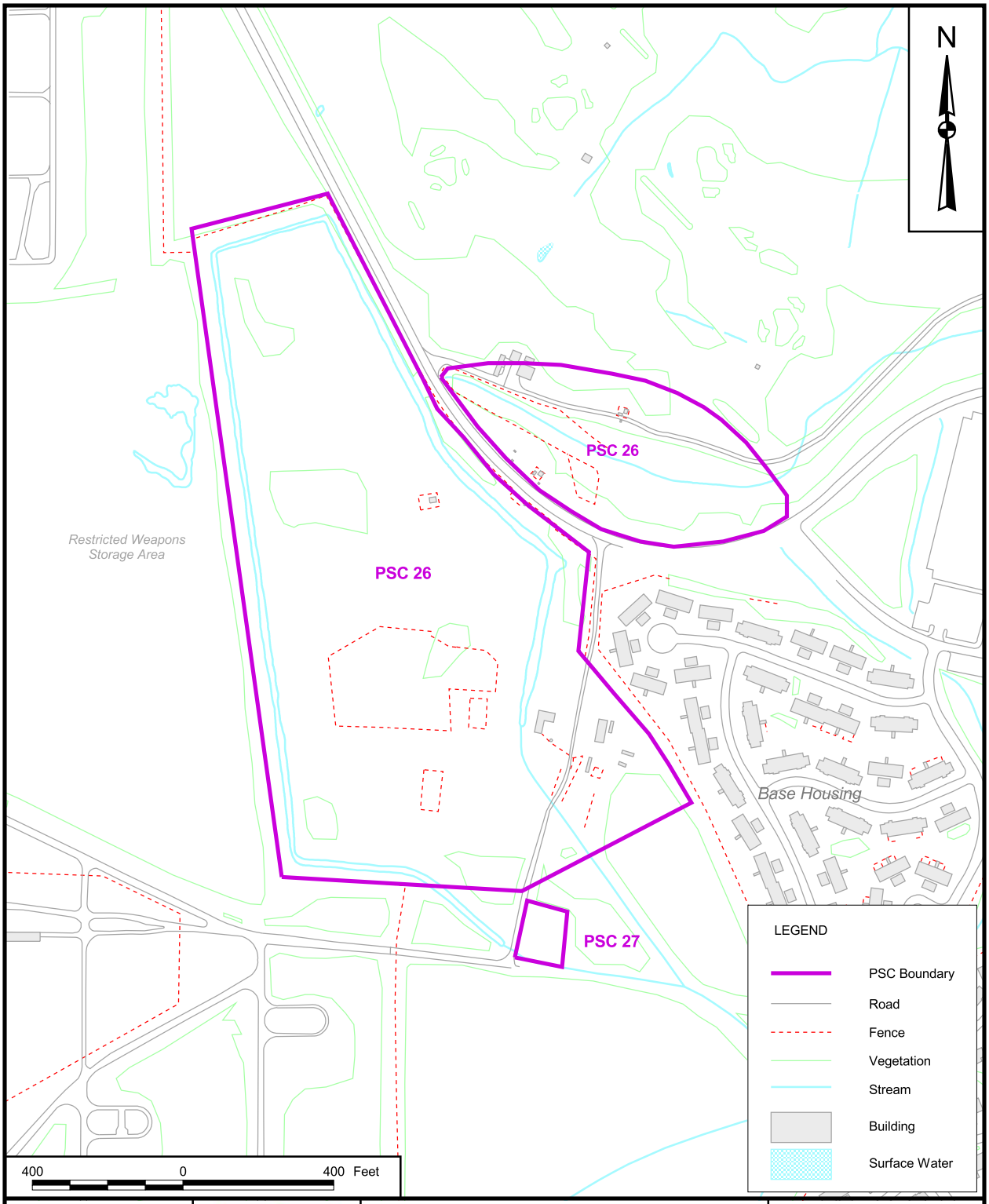
Event (Sub-events indented)		**Date**
Pre-discovery of contaminants		
	United States Army disposed of non-hazardous debris such as vehicles at PSC 26.	Prior to 1940
	The Navy disposed of radium-226 and radium-228 paint waste and luminescent dials at PSC 26.	1940 to 1950
	PSC 26 served as a NAS Jacksonville disposal area for household, sanitary, and industrial waste.	1940 to 1979
Initial discovery of problem or contamination		
	Radiation survey and soil/groundwater sampling discovered "hazard to human health"[(1)].	Feb 1973
Pre-NPL responses		
	Excavation activities resulted in 501 barrels of radiological contaminated material removed from PSC 26. [(2)]	Nov 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; transformers removed by the Navy.	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
	Excavated ditch material (from LNAPL trenches) was blended with dry sandy fill and spread over the landfill. [(2)]	1983
NPL Listing		Nov 1989
FFA signature		1990
Post-NPL responses		
	Several investigations of the LNAPL contamination.	1990 to 1991
	Focused RI/FS on LNAPL source area.	Dec 1993
Remedial design start (LNAPL only)		Early 1994
Remedial design complete (LNAPL only)		May 1994
	Interim ROD (IROD) signed for LNAPL removal.	Aug 1994
	Interim remedial action initiated for LNAPL removal.	Feb 1995
RI/FS complete for OU 1		Mar 1996
Proposed Plan for Remedial Action (public comment period)		Jul to Sep 1996

TABLE 2-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 1
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event (Sub-events indented)		**Date**
Remedial design start (excavation with landfill cap and cover only)		Late 1996
Remedial design complete (excavation with landfill cap and cover only)		Jun 1997
ROD signature for OU 1		Sep 1997
Construction dates		
	Excavation and disposal of contaminated surface soil and sediment from PSC 27 into PSC 26. (2)	Completed July 1998
	Installation of cap and cover system at PSC 26.	Completed Aug 1998
Construction completion date		Aug 1998
Memorandum of Agreement (MOA) signed between USEPA, FDEP, and Navy to ensure LUC compliance.		Aug 1998
Institutional controls for OU 1 developed through LUC Program		Oct 1998
	Land use control implementation plan (LUCIP) inspections are conducted quarterly	Ongoing
	Inspection of the cap and cover since installation.	Ongoing
	Groundwater and surface water monitoring including monitored natural attenuation (MNA).	Initiated Feb 1999
	First Five-Year Review	Sep 2001
	Second Five-Year Review	Sep 2005
	Groundwater samples collected at base housing near OU 1 to evaluate indoor air intrusion of groundwater volatile organic compounds (VOCs)	Oct 2005
	Groundwater and soil samples collected from northwestern portion of OU 1 to delineate contamination (Phase I)	Oct & Nov 2005
	Groundwater and soil samples collected from northwestern portion of OU 1 to delineate contamination (Phase II)	Mar – Oct 2007
	Partnering Team decision to discontinue LNAPL recovery system operations	Jan 2005
	LNAPL Recovery System Performance Objectives letter for system shut down submitted to USEPA (Tetra Tech)	Mar 2010
	LUC Remedial Design (LUC RD) submitted (Tetra Tech)	Jun 2010

Notes:
(1) ABB Environmental Services (ABB-ES), 1997a
(2) Removal actions



DRAWN BY A. JANOCHA	DATE 9/17/04	SITE MAP OPERABLE UNIT 1 FIVE YEAR REVIEW NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NO. 7302
CHECKED BY M. DALE	DATE 9/17/04		OWNER NO. CTO 0342
REVISED BY ___	DATE ___		APPROVED BY ___ DATE ___
SCALE AS NOTED			DRAWING NO. FIGURE 2 - 1 REV 0

P:\GIS\JACKSONVILLE_NAS\APR\OU1.APR SITE LAYOUT 2/21/05 CF

DRAWN BY	DATE		TOPOGRAPHIC MAP	CONTRACT NO. 7302	
A. JANOCHA	9/17/04	NAVFAC	OPERABLE UNIT 1	OWNER NO. CTO 0342	
CHECKED BY	DATE		FIVE YEAR REVIEW	APPROVED BY	DATE
M. DALE	9/17/04		NAS JACKSONVILLE		
CHECKED BY	DATE		JACKSONVILLE, FLORIDA	DRAWING NO. FIGURE 2 - 2	REV 0
SCALE AS NOTED					

P:\GIS\JACKSONVILLE_NAS\APR\OU1.APR DRG LAYOUT 2/21/05 CF

2.3 HISTORY OF CONTAMINATION AT OU 1

PSC 26, the Old Main Registered Disposal Area, was also known as the Oil and Solvents Disposal Pits Area. Prior to 1940, the Army disposed of non-hazardous debris such as vehicles at the site. The Navy reportedly disposed of 1,000 gallons (gal) per week of volatile organic waste products over a 40-year period in open pits (ABB-ES, 1996a). Other wastes reportedly included approximately 200 gal per week of cold carbon remover residue, 300 gal per week of vapor degreaser, and 600 gal per week of paint shop waste. These wastes contained methylene chloride, methyl ethyl ketone, ethyl acetate, trichloroethene (TCE), methyl isobutyl ketone, n-butyl acetate, xylenes, and heavy metal salts. Methylene chloride and methyl ethyl ketone were utilized during paint stripping operations. TCE and methylene chloride were used for degreasing. N-butyl acetate and xylenes were used as paint and lacquer solvents. These materials were burned in the pits, which were covered with soil when full of burned residues. The burning of wastes was eventually discontinued due to air quality considerations. However, disposal of waste oils, spent solvents, and paint wastes continued until 1978. Low level radioactive wastes were reportedly disposed at PSC 26 during 1940 to 1950. The radioactive wastes consisted of radium-226 and radium-228 paint waste and luminescent dials.

During a 1992 interview, a former NAS Jacksonville employee indicated that approximately 200 drums containing hazardous materials were deposited in the southern portion of OU 1 during land-filling operations (ABB-ES, 1996a)

PSC 27, the Former PCB Transformer Storage Area, is adjacent to the southern boundary of PSC 26. Electrical transformers containing PCBs were stored at PSC 27 until 1978. Vandalism to the transformers occurred in 1978. An investigation in 1979 concluded that the damaged electrical transformers contained PCB-contaminated dielectric fluid that had contaminated soil and groundwater. The Navy removed the transformers, and the PCB-contaminated soil was removed and disposed of off-site.

2.3.1 Initial Response for OU 1

CERCLA response began at NAS Jacksonville in 1982 with an Initial Assessment Study (IAS) conducted to collect and evaluate evidence that contaminants at PSCs might pose a health risk to humans and/or adversely affect the environment at locations both on and off of the station. The IAS evaluated a total of 38 PSCs. PSC 26 and PSC 27 were determined to require additional assessment activities and remedial action.

A remediation system was constructed and operated during 1983 and 1984 to remove LNAPL from PSC 26. The remediation system consisted of infiltration galleries, a perimeter drainage ditch system around PSC 26, two underflow weirs and a flow measuring weir, as well as pumps and/or a boom system

to collect free-phase hydrocarbons. The perimeter drainage ditches were plugged with earthen barriers near the downstream boundaries of OU 1 because the surface water failed to meet discharge requirements for the St. Johns River. Prior to the construction of the perimeter drainage ditch system, the three former primary disposal pits were excavated to a depth of 8 feet, blended with sandy fill materials, and spread across the surface of OU 1. The entire land surface area of OU 1 was then graded to drain toward the perimeter drainage ditch system. The ditch system, while demonstrating some effectiveness in removing LNAPL, was discontinued in 1984 due to failure to meet National Pollutant Discharge Elimination System permit.

2.3.2 Basis for Taking Action at OU 1

Two groundwater plumes of VOCs from OU 1 were identified that are migrating toward the previously-mentioned stream that is a tributary of the St. Johns River. The northern-most plume originates at PSC 26 and included LNAPL. The southernmost plume, consisting primarily of chlorinated VOCs, originates from the central portion of the former landfill.

Potential health risks were evaluated in the RI/FS under current and future land use conditions (ABB-ES, 1996a). The RI/FS concluded that site-related cancer and noncancer risks for current land use were consistent with USEPA guidelines, which indicated that exposure did not exceed the hazard index of 1. Site-related cancer and noncancer risks in surface soil, surface water north of Child Street, and sediment under future residential land use assumptions were consistent with acceptable risks. Cancer risks associated with chlorinated solvents and future use of groundwater as drinking water were sufficiently high to indicate the need to prevent drinking water use in the area of the plume. Cancer and noncancer risks associated with future residential use of areas not addressed by the remedy were slightly above the generally acceptable range. These risks are predominantly due to PCBs in soil in areas south of Child Street. There is at least one chemical in each medium which has associated cancer risk greater than 10^{-6} (ABB-ES, 1996a).

2.4 REMEDIAL ACTIONS

2.4.1 Remedy Selections at OU 1

A focused RI/FS was completed for the LNAPL source area in 1993, and an IROD addressing only the LNAPL area was signed by the Navy in August 1994 (ABB-ES, 1994). In September 1994, the FDEP and USEPA approved the IROD, and an Interim Remedial Action (IRA) for the LNAPL removal was initiated in early 1995 in the area of concern northeast of Child Street. The recovery system consisted of three linear recovery trenches filled with high permeability, inert granular material. Collection sumps were installed at various points along the trenches, and pumps designed to recover product were installed.

The system was designed so that it could be operated as a passive collection system or as an active system that depresses groundwater to enhance flow of product to the collection sumps (ABB-ES, 1997a). The remainder of the site contamination was addressed in the 1996 RI/FS for OU 1 (ABB-ES, 1996a), which identified contamination in various media.

Five remedial alternatives were evaluated in the FS for OU 1 to address the 10 remedial action objectives (RAOs). The selected remedial action for OU 1 was "Capping and Covering, Soil and Sediment Excavation and Intrinsic Natural Attenuation." As stated in the ROD: "*The twofold purpose of the remedial action for OU 1 is to contain and control the contamination at OU 1 and to reduce the risks posed by COCs to acceptable levels within 30 years."* (ABB-ES, 1997a). To meet these goals, 10 RAOs were identified in the ROD, and are summarized in Table 2-2. Specific activities involved with the selected remedial action are further described below.

Landfill Soil and Debris

Soil and debris within the landfill were capped and/or covered. The cover was a partial cover/cap system with a 30-mil geomembrane layer cap for a portion of the landfill. The geomembrane layer was laid over the radionuclide-contaminated soil and debris to prevent water from infiltrating. An 18-inch layer of soil was placed over the geomembrane and on the remaining portions of the landfill. A 6-inch layer of top soil was placed over the entire landfill to promote vegetation, absorb rainwater, and reduce surface runoff.

LNAPL

LNAPL collection and off-site disposal were continued as described in the IROD for LNAPL. This included the potential for upgrading the LNAPL collection system to an active system if required to meet RAOs (ABB-ES, 1997a).

Soil and Sediment

Prior to capping of the landfill, contaminated soils and sediments exceeding the 1×10^{-4} risk action levels were excavated from the area outside the landfill and placed on the existing soil and debris within the landfill. Approximately 9,000 cubic yards (yd^3) (4,000 yd^3 from north of Child Street and 5,000 yd^3 from south of Child Street) of soil were excavated.

In addition to excavating soil from outside the landfill, approximately 900 cubic yards (yd^3) of sediment from the unnamed tributary were excavated. 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 selected for excavation. Excavation of those hot spots reduced the cumulative, residual risk to approach the low (i.e., more aggressive) end of the USEPA acceptable risk

TABLE 2-2

**REMEDIAL ACTION OBJECTIVES FOR OPERABLE UNIT 1
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA**

Medium	Contaminants Causing Unacceptable Risk	Remedial Action Objectives
Landfill Soil and Debris	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 ingest 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.

range. After excavation, soil from outside the landfill and sediment from the unnamed tributary were capped under the partial cap and cover system as part of the remedy.

Groundwater

The groundwater treatment component of the selected remedy consisted of monitored natural biodegradation/attenuation. Access restrictions were 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 landfill, posting signs along the fence, and obtaining a restriction on use of groundwater for consumption. The groundwater restrictions will remain in effect until the groundwater contamination levels for contaminants of concern (COCs) do not exceed maximum contaminant levels (MCLs) and concurrence is obtained from the FDEP and USEPA to remove the restrictions (ABB-ES, 1996a).

Groundwater and surface water monitoring was implemented upon completion of the soil/landfill remedial action to assess the restoration of the surficial aquifer, to evaluate the potential for contamination in the unnamed tributary, and to determine when groundwater access restrictions could be lifted. Groundwater and surface water monitoring locations are presented in Figure 2-3 and are described in Table 2-3.

As part of the natural attenuation remedy, 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, then one or more seepage meters were to be installed to collect water samples at the direct interface of groundwater discharge to surface water. These samples were to be analyzed and if concentrations of COCs were still greater than Florida Surface Water standards, then the first contingent 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, 1996a). 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 (injection of a carbon source and applicable nutrients into impacted groundwater beneath OU 1) was to be implemented. A copy of the Contingency Decision-Making Process Flow Plan Chart for OU 1 developed in the Long-term Monitoring Plan (LTMP) is included in Appendix A.

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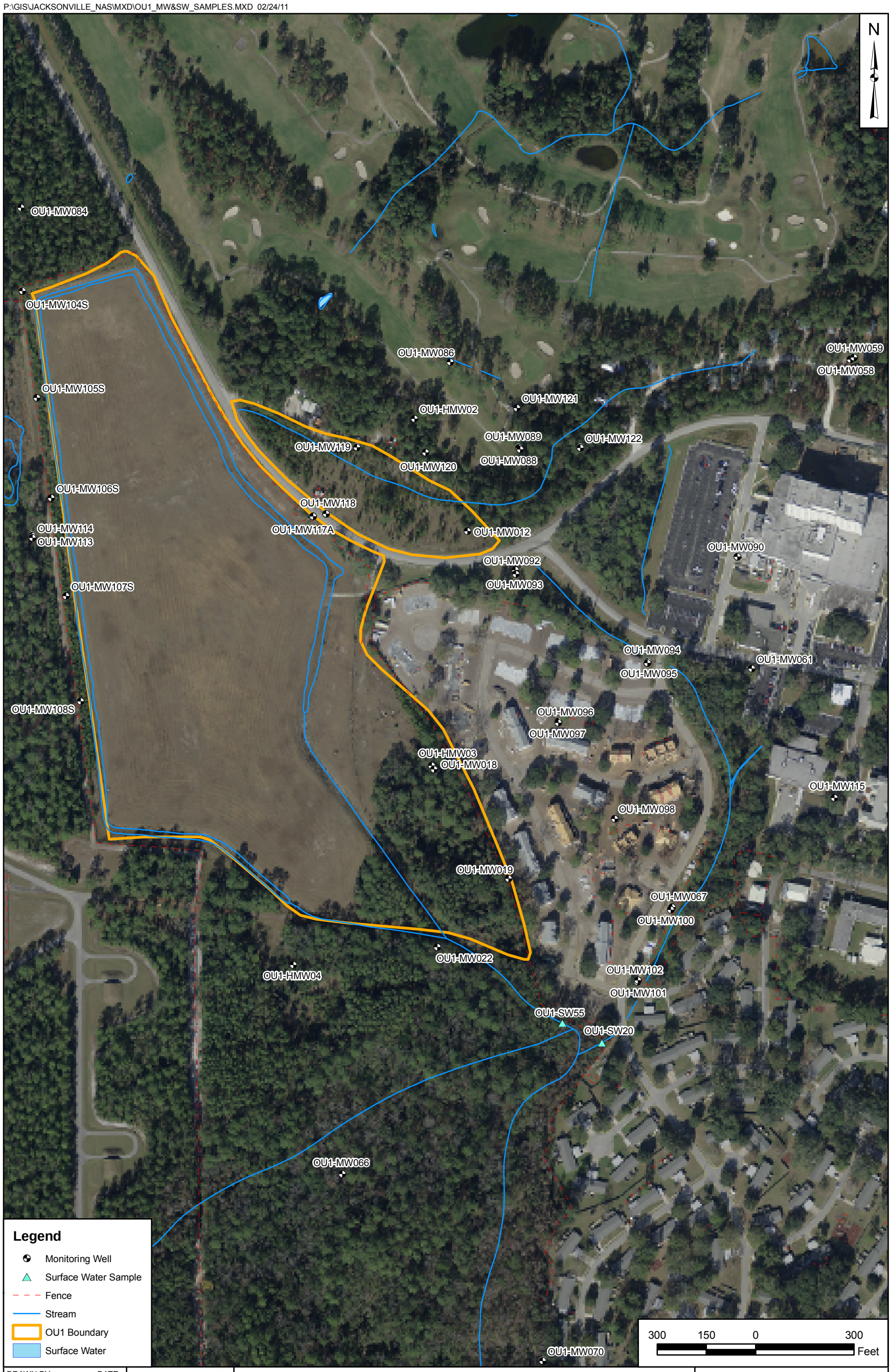

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D. HARDISON	10/22/10
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K. MOORE	02/24/11
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MONITORING WELL AND SURFACE WATER SAMPLE LOCATIONS
OPERABLE UNIT 1
FIVE YEAR REVIEW
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO.	
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FIGURE NO.	REV
FIGURE 2-3	0

TABLE 2-3

**MONITORING PROGRAM AT OPERABLE UNIT 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	Intermediate	30 to 35	Monitor groundwater downgradient of LNAPL area.
MW-18	Intermediate	26.5 to 31.5	Monitor groundwater downgradient of landfill.
MW-19	Intermediate	19 to 24	Monitor groundwater downgradient of landfill.
MW-22	Intermediate	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	Intermediate	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	Intermediate	22.5 to 27.5	Monitor extent of dissolved plume in housing area.
MW-98	Intermediate	20.5 to 25.5	Monitor extent of dissolved plume in housing area.
MW-100	Intermediate	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	Intermediate	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: ROD (ABB-ES, 1997a)

2.4.2 Remedy Implementation at OU 1

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.

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. Remedial activities began in 1998. 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 (BEI, 1999a).

The monitoring and maintenance of the landfill cap was initiated after the completion of the cap and cover system in August 1998. Landfill inspections have been conducted annually since 2000. The long-term monitoring program, which currently includes groundwater monitoring, MNA, and surface water sampling, was initiated in February 1999 and continues at the time of this review.

Institutional controls for OU 1 were developed through the LUC program in October 1998. A MOA between the USEPA, FDEP, and the Navy was signed on August 31, 1998. The purpose of the MOA was to ensure compliance with LUCs 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.

The remedy implementation originally included an LNAPL recovery system, which was installed in April 1995 in general accordance with the IROD for OU 1 (FWEC, 1995a). The recovery system as designed was installed across the groundwater-soil interface to remove the light phase layer from the top of the water table. The system consisted of three recovery trenches with lengths of 20 feet, 195 feet, and 240 feet, each 18 feet deep. A decreasing trend in free product recovery beginning in 2003 was documented and only minimal amounts of free product were available to be recovered. The LNAPL system was evaluated via a NAVFAC SE sponsored optimization program, and it was concluded that the LNAPL recovery system should be discontinued. In January 2005, the NAS Jacksonville Partnering reached consensus to discontinue the LNAPL recovery, and the system ceased operation in February 2005.

2.4.3 System Operation/Operation and Maintenance at OU 1

The LNAPL recovery system began operations in 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 gal of LNAPL (ABB-ES, 1994). A member of the NAS Jacksonville Facilities Environmental Department provided copies of the recovery records to date. The data from those records were then transcribed to a spreadsheet and the total recovered LNAPL over the approximately 10 years of operation (1995 – 2005) was calculated at approximately 781 gal. 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) through 2005 is approximately $1,000,000. As explained above (Section 2.4.2), the LNAPL recovery system ceased operation in February 2005; however, quarterly monitoring of the wells continued until December 2010. Absorbent socks were used to remove any LNAPL that was observed during quarterly monitoring.

The Navy maintains contracts to perform the long-term monitoring and maintenance for OU 1. The work is conducted as directed by the ROD, the OU 1 Monitoring Plan for Selected Remedy, and the Maintenance and Monitoring Plan for OU 1. Current (i.e., subsequent to the previous Five-Year Review) monitoring activities consist of annual monitoring of groundwater and surface water, and annual inspection and maintenance of the landfill cover. NAS Jacksonville performs inspections and maintenance of the landfill. A Basic Order Agreement contractor, Aerostar Environmental Services, Inc. (Aerostar), is currently responsible for the groundwater and surface water sampling for the MNA program.

As stated in the ROD for OU 1 (ABB-ES, 1997a), 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 was approximately $4.2 million. The actual costs of remedial actions to date for OU 1 are in excess of $6 million.

2.5 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

2.5.1 Protectiveness Statements from the Last Review

The previous Five-Year Review (Tetra Tech, 2005a) concluded that remedial actions at OU 1 are currently protective; however, nine issues were identified and the review stated that a protectiveness determination for four of the nine issues (Issues 1, 7, 8, and 9 in Table 2-4, which is duplicated from the previous Five-Year Review) could not be made until further information is obtained.

TABLE 2-4

ISSUES FROM LAST FIVE-YEAR REVIEW AND ACTIONS TAKEN SINCE THEN
FIVE-YEAR REVIEW
OPERABLE UNIT 1
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Issue Number	Issue	Recommendations	Milestone Date	Action Taken and Outcome	Date of Action
1	Soil and Groundwater contamination on NW boundary of OU 1 is not delineated.	Perform supplemental investigation along NW boundary to define and delineate shallow soil and groundwater issues. Make protectiveness determination.	04-Mar-10	See Section 2.5.2.1	LUC RD submitted but not yet approved.
2	LNAPL recovery rates slower than projected.	The LNAPL system was shutdown in February 2005; however, wells were monitored until 2010. Only trace levels of LNAPL were removed after 2005 via absorbent socks. Therefore, these issues have been overcome by events.	28-Feb-05	See Section 2.5.2.2	NA
3	LNAPL system not operating.				
4	Lock missing on well MW-67.	Replace lock on well MW-67.	31-Mar-05	See Section 2.5.2.3	Not recorded.
5	Missed one LUC Inspection.	Inspect site quarterly or as required by LUCIP.	30-Jun-05	See Section 2.5.2.4	On-going
6	No HASP or contingency plan exists for the LNAPL system.	The LNAPL system was shutdown in February 2005. Therefore, these issues have been overcome by events	28-Feb-05	See Section 2.5.2.2	NA
7	Indoor air intrusion potential for residences in the groundwater contamination plume area.	Evaluate this issue and take any required corrective actions.	04-Mar-10	See Section 2.5.2.5	Sep 2008 letter report
8	According to the most recent USGS modeling effort, there is a potential for contaminated groundwater in the northern portion of the plume to migrate beyond the currently defined groundwater system.	Add monitoring wells located east of MW-89 to the monitoring program to verify that the groundwater contamination is contained within the monitoring network.	04-Mar-10	See Section 2.5.2.6	NA
9	The LNAPL system operation has been discontinued, and the RAO has not been achieved. A new remedy (e.g., natural attenuation) may need to be selected and the proper administrative actions performed.	Prepare proper CERCLA documentation for alternate remedy.	04-Mar-10	See Section 2.5.2.2	20-Oct-10

NA: Not applicable; overcome by events.

2.5.2 Status of Recommendations and Follow-up Actions from Last Review

Table 2-4 provides a list of recommendations, recommended follow-up actions from the first Five-Year Review, milestone dates, actions taken, outcomes, and dates of action.

2.5.2.1 Actions Taken and Outcome for Issue 1 from Table 2-4

Shortly before the previous Five-Year Review was completed, buried waste debris and discolored soils were discovered along the northwestern boundary of OU 1. The NAS Jacksonville Partnering Team decided that the collection of groundwater and soil samples along the northwestern edge of the OU 1 landfill cap was needed to ensure the remedy (landfill cap and LUCs) for OU 1 was protective. In Phase I, conducted in October and November 2005, groundwater samples were collected from five newly installed shallow groundwater wells and soil data were collected from soil borings. In Phase II, conducted in March through October 2007, additional groundwater samples were collected, including samples from a sixth newly installed shallow groundwater wells, and additional soil data were collected from soil borings (Figures 2-4 and 2-5). The resulting report (Tetra Tech, 2008a) concluded that a small area of soil and groundwater contamination existed outside of the OU 1 landfill boundary and corresponding OU 1 LUC boundary. Arsenic and benzene were the only two final COCs identified for soil in this area. Arsenic was a COC based upon exceedance of its residential Soil Cleanup Target Level (SCTL), and benzene was a COC based upon exceedance of its SCTL for leachability. Arsenic and benzene were the only two retained COCs detected in groundwater and both were detected in the sample collected from MW105S. Monitoring well MW109S was installed down-gradient of MW105S to complete groundwater delineation. Neither arsenic nor benzene was detected in excess of Groundwater Cleanup Target Levels (GCTLs) in the sample collected from MW109S (Figure 2-4). The Tetra Tech (2008a) report recommended that the boundary of the OU 1 landfill be amended to encompass the extent of the newly delineated soil and groundwater contamination in the northwestern corner of the OU 1 landfill, and that well MW109S be included in the OU 1 groundwater monitoring program. Subsequently, a proposed boundary expansion was completed to encompass monitoring well MW109S and a LUC RD was prepared. The LUC RD has been submitted to USEPA and FDEP but it has not yet been approved.

2.5.2.2 Actions Taken and Outcome for Issues 2, 3, 6, and 9 from Table 2-4

As explained in Section 2.4.2, an evaluation of LNAPL data and the LNAPL recovery was conducted, and it was concluded that the operation of the LNAPL recovery system should be discontinued, because a decreasing trend in free product recovery began in 2003 and only minimal amounts of free product were available to be recovered. In January 2005, the NAS Jacksonville Partnering reached consensus to discontinue the LNAPL recovery. From February 2005 until December 2010, the system was monitored for LNAPL and trace level accumulations noted were removed via absorbent socks. Therefore, Issues 2,

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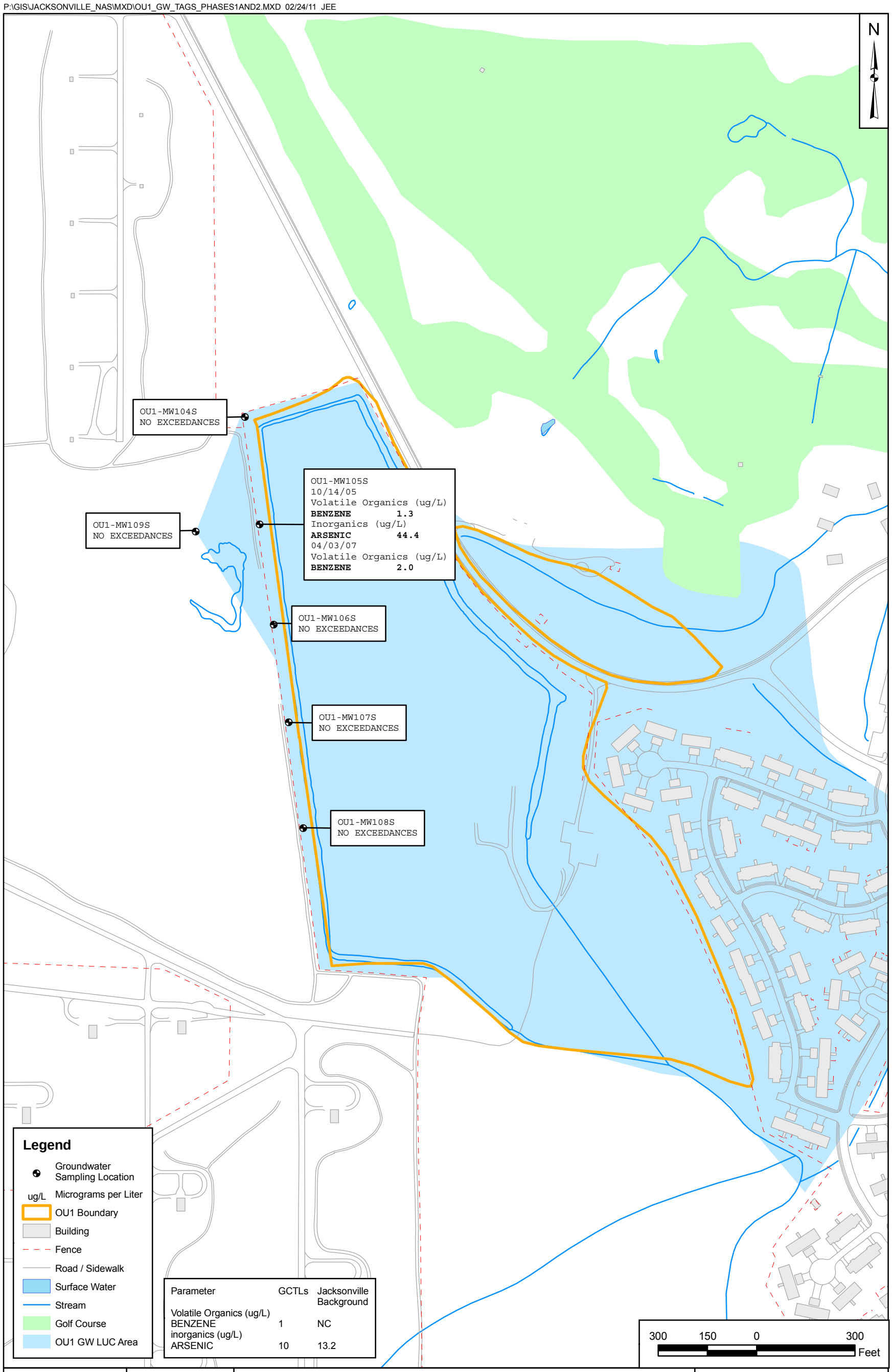

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GROUNDWATER ANALYTICAL RESULTS FROM PHASE I (2005) AND PHASE II (2007) SAMPLING EVENTS
OPERABLE UNIT 1
FIVE YEAR REVIEW
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO.	
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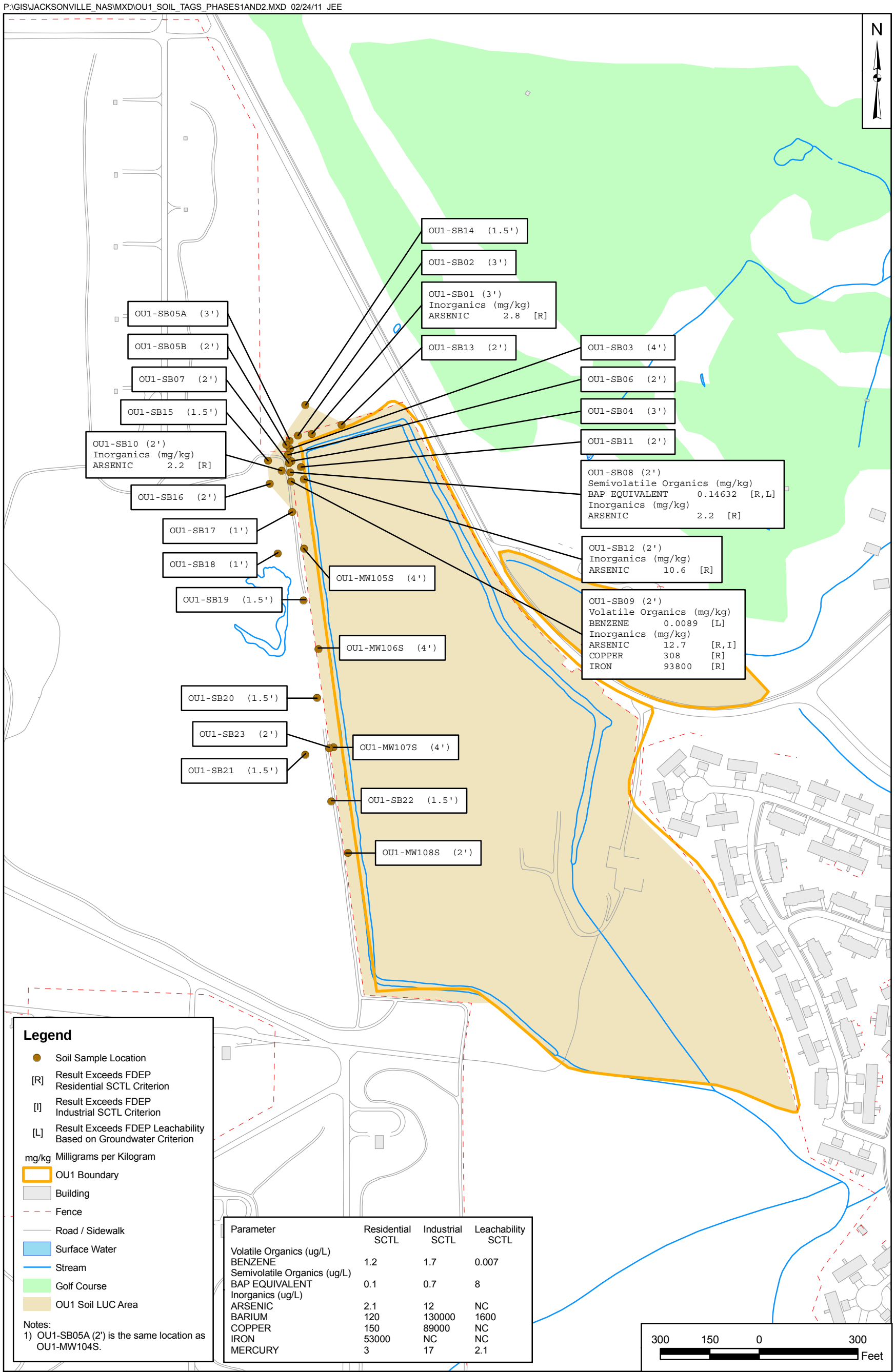

Parameter	Residential SCTL	Industrial SCTL	Leachability SCTL
Volatile Organics (ug/L)			
BENZENE	1.2	1.7	0.007
Semivolatile Organics (ug/L)			
BAP EQUIVALENT	0.1	0.7	8
Inorganics (ug/L)			
ARSENIC	2.1	12	NC
BARIUM	120	130000	1600
COPPER	150	89000	NC
IRON	53000	NC	NC
MERCURY	3	17	2.1

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SOIL ANALYTICAL RESULTS FROM PHASE I (2005) AND PHASE II (2007) SAMPLING EVENTS
OPERABLE UNIT 1
FIVE YEAR REVIEW
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO. 02098
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FIGURE NO. FIGURE 2-5
REV 0

3, and 6 are no longer applicable. Regarding Issue 9, a letter requesting formal approval of the LNAPL system closure was sent to USEPA and FDEP in March 2010 and regulatory approval letters were received from USEPA and FDEP in October 2010.

2.5.2.3 Actions Taken and Outcome for Issue 4 from Table 2-4

The lock has been replaced on well MW-67.

2.5.2.4 Actions Taken and Outcome for Issue 5 from Table 2-4

LUC inspections have been conducted quarterly during the period of this Five-Year Review.

2.5.2.5 Actions Taken and Outcome for Issue 7 from Table 2-4

The previous Five-Year Review identified the potential for indoor air intrusion of groundwater COCs for residences in the base housing complex near OU 1. Groundwater samples from 22 locations around and within the former base housing area adjacent to OU 1 were subsequently collected in October 2005 (Tetra Tech, 2008b) and analyzed for OU 1 COCs. Only 1 of the 22 samples had any detection of COCs. TCE and cis-1,2-dichloroethene (DCE) were detected in that sample (OU1-DPT009), but concentrations of both were below FDEP GCTLs. TCE was detected at 1.3 micrograms per liter (µg/L) and cis-1,2-DCE was detected at 3.8 µg/L. Detailed sampling information and results are available in the Tetra Tech (2008b) report. Because groundwater COC concentrations did not exceed FDEP GCTL values, no soil gas samples were collected after the groundwater investigation, and it was concluded that the OU 1 groundwater plume presented no indoor air intrusion risks to the adjacent base housing. In order to further support that conclusion, Tetra Tech used the data from sample OU1-DPT009 to run the USEPA-approved Johnson and Ettinger model. The intent was to present a “worst case” scenario to determine if vapor intrusion risk(s) was/were present. Detailed data and assumptions used in running the model, and model results, are available in the Tetra Tech (2008b) report. Results of the Johnson and Ettinger model indicated no cancer risks were present for either COC in excess of 1.0E-06. The Hazard Quotient (non cancer risk) for both COCs was less than 1.0.

In summary, no risk via indoor air intrusion for both cancer and non-cancer risks are expected. No shallow groundwater contamination is known to be present near the base housing area adjacent to OU 1. While groundwater contamination does exist in this area at deeper depths, sampling data indicates that it is present at depth of 20 feet bgs and greater. Groundwater contamination at depths greater than 20 feet bgs is generally not viewed as a potential for indoor vapor intrusion. Thus, groundwater contamination associated with OU 1 does not present unacceptable indoor air risks to base housing from vapor intrusion.

2.5.2.6 Actions Taken and Outcome for Issue 8 from Table 2-4

The previous Five-Year Review noted that some groundwater near monitoring well MW-89, located north of Child Street near the golf course (Figure 2-3) could possibly migrate beyond the currently defined groundwater system. Specifically, groundwater near MW-89 might migrate to the east and escape collection by the groundwater control network described in the original RI/FS. Subsequent discussions of this issue by the NAS Jacksonville Partnering Team have concluded that any groundwater-to-surface water connection in the vicinity of MW-89 would probably occur through seepage into the wet-weather stream system along Child Street; this stream drains roughly south to surface water location SW-20 (Figure 2-3), which is one of two points of compliance for OU 1 monitoring. Therefore, potential groundwater contamination in the vicinity of MW-89 will be evaluated by SW-20 data, and no additional action regarding Issue 8 is necessary.

2.6 FIVE-YEAR REVIEW PROCESS

2.6.1 Document Review

This Five-Year Review consisted of a review of relevant documents including landfill inspection reports, monitoring data, and other reports. Applicable groundwater and surface water cleanup standards listed in the 1997 ROD were reviewed.

2.6.2 Data Review

2.6.2.1 Review of COC Data for Groundwater

Long-term monitoring through 12 years has occurred in accordance with the LTMP for OU 1. As part of the monitoring program, groundwater from specific well locations (see Table 2-3) were analyzed for the COCs as indicated in the ROD and later modified by the NAS Jacksonville Partnering Team. Additionally, natural attenuation parameters were monitored. Annual monitoring events covered by this Five-Year Review were conducted in November 2004, November 2005, November 2006, November 2007, December 2008, and February 2010. The previous Five-Year Review for OU 1 evaluated groundwater samples collected during 2001 through 2003, so the current review of OU 1 actually consists of monitoring data for six years (2004 through 2010).

The OU 1 ROD specified criteria for the following nine groundwater COCs: 1,1-DCE (7 µg/L); 1,2-dichloroethane (DCA) (3 µg/L); cis-1,2-DCE (70 µg/L); trans-1,2-DCE (100 µg/L); benzene (1 µg/L); TCE (3 µg/L); vinyl chloride (1 µg/L); bis-(2-ethylhexyl)phthalate (6 µg/L); and naphthalene (6.8 µg/L). However, bis-(2-ethylhexyl)phthalate and naphthalene were eliminated after the first year of monitoring as approved by the FDEP and USEPA due to lack of detection of either compound during 1999. The

groundwater criteria noted above for the remaining seven COCs are Florida GCTLs from Table 4 of FAC Chapter 62-550, as per guidance in FAC 62-777 and 62-520. Concentrations of the seven COCs at each well location during the six events covered by this review are provided in Table 2-5, and a review of the data is summarized below.

- 1,1-DCE consistently exceeded its GCTL in well MW-89. The concentration attained the highest level during the November 2006 event, and while the concentration has steadily decreased since then, it remains above the GCTL.
- 1,2-DCA exceeded its GCTL in well MW-89 during five of the six events.
- Benzene exceeded its GCTL in wells MW-12 and MW-89 during five of six events. It was not detected during the fifth event, but its detection limit in MW-89 during the fifth event (1.4 µg/L) slightly exceeded the 1 µg/L GCTL.
- Cis-1,2-DCE exceeded its GCTL in five wells (MW-18, MW-19, MW-67, MW-89, and MW-100) during one or more sampling events. Concentrations tended to be highest in November 2006 and have decreased since then, dropping below the GCTL in wells MW-18 and MW-67.
- Trans-1,2-DCE exceeded the GCTL in only one well (MW-19) and during only one sampling event.
- TCE exceeded its GCTL in five wells (MW-18, MW-19, MW-22, MW-67, and MW-89) during one or more sampling events. The concentrations have tended to decline since the November 2006 event, dropping below GCTL in MW-67.
- Vinyl chloride exceeded its GCTL in nine wells (MW-12, MW-18, MW-19, MW-22, MW-67, MW-89, MW-100, MW-101, and MW-102 during one or more sampling events. Concentrations in most wells tended to remain steady through the five events or declined after 2006, indicating reductive dechlorination processes continue to be active at the site.

The point of compliance for the groundwater monitoring at OU 1 is surface water stations SW 20 and SW 55. Any contamination indicated by downgradient wells is expected to follow a vertical gradient upward to the surface water at one of these two locations. The downgradient groundwater monitoring well pairs designed for this part of the LTMP consist of MW-67 (shallow zone), MW-100 (intermediate zone), MW-101 (shallow zone), and MW-102 (intermediate zone) (Figure 2-3). Therefore, as long as the surface water monitoring network is adequate and the trigger levels for contingent action (TLCAs) are not exceeded at the surface water monitoring locations, the monitoring program is expected to be protective of human health and the environment as it relates to groundwater contamination.

TABLE 2-5

SUMMARY OF GROUNDWATER ANALYTICAL DATA
OPERABLE UNIT 1
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Contaminant	Well Identification	Interval of Surficial Aquifer	GCTL	Concentrations in µg/L					
				11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
1,1-DCE	OU1-MW12	INT	7	<0.3	<0.3	<0.2	<0.36	<0.34	<0.15
	OU1-MW18	INT	7	2.6	6.0	6.3	<0.36	1.9	<0.21
	OU1-MW19	INT	7	2.1	3.0 – V	<4.4 – D	2.4 – I	2.3	2.2
	OU1-MW22	INT	7	<0.3	<0.3	0.91	0.61 – I	0.76 – I	<0.21
	OU1-MW67	Shallow	7	<1.0	<0.3	<0.3	<0.36	<0.34	<0.21
	OU1-MW84	INT	7	<1.0	<0.3	<0.2	<0.36	<0.34	<0.15
	OU1-MW85	Shallow	7	<1.0	<0.3	<0.2	<0.36	<0.34	<0.15
	OU1-MW89	Shallow	7	**61**	**63 – D2**	**131**	**90**	**64**	**22**
	OU1-MW93	Shallow	7	<1.0	<0.3	<0.2	<0.36	<0.34	<0.15
	OU1-MW95	Shallow	7	<1.0	<0.3	<0.3	<0.36	<0.34	<0.21
	OU1-MW97	INT	7	<1.0	<0.3	<0.2	<0.36	<0.34	<0.21
	OU1-MW98	INT	7	<1.0	<0.3	-	<0.36	-	<0.21
	OU1-MW100	INT	7	<1.0	<0.3	<0.2	<0.36	<0.34	<0.21
	OU1-MW101	Shallow	7	<2.0	<0.3	<0.2	<0.36	<0.34	<0.21
	OU1-MW102	INT	7	<2.0	<0.3	<0.2	<0.36	1.2	<0.21

TABLE 2-5 (CONTINUED)

SUMMARY OF GROUNDWATER ANALYTICAL DATA
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Contaminant	Well Identification	Interval of Surficial Aquifer	GCTL	Concentrations in µg/L					
				11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
1,2-DCA	OU1-MW12	INT	3	<0.2	<0.2	<0.1	<0.19	<0.43	<0.003
	OU1-MW18	INT	3	<0.2	<0.2	<0.2	<0.19	<0.43	<0.28
	OU1-MW19	INT	3	<1.0	<0.2	<0.5 – D	<0.95	<0.43	<0.28
	OU1-MW22	INT	3	<0.2	<0.2	<0.1	<0.19	<0.43	<0.28
	OU1-MW67	Shallow	3	<1.0	<0.2	<0.1	<0.19	<0.43	<0.28
	OU1-MW84	INT	3	<1.0	<0.2	<0.1	<0.19	<0.43	<0.003
	OU1-MW85	Shallow	3	<1.0	<0.2	<0.1	<0.19	<0.43	<0.082
	OU1-MW89	Shallow	3	**6 – I**	**6 – I, D2**	**10.2**	**9.2**	<2.2	**5.6**
	OU1-MW93	Shallow	3	<1.0	<0.2	<0.1	<0.19	<0.43	<0.002
	OU1-MW95	Shallow	3	<1.0	<0.2	<0.1	<0.19	<0.43	<0.28
	OU1-MW97	INT	3	<1.0	<0.2	<0.1	<0.19	<0.43	<0.28
	OU1-MW98	INT	3	<1.0	<0.2	-	<0.19	-	<0.28
	OU1-MW100	INT	3	<1.0	<0.2	<0.1	<0.19	<0.43	<0.28
	OU1-MW101	Shallow	3	<0.2	<0.2	<0.1	<0.19	<0.43	<0.28
	OU1-MW102	INT	3	<0.2	<0.2	<0.1	<0.19	<0.43	<0.28

TABLE 2-5 (CONTINUED)

SUMMARY OF GROUNDWATER ANALYTICAL DATA
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Contaminant	Well Identification	Interval of Surficial Aquifer	GCTL	Concentrations in µg/L					
				11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
BENZENE	OU1-MW12	INT	1	**4.5**	**4.0**	**5.1**	**7.8**	<0.29	**2.6**
	OU1-MW18	INT	1	0.5 – I	0.6 - I	0.4 – I	0.52 – I	<0.29	<0.27
	OU1-MW19	INT	1	<1.0	0.3 – I	<1.0 – D	<1.2	0.34 – I	<0.27
	OU1-MW22	INT	1	0.2 – I	<0.2	0.31	<0.23	<0.29	<0.27
	OU1-MW67	Shallow	1	<1.0	<0.2	<0.2	<0.23	<0.29	<0.27
	OU1-MW84	INT	1	<1.0	<0.2	<0.2	<0.23	<0.29	<0.050
	OU1-MW85	Shallow	1	<1.0	<0.2	<0.2	<0.23	<0.29	<0.050
	OU1-MW89	Shallow	1	**55**	**42 – D2**	**37**	**40**	**<1.4**	**32**
	OU1-MW93	Shallow	1	<1.0	<0.2	<0.2	<0.23	<0.29	<0.050
	OU1-MW95	Shallow	1	<1.0	<0.2	<0.2	<0.23	<0.29	<0.27
	OU1-MW97	INT	1	<1.0	<0.2	<0.2	<0.23	<0.29	<0.27
	OU1-MW98	INT	1	<1.0	<0.2	-	<0.24 – I	-	<0.27
	OU1-MW100	INT	1	<1.0	<0.2	<0.2	<0.23	<0.29	<0.27
	OU1-MW101	Shallow	1	<0.2	<0.2	<0.2	<0.23	<0.29	<0.27
	OU1-MW102	INT	1	<0.2	<0.2	<0.2	<0.23	<0.29	<0.27

TABLE 2-5 (CONTINUED)

SUMMARY OF GROUNDWATER ANALYTICAL DATA
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Contaminant	Well Identification	Interval of Surficial Aquifer	GCTL	Concentrations in µg/L					
				11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
CIS-1,2-DCE	OU1-MW12	INT	70	2.6	3.0	1.8	0.76 – I	1.6	1.3
	OU1-MW18	INT	70	39	66	**74**	37.0	22	30
	OU1-MW19	INT	70	**150**	**170**	**420 – D**	**140**	**155**	**260**
	OU1-MW22	INT	70	26	30	27.4	18	14	11
	OU1-MW67	Shallow	70	**80**	58	**83.2**	57	26	24
	OU1-MW84	INT	70	<1.0	0.4 – I	0.6 – I	<0.45	<0.32	<0.075
	OU1-MW85	Shallow	70	<1.0	<0.2	0.2	<0.45	<0.32	<0.075
	OU1-MW89	Shallow	70	**300**	**210 – D2**	**448 – D**	**320**	**190**	**55**
	OU1-MW93	Shallow	70	<1.0	<0.2	0.2	<0.45	<0.32	<0.075
	OU1-MW95	Shallow	70	<1.0	<0.2	0.2	<0.45	<0.32	<0.22
	OU1-MW97	INT	70	<1.0	1.0	16.6	<0.45	1.0	<0.22
	OU1-MW98	INT	70	<1.0	0.6 – I	-	2.7	-	<0.22
	OU1-MW100	INT	70	53	**97**	**80**	31	36	**80**
	OU1-MW101	Shallow	70	<0.1	<0.2	0.2	8	39	<0.22
	OU1-MW102	INT	70	18	24	1.3	14	8.5	0.55 – I

TABLE 2-5 (CONTINUED)

SUMMARY OF GROUNDWATER ANALYTICAL DATA
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Contaminant	Well Identification	Interval of Surficial Aquifer	GCTL	Concentrations in µg/L					
				11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
TRANS-1,2-DCE	OU1-MW12	INT	100	<0.2	0.2 – I	<0.2	<0.41	<0.49	<0.11
	OU1-MW18	INT	100	6	12	8	6	2.4	5.8
	OU1-MW19	INT	100	21	36	**134 – D**	18	41	61
	OU1-MW22	INT	100	8.3	10	7.2	4.2	2.8	1.6
	OU1-MW67	Shallow	100	7.7	5	7.9	1.9	1.3	<0.30
	OU1-MW84	INT	100	<1.0	0.2 – I	<0.2	<0.41	<0.49	<0.11
	OU1-MW85	Shallow	100	<1.0	<0.2	<0.2	<0.41	<0.49	<0.11
	OU1-MW89	Shallow	100	3 – I	4.0 – I, D2	6.4	5.8	<2.4	2.1
	OU1-MW93	Shallow	100	<1.0	<0.2	<0.2	<0.41	<0.49	<0.11
	OU1-MW95	Shallow	100	<1.0	<0.2	<0.2	<0.41	<0.49	<0.30
	OU1-MW97	INT	100	<1.0	0.3 – I	3.5	<0.41	<0.49	<0.30
	OU1-MW98	INT	100	<1.0	<0.2	-	<0.41	-	<0.30
	OU1-MW100	INT	100	5.7	6.0	5.6	1.8	2.4	4.6
	OU1-MW101	Shallow	100	<0.2	<0.2	<0.2	<0.41	<0.49	<0.30
	OU1-MW102	INT	100	<0.2	<0.2	<0.2	<0.41	0.53 – I	<0.30

TABLE 2-5 (CONTINUED)

SUMMARY OF GROUNDWATER ANALYTICAL DATA
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Contaminant	Well Identification	Interval of Surficial Aquifer	GCTL	Concentrations in µg/L					
				11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
TCE	OU1-MW12	INT	3	1 – I	1.0	<0.3	<0.26	<0.50	<0.13
	OU1-MW18	INT	3	**42**	**60**	**46.5**	**46.0**	**27.0**	**43**
	OU1-MW19	INT	3	**140**	**180**	**238 – D**	**95**	**110**	**170**
	OU1-MW22	INT	3	**22**	**31**	**26.5**	**29**	**14**	**9.9**
	OU1-MW67	Shallow	3	**7**	**6**	**12.5**	**3.2**	2.6	<0.24
	OU1-MW84	INT	3	<1.0	1.0	1.5	<0.26	<0.50	<0.13
	OU1-MW85	Shallow	3	<1.0	0.5 – I	0.6 – I	<0.26	<0.50	<0.13
	OU1-MW89	Shallow	3	**1000**	**880 – D2**	**1070 – D**	**1500**	**870**	**840**
	OU1-MW93	Shallow	3	<1.0	<0.3	0.4 – I	<0.26	<0.50	<0.13
	OU1-MW95	Shallow	3	<1.0	<0.3	<0.3	<0.26	<0.50	<0.24
	OU1-MW97	INT	3	<1.0	0.7 – I	2.9	<0.26	<0.50	<0.24
	OU1-MW98	INT	3	<1.0	0.4 – I	-	0.91 – I	-	<0.24
	OU1-MW100	INT	3	2.6	2.0	1.8	1.4	0.00 – I	<0.24
	OU1-MW101	Shallow	3	<0.3	0.4 – I	<0.3	<0.26	<0.50	<0.24
	OU1-MW102	INT	3	<0.3	<0.3	<0.3	<0.35	<0.50	<0.24

TABLE 2-5 (CONTINUED)

SUMMARY OF GROUNDWATER ANALYTICAL DATA
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Contaminant	Well Identification	Interval of Surficial Aquifer	GCTL	Concentrations in µg/L					
				11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
VINYL CHLORIDE	OU1-MW12	INT	1	**2.4**	**2.0**	**1.6**	<0.52	<0.81	0.80 – I
	OU1-MW18	INT	1	**9.7**	**15**	**20.5**	**11.0**	**6.2**	**10**
	OU1-MW19	INT	1	**11**	**11**	**22.0 – D**	**7.6**	**11**	**12**
	OU1-MW22	INT	1	**1.9**	**3**	**2.2**	**1.7**	**1.3**	**1.9**
	OU1-MW67	Shallow	1	**5.4**	**8**	**5**	**6.4**	**1.6**	**2.1**
	OU1-MW84	INT	1	<1.0	<0.4	<0.4 – I	<0.52	<0.61	<0.083
	OU1-MW85	Shallow	1	<1.0	<0.4	<0.4	<0.52	<0.61	<0.083
	OU1-MW89	Shallow	1	**430**	**300 – D2**	**459**	**490**	**230**	**99**
	OU1-MW93	Shallow	1	<1.0	<0.4	<0.4	<0.52	<0.61	<0.083
	OU1-MW95	Shallow	1	<1.0	<0.4	<0.4	<0.52	<0.61	<0.33
	OU1-MW97	INT	1	<1.0	<0.4	<0.4 – I	<0.52	<0.61	<0.33
	OU1-MW98	INT	1	<1.0	<0.4	-	<0.52	-	<0.33
	OU1-MW100	INT	1	**1.9**	**9.0**	**2.9**	0.66 – I	0.92	**2.6**
	OU1-MW101	Shallow	1	0.4 – I	<0.4	0.4 – I	**19**	**51**	<0.33
	OU1-MW102	INT	1	**41**	**140**	**1.2**	**2.1**	**67**	**2.8**

Notes:

< – Less than
Bolded – Concentration exceeds the FDEP GCTL
INT – Intermediate zone of the aquifer
Shallow – Shallow zone of the aquifer
I – Analyte detected at a value between the Method Detection Level (MDL) and the Method Quantification Level (MQL)
V – Indicated that the analyte was detected in both the sample and associated method blank.
D – Analyte value was determined from a dilution
D2 – Analyte value was determined from a 1:10 dilution

2.6.2.2 Review of Natural Attenuation Data for Groundwater

Field and laboratory natural attenuation parameters are being analyzed to monitor the biodegradation of regulated chlorinated solvents in groundwater at OU 1. Groundwater samples collected from the designated monitor wells were analyzed for a series of biodegradation indicators such as total organic carbon (TOC), chloride, dissolved sulfide, sulfate, total iron, and dissolved gasses (methane/ethane/ethene). In addition, natural attenuation field parameters including temperature, pH, dissolved oxygen, oxidation reduction potential, and specific conductivity. Based on the historical data and water quality data collected since 2004, conditions are present to support anaerobic biodegradation processes in the groundwater beneath OU 1 as evidenced by stable to decreasing trends in COCs noted in OU 1 monitoring wells. Appendix A includes field and laboratory natural attenuation data in tables obtained from annual monitoring reports.

2.6.2.3 Review of Surface Water COC Data

Long-term monitoring of surface water through an eleventh year has occurred in accordance with the LTMP for OU 1. Annual monitoring events evaluated for this Five-Year Review were conducted in November 2004, November 2005, November 2006, November 2007, December 2008, and February 2010. Similar to groundwater, the previous Five-Year Review for OU 1 evaluated surface water collected during 2001 through 2003, so the current review of OU 1 actually consists of monitoring data for six years (2004 through 2010).

As part of the monitoring program, two specific surface water locations (SW-20 and SW-55) were sampled and analyzed for COCs indicated in the ROD as modified by the NAS Jacksonville Partnering Team. The surface water COCs are the same as those in groundwater. Table 2-6 summarizes the surface water data for the six events covered by this review. The data indicate only sporadic detections of most COCs and none of the TLCAs have been exceeded.

2.6.2.4 LUC Inspections

LUC inspections were conducted quarterly at OU 1 during the period under review. The inspections noted no problematic observations, except occasional comments that a small amount of plant growth consisting of weeds, shrubs, and small saplings were observed in the west and southwest drainage channels.

2.6.3 Site Inspection and Interviews

Tetra Tech conducted a site inspection of OU 1 on August 25, 2010. Prior to initiating the inspection, the inspector interviewed the IR manager, Mr. Tim Curtin. Mr. Curtin accompanied the Tetra Tech inspector

during the site inspection, which included visual observations of the landfill cover, fences, access gate, and groundwater monitoring wells. The fence and signs at the site were in good condition, and several wells were observed with locks in place. The ground cover at OU 1 is in good condition with no evidence of erosion. The portion of OU 1 west of Child Street is vegetated with a thick layer of grass. The IR Manager reports that there have been no incidents of trespassing or vandalism in the area.

TABLE 2-6

SUMMARY OF SURFACE WATER ANALYTICAL DATA
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

LOCATION SAMPLE DATE	TLCA(1)	OU1-SW20					
		11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
Volatile Organics (µg/L)							
1,1-DCE	3.2	<0.3	<0.3	<0.2	<0.36	<0.34	<0.15
1,2-DCA	37	<0.2	<0.2 – I	<0.2 – I	<0.19	<0.43	<0.082
BENZENE	71.28	<0.2	<0.2	<0.2	<0.23	<0.29	<0.050
CIS-1,2-DCE	---	1.2	0.2 – I	<0.2	1.1	0.81 – I	2.7
TRANS-1,2-DCE	11,000	<0.2	<0.2	<0.2	<0.41	<0.49	<0.11
TCE	80.7	<0.3	<0.3	<0.3	<0.26	<0.50	<0.64 – I
VINYL CHLORIDE	2.4	<0.4	<0.4	<0.4	<0.52	<0.61	0.48 – I

LOCATION SAMPLE DATE	TLCA(1)	OU1-SW55					
		11/2004	11/2005	11/2006	11/2007	12/2008	2/2010
Volatile Organics (µg/L)							
1,1-DCE	3.2	<0.3	<0.3	<0.2	<0.36	<0.34	<0.15
1,2-DCA	37	<0.2	<0.2	<0.2 – I	<0.19	<0.43	<0.082
BENZENE	71.28	<0.2	<0.2	<0.2	<0.23	<0.29	<0.050
CIS-1,2-DCE	---	0.9 – I	0.9 – I	<0.2	0.75 – I	0.90 – I	<0.55 – I
TRANS-1,2-DCE	11,000	<0.2	<0.2	<0.2	<0.41	<0.49	<0.11
TCE	80.7	0.7 – I	0.7 – I	<0.3	<0.26	<0.50	0.47 – I
VINYL CHLORIDE	2.4	<0.4	<0.4	<0.4	<0.52	<0.61	<0.083

(1) Trigger levels for contingent action (TLCAs) are the most recent surface water cleanup target levels (SWCTLs) for freshwater from FAC 62-777.

I = Analyte detected at a value between the MDL and the MQL.

2.7 TECHNICAL ASSESSMENT

2.7.1 Question A: Is the remedy functioning as intended by the ROD?

The review of documents, ARARs, risk assumptions, groundwater and surface water monitoring, LUC inspections, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD as modified by the NAS Jacksonville Partnering Team.

2.7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Exposure Assumptions

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considered (TBC) Criteria

The TLCAs shown in Tables 2-6 and 2-7 for 1,1-DCE (3.2 µg/L), benzene (71.28 µg/L) and TCE (80.7 µg/L) are from FAC 62-302.530 and were previously approved by the NAS Jacksonville Partnering Team and used as TLCAs in the previous Five-Year Review (Tetra Tech, 2005a). When the previous Five-Year Review was being generated, there were no Florida Surface Water standards (and thus no TLCAs) for the other four OU 1 groundwater/surface water COCs (1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride). The current FAC 62-777, however, does include freshwater surface water CTLs for 1,2-DCA (37 µg/L), trans-1,2-DCE (11,000 µg/L), and vinyl chloride (2.4 µg/L), and the surface water CTLs for these three COCs were included in Tables 2-6 and 2-7. Because the current surface water CTLs have not yet been approved as OU 1 TLCAs, it is recommended that the NAS Jacksonville Partnering Team do so.

Since the previous review, there have been revisions made to Ambient Water Quality Criteria and to various FAC chapters. None of the revisions have been applicable to the COCs for OU 1, except as noted in the previous paragraph.

The only location-specific ARAR for OU 1 is the Endangered Species Act, which has remained unchanged.

USEPA's dioxin reassessment has been developed and undergone review over many years with the participation of scientific experts in USEPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current cancer guidelines and incorporated the latest data and physiological/biochemical research into the assessment. The results of the assessment have

currently not been finalized and have not been adopted into state or federal standards. USEPA anticipates that a final revision to the dioxin toxicity numbers may be released by the end of 2010. In addition, USEPA/OSWER has proposed to revise the interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds, based on technical assessment of scientific and environmental data. However, USEPA has not made any final decisions on interim PRGs at this time. Therefore, the dioxin toxicity reassessment for this Site will be updated during the next Five Year Review.

TABLE 2-7

REVISED TRIGGER LEVELS FOR CONTINGENT ACTION
FIVE-YEAR REVIEW
OPERABLE UNIT 1
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Parameter (COCs in Groundwater or Surface Water)	Concentration Triggering Contingent Action[1]
Volatile Organic Compounds (µg/L)	
1,1-DCE	3.2
1,2-DCA	37
1,2-DCE (cis)	--
1,2-DCE (trans)	11,000
Benzene	71.28
TCE	80.7
vinyl chloride	2.4

Notes:

(1) Concentrations are Florida Surface Water CTLs for freshwater published in FAC Chapter 62-777 and FAC 62-302.530. No standard is available for cis-1,2-DCE.

TLCAs are for the two surface water sample locations and shallow monitoring wells MW-67, MW-93, MW-95, and MW-101.

Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (trespasser, neighbor, maintenance worker, recreational user of the St. Johns River) and future exposures (neighbor, recreational user of the St. Johns River, excavation worker). There have been no changes in the toxicity factors for the COCs that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

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

Several monitoring wells have detected concentrations of iron that considerably exceed background values and FDEP's GCTL of 300 µg/L and FDEP's surface water criteria for iron (1,000 µg/L). FDEP has expressed concern that iron-rich groundwater could discharge into the nearby stream that drains into the St. Johns River. Because surface water samples collected at locations SW-20 and SW-55 are not analyzed for iron, the protectiveness of the remedy could be questioned.

2.8 ISSUES

Issues discovered during this Five-Year Review, along with recommendations for follow-up actions, are summarized below in Table 2-8. None of these are sufficient to warrant a finding of not protective as long as the issues are resolved.

2.9 PROTECTIVENESS STATEMENT

The remedy at OU 1 currently protects human health and the environment for the short term because LUCs are in place to prevent any potential ecological or human health exposure to contaminated media. The MNA effectiveness determination after collection of five years of data has been completed at this site and MNA for the groundwater component of the remedy was found to be meeting the RAOs, therefore the remedy for the short and long terms are protective for the groundwater component of the remedy. However, in order for the surface water component of the remedy to be protective in the long term the following actions need to be taken. Evaluate if FAC 62-777 freshwater CTLs for 1,2-DCA, trans 1,2-DCE, and vinyl chloride should be used as target concentration action levels for OU 1.

TABLE 2-8

RECOMMENDATIONS AND FOLLOW-UP ACTIONS
FIVE-YEAR REVIEW
OPERABLE UNIT 1
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Issue Number	Issues	Recommendations	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
						Current	Future
1	A proposed boundary expansion was completed to encompass monitoring well MW109S and a Land Use Control Remedial Design (LUC RD) was prepared. The LUC RD has been submitted to USEPA and FDEP but it has not yet been approved.	Approval of LUC RD by USEPA and FDEP.	Navy	USEPA/FDEP	**30-Oct-11**	N	N
2	Trigger levels for contingent action (TLCAs) for OU 1 surface water have not been established for 1,2-DCA, trans-1,2-DCE, and vinyl chloride and are recommended.	FAC 62-777 provides freshwater surface water CTLs for 1,2,-DCA, trans-1,2-DCE, and vinyl chloride. Evaluate the CTLs and determine if the CTLs should be used as TLCAs for OU 1. If the determination is that the CTLs will be adopted, then an Explanation of Significant Difference will be completed as appropriate.	Navy	USEPA/FDEP	**06-Mar-15**	N	Y

3.0 OPERABLE UNIT 2

This Five-Year Review for OU 2 (the Wastewater Treatment Area) is being conducted because contaminated subsurface soil and groundwater are still contained on site and do not allow for unlimited use and unrestricted exposure.

Implementation of remedial actions at OU 2 began in 1994. The risks posed by the PSCs at OU 2 were addressed through IRAs, which were specified in the IROD dated July 1, 1994. The ROD for OU 2, which was signed in 1998, specified that No Further Action (NFA) was required except for the implementation of LUCs 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.

A 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. Due to the presence of LNAPL and petroleum contamination 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 SITE CHRONOLOGY

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

3.2 BACKGROUND

3.2.1 Physical Characteristics of OU 2

OU 2 is located in the northern portion of NAS Jacksonville (Figure 1-2). The relative locations of PSCs within OU 2 are shown in Figure 3-1. OU 2 is bordered by the St. Johns River to the north, the Timuquana Country Club golf course to the northwest, Roosevelt Boulevard (U.S. Highway 17) to the west, and NAS Jacksonville runways to the south and east (Figure 3-1). The topography of OU 2 and surrounding area is shown in Figure 3-2.

OU 2 contains NAS Jacksonville's waste water treatment plant (WWTP), which treated industrial and domestic wastes. Buildings remain at OU 2; however, the majority of the area consists of grassland with patches of trees. The topography is generally flat with the exception of a serpentine mound created during the soil remediation.

TABLE 3-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 2
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event		**Date**
Pre-discovery of contaminants		
	PSC 2 - 6,000 gal 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 – Domestic waste sludge drying beds received sludge from 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
Initial discovery of problem or contamination		
	PSCs 2, 3, and 4 were identified as PSCs.	1983
Pre-NPL responses		
	Hazardous Waste Permit H016-119108 issued to NAS Jacksonville.	Jun 1987
	Consent Order issued to NAS Jacksonville indicating they were out of compliance with the Hazardous Waste Permit.	1988
NPL Listing		Nov 1989
FFA signature		1990
Post-NPL responses		
	Compliance monitoring at PSCs 41 and 42 detected contamination.	1991
	PSC 4 grouped into OU 2.	1991
Focused RI/FS conducted for PSCs 2, 41, and 43		1994
IROD for PSCs 2, 41, and 43		1994
Focused RI/FS conducted for PSCs 3 and 42		1995
IROD for PSC 42		1995
IRA for PSC 2 included soil excavation, thermal desorption, and backfill and free product removal		1995
Completion Report for PSC 2		1996
USEPA and FDEP approved transfer of PSC 2 to Florida's petroleum program since LNAPL still present		1996
Limited soil removal conducted at PSC 3 and the soil was incorporated in IRA at PSC 42		1997
Soil removed at PSC 4 and incorporated in IRA at PSC 42		1997

TABLE 3-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 2
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event		Date
Certification and Closure Report for PSC 41 (work conducted in two phases)		1997
	Phase 1 included excavation and on-site stabilization of media from PSCs 41 and 43.	---
	Phase 2 included excavation/transportation of stabilized material from PSC 41 to PSC 42.	---
Certification and Closure Report for PSC 42		1997
	Closure included construction of containment berm around PSC 42 and in situ stabilization of sediment, sludge, and water.	---
Certification and Closure Report for PSC 43		1997
	Closure included removal and disposal of non-hazardous material off site.	---
	Hazardous material was excavated, treated on site, and included in PSC 42 IRA. Site received clean backfill.	---
RI conducted for OU 2		1998
Proposed Plan for Remedial Action (public comment period)		Apr to May 1998
MOA signed between USEPA, FDEP, and Navy to ensure LUC compliance		Aug 1998
ROD signature for OU 2		Oct 1998
Institutional controls for OU 2 developed through LUCIP		
Post-ROD RCRA activities		
	Groundwater Monitoring at PSCs 41, 42, and 43.	Jan 1999
	Groundwater Monitoring at PSCs 41, 42, and 43.	Jan 2000
	Groundwater Monitoring at PSCs 41, 42, and 43.	Jan 2001
First Five-Year Review		Sep 2001
Continuing Post-ROD RCRA activities		
	Groundwater Monitoring at PSCs 41, 42, and 43.	Jan 2002
	Groundwater Monitoring at PSCs 41, 42, and 43.	Jan 2003
	Groundwater Monitoring at PSCs 41, 42, and 43.	Jan 2004
	Groundwater Monitoring at PSCs 41, 42, and 43.	Jan 2005
Second Five-Year Review		Sep 2005

TABLE 3-1

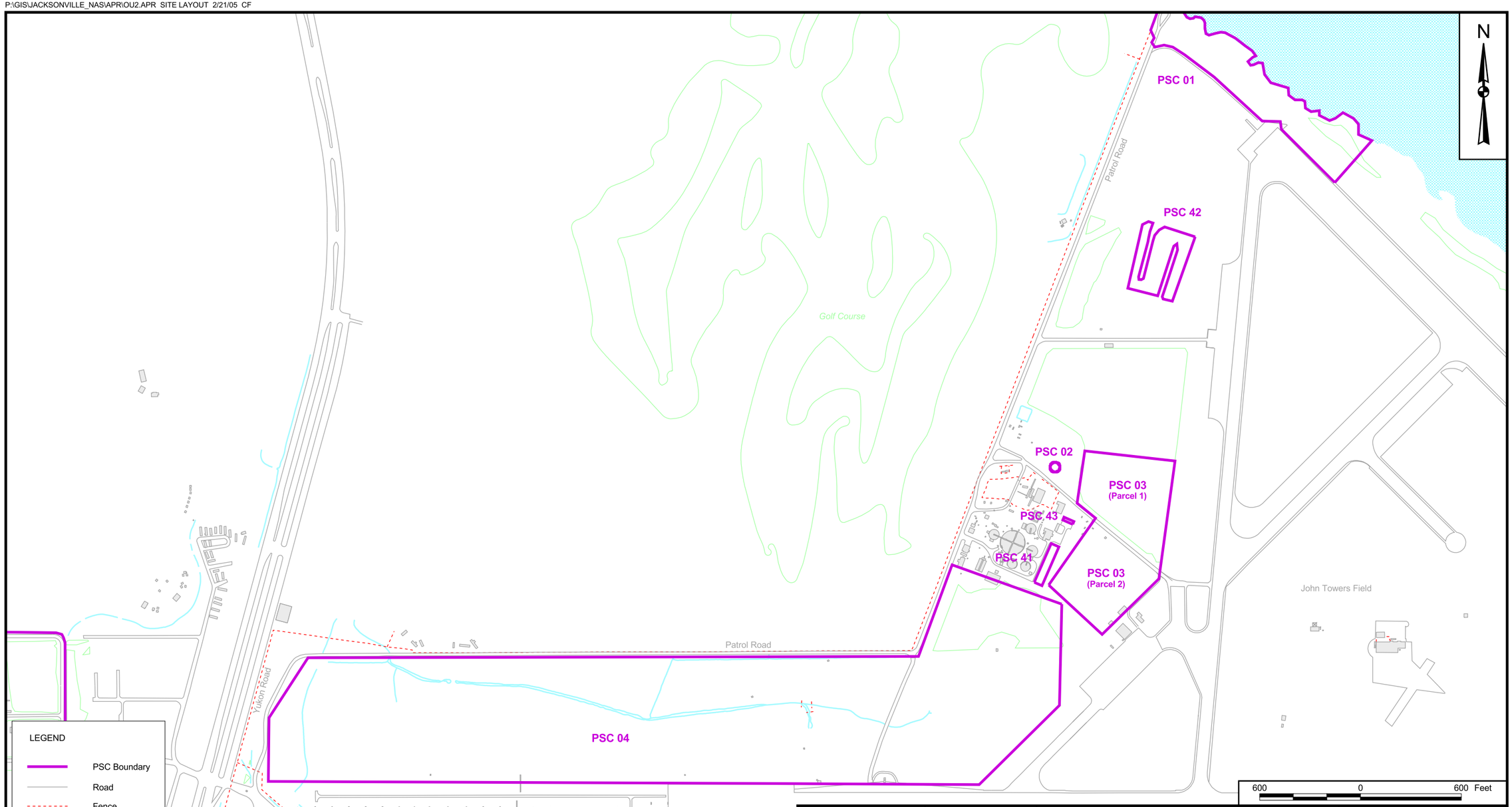
CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 2
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event		**Date**
Continuing Post-ROD RCRA activities		
	Groundwater Monitoring at PSCs 41 and 42.	Jan 2006
	Groundwater Monitoring at PSC 42.	Jan 2007
	Groundwater Monitoring at PSC 42.	Jan 2008
	Groundwater Monitoring at PSC 42.	Jan 2009
	Groundwater Monitoring at PSC 42.	Jan 2010

Note:

This table lists historical events and relevant dates for OU 2; however, it is not comprehensive. Also, due to the complex history of the site, dates may overlap or appear to be out of order as they were placed to fit certain major events.

P:\GIS\JACKSONVILLE_NAS\APR\OU2.APR SITE LAYOUT 2/21/05 CF

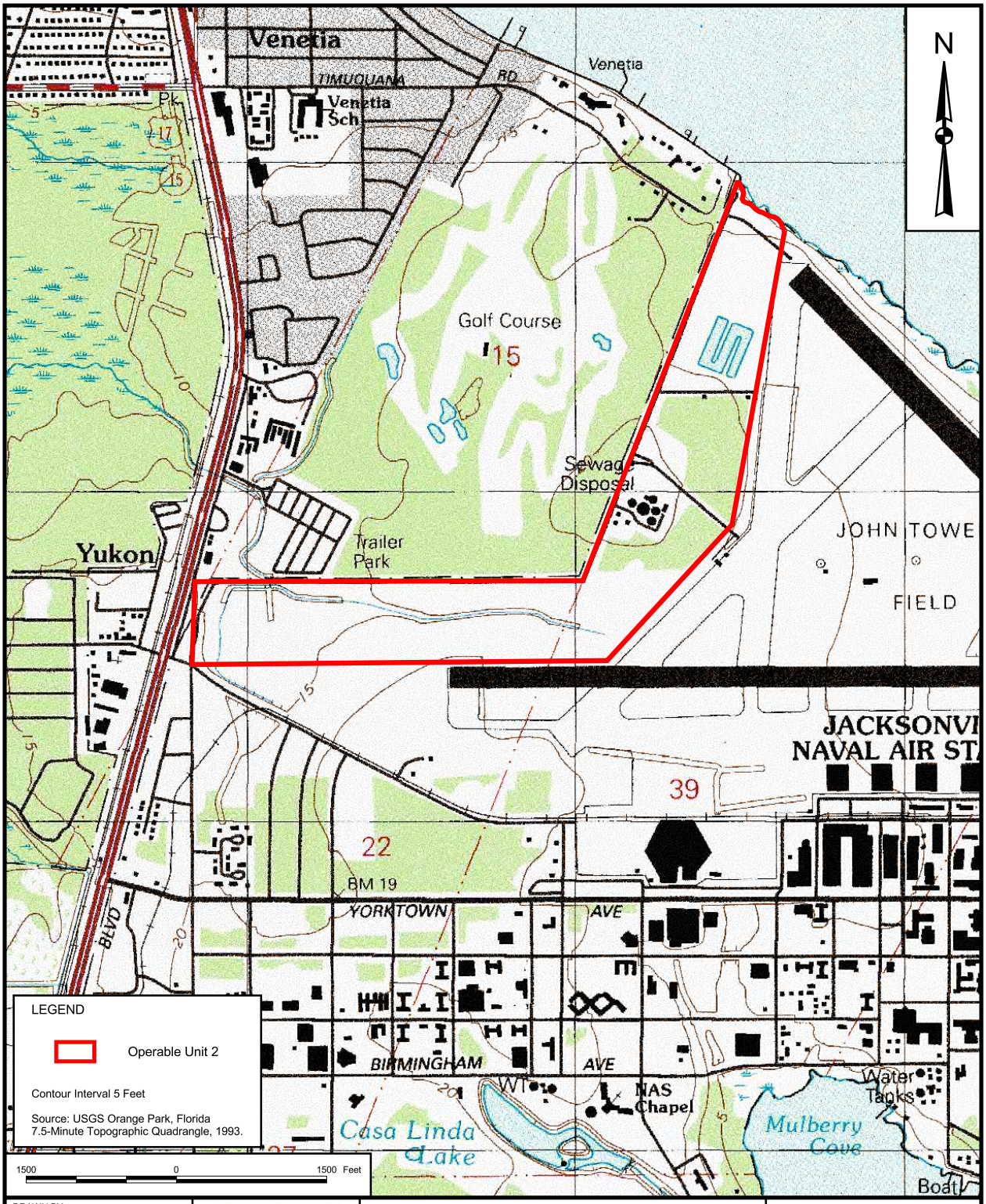


DRAWN BY	DATE
A. JANOCHA	9/17/04
CHECKED BY	DATE
M. DALE	9/17/04
REVISED BY	DATE
SCALE	
AS NOTED	

NAVFAC

SITE MAP
OPERABLE UNIT 2
FIVE YEAR REVIEW
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO.	
7302	
OWNER NO.	
CTO 0342	
APPROVED BY	DATE
DRAWING NO.	REV.
FIGURE 3 - 1	0



DRAWN BY	DATE			CONTRACT NO.
A. JANOCHA	9/17/04		TOPOGRAPHIC MAP	7302
CHECKED BY	DATE		OPERABLE UNIT 2	OWNER NO.
M. DALE	9/17/04		FIVE YEAR REVIEW	CTO 0342
REVISED BY	DATE		NAS JACKSONVILLE	APPROVED BY / DATE
			JACKSONVILLE, FLORIDA	
SCALE				DRAWING NO. / REV
AS NOTED				FIGURE 3 - 2 / 0

P:\GIS\JACKSONVILLE_NAS\APR\OU2.APR DRG LAYOUT 2/21/05 CF

There are no surface water bodies within OU 2. However, there are small low lying areas and drainage ditches where water collects during period of heavy precipitation.

The Master Plan for NAS Jacksonville reports that only a narrow portion of the northern part of OU 2 is inside the 100-year floodplain. None of the PSCs are within the 100-year flood level for the station (EDAW, 2009).

3.2.2 Land and Resource Use at OU 2

NFA was granted for OU 2 by the USEPA and FDEP in the ROD (HLA, 1998) under the condition that LUCs would be enacted to prevent exposure to contaminated media remaining on site. A second condition was that groundwater monitoring under the RCRA program would be conducted at the site until cleanup is achieved.

Under the LUC program, the station maintains the existing fence, which restricts trespassing, and has agreed to maintain OU 2 for industrial use. The objectives for the LUCs include preventing residential use and providing worker notification of potential hazards. The land use for the site has remained unchanged.

3.3 HISTORY OF CONTAMINATION AND INITIAL RESPONSES AT OU 2

PSC 3 – WWTP Former Sludge Disposal Area

The former sludge disposal area for the WWTP, where domestic and industrial sludge containing organic and inorganic materials were disposed between 1962 and 1980, is approximately 15 acres in size. In 1991, various waste materials were identified including inorganics, VOCs, and 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 groundwater contaminants at PSC 41 may have been a result of migration from PSC 3, but this 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 concentrations were consistent with existing station-wide background samples that were attributed to past station-wide 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 because 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, signed in 1998, specified NFA for PSC 3 with the implementation of LUCs 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 determine whether 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 an RI was conducted in 1992. Soil samples were collected throughout PSC 4 and laboratory testing indicated no significant concentrations of VOCs or SVOCs. Pesticide concentrations were consistent with existing station-wide background concentrations that were attributed to past station-wide 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 it specified that NFA was required at PSC 4 except for the implementation of LUCs for land and groundwater use at OU 2.

PSC 41 – Domestic Waste Sludge Drying Beds (DSDBs)

The DSDBs 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 (ISBDs) (PSC 43) in 1980, sludge from the industrial wastewater treatment operations was channeled to the DSDBs. 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 DSDBs 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 Hazardous Waste 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 data indicated groundwater contamination from VOCs, SVOCs, and metals in 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 41 was to excavate and treat the sludge drying bed material and hazardous debris on-site by stabilization and solidification, backfill with the treated material, and dispose of non-hazardous debris off-site. 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 (RAD) surveys conducted in 1995 indicated that the PSCs were free of RAD contaminants (ABB-ES, 1998). The RI for OU 2 was completed in 1998. The ROD was signed in 1998 that specified NFA for PSC 41 with the implementation of LUCs and monitoring under the RCRA program until cleanup is achieved.

PSC 42 – Effluent Polishing Pond (PP)

The WWTP Effluent PP, 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 PP as a surface impoundment to treat RCRA hazardous wastes F001 through F006 and F019 (toxic hazardous wastes from non-specified sources). Three monitoring wells were installed in 1983 around the PP 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, total petroleum hydrocarbons (TPH), chloromethane, and 1,1,1-trichloroethane (TCA). Additional monitoring wells were installed and sampled in 1987. Results from wells surrounding the WWTP indicated that concentrations of 14 analytes were above permit criteria.

In June 1987, the FDEP authorized Hazardous Waste Permit Certification Number H016-119108. Included in the environmental compliance requirements of the permit was that NAS Jacksonville stop adding wastes to designated surface impoundments including the PP. In anticipation of this requirement, the PP 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 USEPA 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. RAD surveys conducted in 1995 indicate that the PSCs are free of RAD contaminants (ABB-ES, 1998). The RI was completed for OU 2 in 1998. The ROD, signed in 1998, specified NFA for PSC 42 with the implementation of LUCs and monitoring under the RCRA program until cleanup is achieved.

PSC 43 – Industrial Waste Sludge Drying Beds (ISDBs)

The ISDBs 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 ISDBs as a surface impoundment operated to treat hazardous wastes F006 and F019. PSC 43 was also used to dewater 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 (GWPS). In June 1988, the FDEP issued a consent order to NAS Jacksonville stating the station was out of compliance with Hazardous Waste 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 OU 2. 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. 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. RAD surveys conducted in 1995 indicate that the PSCs are free of RAD contaminants (ABB-ES, 1998). The RI for OU 2 was completed in 1998. The ROD was signed in 1998, which specified an NFA for PSC 43 with the implementation of LUCs and monitoring under the RCRA program until cleanup is achieved.

Under the LUC program, the station restricts OU 2 to industrial use and maintains the existing fence, which restricts trespassing. The objectives for the LUCs are to prevent residential use and provide worker notification of potential hazards. The land use for the site remains unchanged.

3.3.1 Basis For Taking Action at OU 2

Various human health contaminants of potential concern (COPCs) were detected in soil and groundwater at the PSCs in OU 2 (HLA, 1998). This prevented unrestricted use and unlimited exposure. Therefore, the IROD and ROD detailed remedial actions necessary to maintain protectiveness at this operable unit.

3.4 REMEDIAL ACTIONS

3.4.1 Remedy Selections at OU 2

Investigations at OU 2 prior to the ROD indicated contamination in soil, groundwater, surface water, and sediment 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. The ROD 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 agreed that the site conditions, Risk Assessment (RA) results, and regulatory requirements (ARARs) did not warrant establishing RAOs for OU 2 (HLA, 1998).

As noted in the Declaration of the Record of Decision Section 1.0 of the OU 2 ROD, "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 two to three 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 that "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).

Based on the risk assessment from the RI, no unacceptable human health or ecological risks were identified at OU 2 with the implementation of LUCs at OU 2 to prevent exposure to soils and to control groundwater use. The ROD required post-closure monitoring at PSCs 41, 42, and 43 until standards are achieved under the RCRA program.

3.4.2 Remedy Implementation at OU 2

Based on results of the RI and RA, the selected remedy at OU 2 was implementation of LUCs and RCRA monitoring of the groundwater plume associated with PSCs 41, 42, and 43. This remedy was selected 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 (UST) program.

Interim Remedial Actions at PSCs 3 and 4

Approximately 20 yd^3 of previously dried sludge was transported to PSC 42 from surface layers and piles identified at PSCs 3 and 4, the WWTP 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 (Figure 3-1). Although risks were not expected from exposure to soil at PSC 3, there were concerns about exceedances of cleanup goals for lead in one surface soil sample location at Parcel 2 (HLA, 1998). Metals concentrations in this sample were also much greater 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. Soil 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 reports (ABB-ES, 1997b and 1997c), remedial activities at PSC 41 and PSC 43 were conducted in two phases.

Phase I, 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 required criteria. Selection of metals used as stabilization criteria for PSCs 41 and 43 was based on results of the risk evaluation for both PSCs 41 and 43. The total volume of stabilized material from the IRAs at both PSC 41 and PSC 43 was approximately 2,800 yd^3.

Phase II 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 a plastic layer was 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 material 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 only one COC (nickel) exceeded a standard. 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 hydro-seeding the newly graded area (ABB-ES 1997b and 1997c).

Interim Remedial Action at PSC 42

Contaminated media treated at PSC 42 included soil and sludge 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 PP 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:

- Toxicity Characteristic Leaching Procedure (TCLP) extract levels for the five metals identified below to be equal to or less than the following concentrations: cadmium [0.19 milligrams per liter (mg/L)], chromium (0.86 mg/L), lead (0.37 mg/L), nickel (5.00 mg/L), and silver (0.30 mg/L).
- Unconfined Compressive Strength of stabilized material to be 30 pounds per square inch 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 PP (PSC 42) was conceptually divided into sequential cells for stabilization with approximate dimensions of 40 feet by 105 feet. Forty-two cells were stabilized in the PP. Prior to stabilization, established cells were de-watered by pumping excess water from the cells to 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, 1997c).

Land Use Controls

The institutional controls for OU 2 were developed through a MOA between the USEPA, FDEP, and the Navy and signed on August 31, 1998. The purpose of the MOA was to ensure compliance with LUCs 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, 1998).

3.4.3 System O&M at OU 2

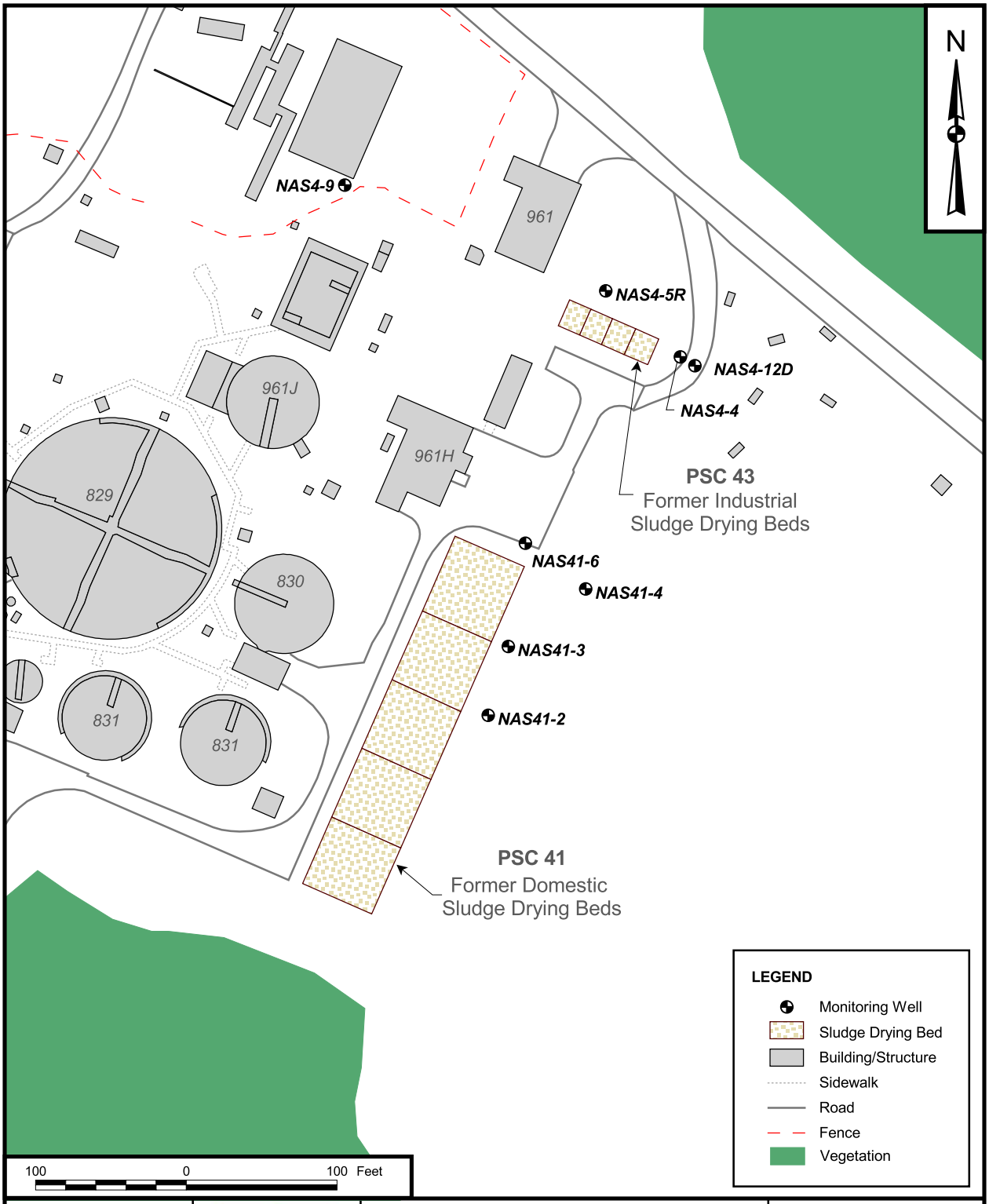
There are no costs for system O&M at OU 2. However, RCRA groundwater monitoring was performed for the post closure of RCRA sites PSCs 41, 42, and 43. The initial RCRA groundwater monitoring for PSCs 41, 42, and 43 (after the signing of the ROD) was conducted with an annual sampling event in January 1998. Semi-annual and eventually only annual sampling events continued through 2006. On January 9, 2007, the Navy submitted a request to end post-closure care monitoring requirements for PSCs 41 and 43, which the FDEP approved on February 5, 2007. From 2007 through 2010, monitoring was continued for the PP (PSC 42). Figures 3-3 and 3-4 show the locations of the monitoring wells at the three sites.

The current RCRA permit (PCP 0072437-HO-010) was issued on August 6, 2009 and expires on May 25, 2014. Under the permit, compliance monitoring at PSC 42 is to be performed until the GCTLs are not exceeded for a period of three years. Results of the groundwater monitoring are discussed in the Document and Data Review portions of this section. Since the only required O&M for OU 2 involved RCRA groundwater monitoring, the ROD made no determination of a present worth cost estimate for implementation of the action.

3.5 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

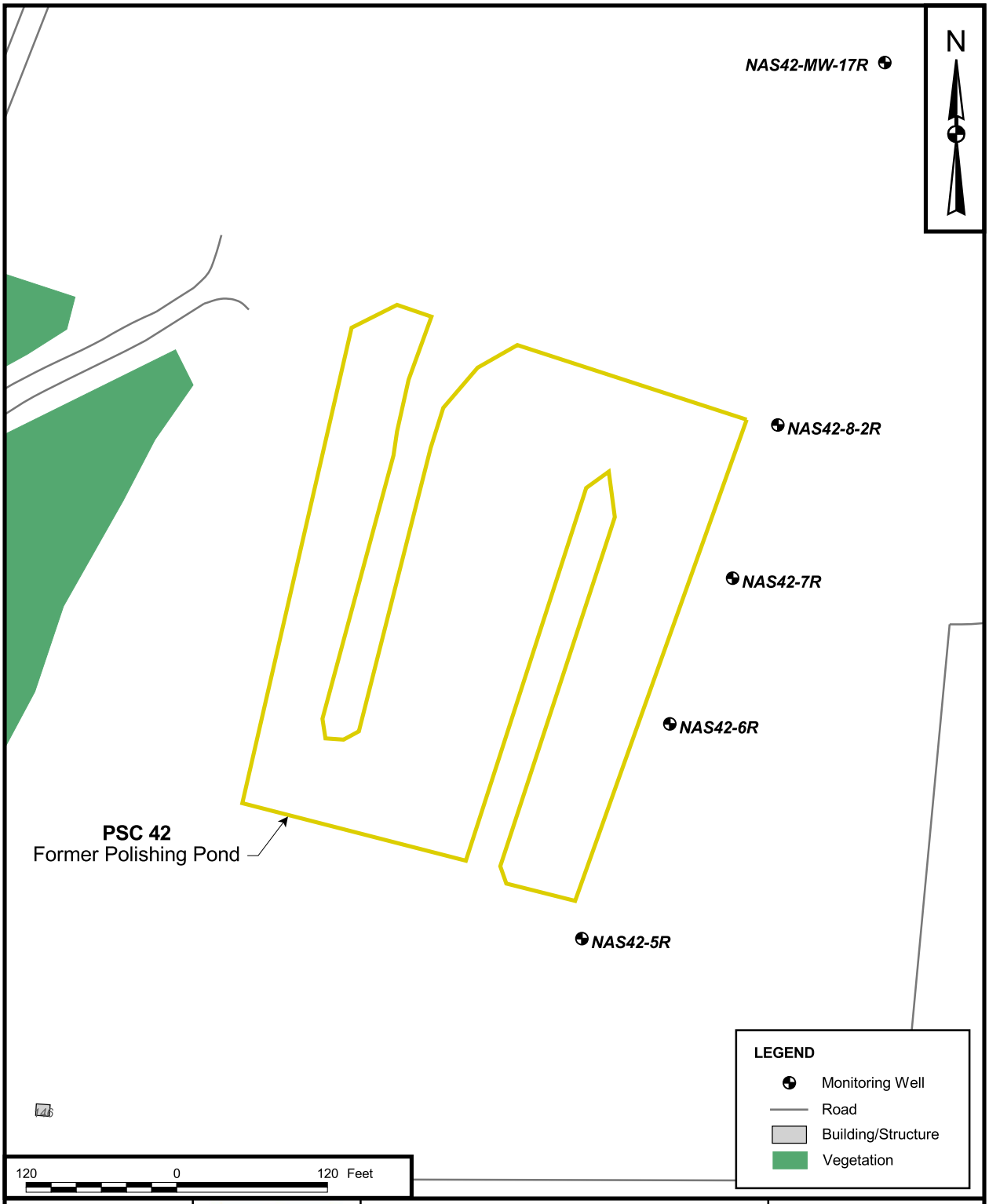
3.5.1 Protectiveness Statements from the Last Review

The remedy at OU 2 is protective of human health and the environment. The institutional controls and RCRA groundwater monitoring at OU 2 provide an acceptable 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 the stabilized soil and sediment.



DRAWN BY	DATE			CONTRACT NO.
J. LAMEY	2/23/04		PSCs 41 AND 43	7302
CHECKED BY	DATE		SITE PLAN SHOWING MONITORING WELL LOCATIONS	OWNER NO.
J. JOHNSON	2/11/05		FIVE-YEAR REVIEW	CTO 0342
REVISED BY	DATE	NAVFAC	NAS JACKSONVILLE	APPROVED BY / DATE
—	—		JACKSONVILLE, FLORIDA	— / —
SCALE				DRAWING NO. / REV
AS NOTED				FIGURE 3 - 3 / 0

P:\GIS\JACKSONVILLE_NAS\APR\PSC_41_42_43.APR PSCS 41 AND 43 MONITORING WELL LOCATION MAP 2/21/05 CF



DRAWN BY J. LAMEY — DATE 2/23/04	NAVFAC	PSC 42 SITE PLAN SHOWING MONITORING WELL LOCATIONS FIVE-YEAR REVIEW NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NO. 7302
CHECKED BY ___ — DATE ___			OWNER NO. CTO 0342
REVISED BY ___ — DATE ___			APPROVED BY ___ — DATE ___
SCALE AS NOTED			DRAWING NO. FIGURE 3 - 4 — REV 0

P:\GIS\JACKSONVILLE_NAS\APR\PSC_41_42_43.APR PSC 42 MONITORING WELL LOCATION MAP 2/22/05 CF

3.5.2 Status of Recommendations and Follow-up Actions from Last Review

The 2005 Five-Year Review noted that one LUC quarterly inspection had been missed in 2003 and recommended that OU 2 be inspected as required by LUCIPs. Since 2005, the LUC Inspection Checklists for OU 2 show that quarterly inspections have been conducted as required.

3.6 FIVE-YEAR REVIEW PROCESS

3.6.1 Document Review

This Five-Year Review consisted of a review of relevant documents including annual groundwater monitoring reports for PSCs 42 and LUC Inspection Checklists. The source of ARARs for groundwater cleanup at OU 2, Post-closure Permit (PCP) 72437-HO-010, was also reviewed for changes to the applicable groundwater cleanup standards.

3.6.2 Data Review

The OU 2 documents covering the post-closure RCRA monitoring for PSC 42were reviewed to determine if the site is achieving cleanup standards set in the current permit and to determine if new information has come to light since the last Five-Year Review. Also, a review of the LUC Inspection Checklists for OU 2 was conducted to determine if periodic inspections are being performed as required.

The LUC Inspection Checklists for OU 2 show that quarterly inspections have been conducted at OU 2 each quarter since 2005.

A review of the specific conditions in Part IV of the PCP indicates that three monitoring wells are currently included in the monitoring of OU 2 as part of the RCRA post-closure monitoring program for PSC 42 (Figures 3-3 and 3-4). The background well for PSC 42 is monitoring well NAS 4-9. The point of compliance (POC) wells for PSC 42 (PP) are NAS 42-5R and NAS 42-8-2R. These three monitoring wells are shallow wells (14-15 feet deep).

The specific conditions in Part IV of the PCP were also reviewed for analytical requirements. Part IV, Subpart C of the PCP stipulates the groundwater samples will be analyzed for arsenic, barium, cadmium, chromium (total), lead, mercury, selenium, and silver in addition to groundwater quality parameters (pH, specific conductance, and turbidity). The GCTLs for these constituents are also specified in Part IV, Subpart C of the PCP.

3.6.2.1 Background Well NAS 4-9 Analytical Results

Appendix B summarizes data from the 2005 through 2010 annual monitoring events. A review of the data for those monitoring events shows that manganese and gross beta in NAS 4-9 exceeded GCTLs in 2005. No parameters were detected in exceedance of GCTLs in well NAS 4-9 in 2006 through 2010.

3.6.2.2 PSC 42 (PP) Analytical Results

Appendix B summarizes data from the 2005 through 2010 annual monitoring events. In 2005, five analytes exceeded GCTLs in one or more samples at PSC 42. In 2006, 2,4-dinitrololuene exceeded its GCTL in wells NAS-42-5R and NAS 42-8-2R, but has not been detected in groundwater at PSC 42 since then. Arsenic exceeded its GCTL in well NAS-42-5R from 2006 through 2010. Arsenic was below the GCTL in 2005.

3.6.3 Site Inspection and Interviews

Tetra Tech conducted a site inspection of OU 2 on August 25, 2010. Prior to initiating the inspection, the inspector interviewed the IR manager, Mr. Tim Curtin. Mr. Curtin accompanied the Tetra Tech inspector during the site inspection, which included visual observations of the landfill cover at PSC 42, fences, access gate, and groundwater monitoring wells for OU 2. The fence and signs at the site were in good condition, and several wells were observed with locks in place. The ground cover at PSC 42 is in good condition, and the IR Manager reports that there have been no incidents of trespassing or vandalism in the area.

3.7 TECHNICAL ASSESSMENT

3.7.1 Question A: Is the remedy functioning as intended by the ROD?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD.

- ***HASP/Contingency Plan:*** A HASP is in place for the required RCRA groundwater monitoring at this time. The contingency plan for the current remedy consists of continuing the groundwater monitoring for up to 30 years or until groundwater contamination levels decrease to less than the applicable groundwater standards.
- ***Implementation of Institutional Controls and Other Measures:*** Institutional controls are in place for OU 2.
- ***Remedial Action Performance:*** Not applicable.

- ***System Operations/O&M:*** Not applicable.
- ***Cost of System Operations/O&M:*** Not applicable.
- ***Opportunities for Optimization:*** Not applicable.
- ***Early Indicators of Potential Remedy Failure:*** None noted.

3.7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC Criteria

In accordance with the ROD, the only chemical-specific ARARs identified for the site are as follows:

- Occupations Safety and Health Administration permissible exposure limits for workers in 29 CFR Part 1910, Subpart Z
- RCRA, Identification and Listing of Hazardous Wastes in 40 CFR Part 261
- RCRA, Releases from Solid Waste Management Units in 40 CFR Part 264, Subpart F

The chemical-specific ARARs in the PCP 0072437-HO-010 are listed as FDEP's GCTLs. No changes to these ARARs have occurred since the last Five-Year Review.

The ROD indicated that no location-specific or action-specific ARARs were identified for OU 2.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (worker exposure to soil, diver exposure to sediment and surface water, and fish ingestion by off-site residents) and future exposures (same scenarios). There have been no changes in the toxicity factors for the COCs that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

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

No other information has come to light that would call into question the protectiveness of the remedy.

3.8 ISSUES

No issues were discovered during the Five-Year Review.

3.9 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

No issues regarding OU 2 were discovered during the Five-Year Review.

3.10 PROTECTIVENESS STATEMENT

The remedy at OU 2 is protective of human health and the environment. The institutional controls and RCRA groundwater monitoring at OU 2 provide an acceptable 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 the stabilized soil and sediment.

4.0 OPERABLE UNIT 3

OU 3 is located within a large industrial area of NAS Jacksonville encompassing an area that houses the FRCSE formerly known as the Naval Aviation Depot (NADEP). FRCSE conducts a wide range of activities associated with the maintenance and repair of aircraft. OU 3 contains PSC 11 (Building 101), PSC 12 (the old Test Cell Building), PSC 13 (the Radium Paint Disposal Pit), PSC 14 (the Battery Shop area), PSC 15 (the Solvent and Paint Sludge Disposal area), PSC 16 (the Black Point Storm Sewer Discharge), PSC 48 (the Station's Dry Cleaners – Building 106), and Building 780. In addition to the PSCs and Building 780, there are also seven isolated areas of elevated groundwater contamination identified as Areas A through G within OU 3.

There are two RODs in place for OU 3. The first ROD (HLA, 2000a) addresses all sites with the exception of Areas A and E and will be hereafter referred to as the "primary ROD". A second ROD was completed for Area A in 2006 (Tetra Tech, 2006a). Area E was not included in either of the RODs for OU 3, but is currently being investigated as part of an ongoing optimization effort detailed in following sections of this document.

In the primary ROD the following actions were specified:

- PSC 11 – No Further Remedial Action Planned (NFRAP)
- PSC 12 – NFRAP
- PSC 13 – NFRAP
- PSC 14 – NFRAP with implementation of LUCs for an industrial scenario
- PSC 15 – NFRAP with implementation of LUCs for an industrial scenario
- PSC 16 – Selective removal of the tar balls
- PSC 48 (Building 106) – Continuation of the IRA as the selected remedy
- Building 780 – Continuation of the IRA as the selected remedy
- Area B – MNA
- Area C – Enhanced biodegradation
- Area D – Enhanced biodegradation
- Area F – Chemical Oxidation
- Area G – MNA
- Storm Sewer – Monitor the water quality after clean up of Area F is complete. If the storm sewer remains contaminated after Area F groundwater is remediated, then cured-in-place pipe (CIPP) will be installed.

The ROD for Area A in OU 3 was signed in September 2006. In the Area A ROD, MNA and LUCs were specified.

This Five-Year Review is being conducted for OU 3 because contaminated subsurface soil, sediment, and groundwater did not allow for unlimited use and unrestricted exposure. Primary COCs at OU 3 include VOCs in groundwater, PAHs, and metals in sediments.

4.1 SITE CHRONOLOGY

The OU 3 area is large and has a lengthy operational history. However, to achieve the purpose of this document, an extremely abbreviated list of the operational history is included herein. A more involved report on the historical operations is available in the OU 3 RI/FS (HLA, 2000b). A list of significant OU 3 historical events and relevant dates in the site chronology is provided in Table 4-1. The identified events are illustrative, not comprehensive.

4.2 BACKGROUND

A generalized map of NAS Jacksonville showing the location of OU 3 in the eastern portion of the facility is provided on Figure 1-2. A map of OU 3 showing the relative locations of the PSCs and Areas is provided on Figure 4-1.

4.2.1 Physical Characteristics of OU 3

The 134-acre site consists mainly of the activities associated with FRCSE, which is the largest tenant command at NAS Jacksonville. Due to the industrial nature of the site, the majority of OU 3 is paved. The physical setting of the OU has undergone numerous changes over time. Old buildings have been demolished and new buildings constructed. In fact, during the early-to-mid 1940s in order to meet the growing needs for repair of aircraft, hydraulic fill was used to expand the land area of FRCSE along the St. Johns River. Since that time, over 90 percent of OU 3 has been covered with buildings or thick (greater than 1 foot in thickness) concrete pavement in order to accommodate both aircraft and associated industrial activities. Generally, the only exposed soil is at the southern end of the OU near PSC 16 or in small, generally non-vegetated strips along a few of the buildings. As a result of all the buildings and pavement, there are no surface water bodies, wetlands, or drainage courses on OU 3. Storm water runoff is picked up in drainage inlets or catch basins and directed to the storm sewer system, which discharges to the St. Johns River. Section 3.0 of the RI/FS (HLA, 2000b) provides details of the physical characteristics (including geology, hydrology, and groundwater flow).

TABLE 4-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 3
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event (Sub-events indented)		**Date**
Pre-discovery of contaminants		n/a
	NADEP began performing rework, repair, and modification of aircraft.	1940
	Hydraulic fill brought in to expand NADEP work area.	Early-to-mid 1940s
	Radium paint waste, discarded luminous dials, and associated contaminated soils removed from pit at PSC 13.	1950s
	Hazardous Waste Management Plan recommended OU 3 PSCs for study. (1)	1982
	Initial Assessment Study recommended PSCs 11, 12, 14, and 15.	1983
	Sediment sampling at Plating and Cleaning Shop (Building 101) reported no risk to humans.	1985
Initial discovery of problem or contamination		n/a
	Verification Study of groundwater at PSCs 11 through 15 indicated contamination at each PSC except PSC 13.	1985
Pre-NPL responses		n/a
	Report to characterize groundwater contamination at OU 3 recommended well resampling program for risk assessment.	1986
	Report of subsurface investigation at Wright Street issued and recommended Level C PPE for excavation work therein. (2)	Feb-1988
	Report issued that identified leaks in OU 3 sewer and industrial lines.	Jul-1988
	Contamination assessment of Building 795 issued with recommendation that only standard safety practices required for site work.	Feb-1989
NPL Listing		Nov-1989
Post-NPL responses		n/a
	Technical memo on Building 780 concluded further work was necessary to assess the site.	Jul-1990
FFA signature		Oct-1990
	Report on proposed construction site (MILCON P615) found no health threat to construction workers.	Jul-1992
	Emergency response removal action conducted on tank system at Old Plating Shop in Building 101. (3)	Aug-1992
	Report of contamination at Building 780 proposed construction site recommended Level C PPE for workers.	Oct-1992
	Contaminated soil removal and underground liner system installation conducted at Building 780. Environmental health survey at construction site at Albemarle and Wasp Street indicated no special precautions needed.	1992 Jan-1993

TABLE 4-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 3
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event (Sub-events indented)		Date
	Field closure activities initiated at Old Plating Shop in Building 101. (3)	Apr-1993
	Initial contamination assessment of Building 101 USTs issued with conclusion that additional work was required. (4)	Jun-1993
	Environmental sampling at proposed MILCON construction site (P159) detected VOCs in groundwater and further work recommended. (5)	Jun-1993
	SSFP screened soil/groundwater at OU 3, which identified 10 areas of groundwater contamination, but no soil issues. (6)	1993
	Focused field investigation conducted at Building 106 (PSC 48) and Building 780.	Oct to Nov 1994
	SSFP data reported in Navy Installation Restoration Program Plan, Volume 7.	Mar-1995
	EECA for Building 106 (PSC 48) and Building 780 issued with recommendation for IRAs. (7) (8)	Aug-1995
	Closure activities completed at Old Plating Shop in Building 101.	Aug-1995
	RAD survey and contaminated soil removal conducted at PSC 13. (3)	Sep-1995
	U.S. Navy Radiological Affairs Support Office issued letter releasing PSC 13 for unrestricted use.	1995
	Closure report for Old Plating Shop issued stating that RCRA closure requirements were satisfied for Building 101. RCRA groundwater monitoring of site was reported as ongoing. (9)	Nov-1995
	Focused field investigation into groundwater contamination at eight 'hot spots' (Areas A - H) identified in the SSFP.	1996 to 1997
Interim remedial design start for Building 106 (PSC 48) and Building 780		1996
Interim remedial design complete for Building 106 (PSC 48) and Building 780		1997
	Building 106 (PSC 48) built with AS/SVE system. (10) Monitoring of 8 piezometers and 1 well also included in program.(11)	n/a
	Building 780 built with groundwater extraction and treatment and SVE. Monitoring of 4 wells is also included in program.	n/a
Construction dates		n/a
	AS/SVE system at PSC 48.	Apr-1997
	Groundwater extraction and treatment and SVE at Building 780.	Jun-1997
	RAD survey and contaminated soil removal conducted at PSC 15. NFA planned with LUCs. (3) (12) Sampling Event Report for PSC 12 issued with recommendation of NFA with no conditions.	1997 to 1998 Feb-1998

TABLE 4-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 3
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event (Sub-events indented)		Date
	Sampling Event Report for PSC 14 issued with recommendation of NFA with LUCs recommended for soil contamination that was less than Florida industrial cleanup standards. (13)	Feb-1998
	EECA for 'hot spots' (Areas A - H) issued with claim that IRAs not warranted. It recommended that an FS evaluate groundwater treatment alternatives. (14)	Mar-1998
Construction completion date for PSC 48		Mar 1998
Construction completion date for Building 780		Apr 1998
IRA system startup for Building 106 (PSC 48)		Mar 1998
IRA system startup for Building 780. Continuous operation of this system did not begin until March 1999		Apr 1998
MOA signed between USEPA, FDEP, and Navy to ensure LUC compliance (15) (16)		31-Aug-1998
RI/FS complete for OU 3 (17)		Apr 2000
Proposed Plan for Remedial Action (public comment period)		Apr to May 2000
	Proposed remedial actions accepted with two exceptions as indicated below.	n/a
	Area B changed from enhanced bioremediation to MNA.	n/a
	Area G changed from chemical oxidation to MNA.	n/a
Proposed Plan for Remedial Action Area A(public comment period)		Jul to Aug 2006
ROD signature for OU 3 (IRAs for Buildings 106 and 780 attain status as final remedy in this document)		25-Sep-2000
	Selected remedy for Areas B and G is MNA.	n/a
	Selected remedy for Areas C and D is enhanced biodegradation.	n/a
	Selected remedy for Area F is chemical oxidation.	n/a
	PSCs 11 through 13 were determined to pose no risk to human health or environment, and NFAs were assigned to them.	n/a
	PSCs 14 and 15 were assigned NFA on condition that LUCs would restrict future activities at the sites.	n/a
	Areas A and E require additional assessment work and they will be addressed in a separate ROD.	n/a
ROD signature for OU 3 Area A		22-Sep-2006
	Selected remedy is MNA and LUCs	n/a

TABLE 4-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 3
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event (Sub-events indented)		Date
Current remedial activities (note these are grouped by site and not necessarily in chronological order)		n/a
	Area A - First annual sampling event held in November.	2003
	Area A - Second annual sampling event held in November.	2004
	Area A - Third annual sampling event held in November.	2005
	Area A - Fourth annual sampling event held in November.	2006
	Area A - Fifth annual sampling event held in November.	2007
	Area A - Sixth annual sampling event held in December.	2008
	Area A - Seventh annual sampling event held in February.	2010
	Area B - First and second semi-annual sampling events held in July and December.	2002
	Area B - Third semi-annual sampling event held in September.	2003
	Area B - Fourth and fifth semi-annual sampling event held in January and August.	2004
	Area B - Sixth and seventh semi-annual sampling event held in January and August.	2005
	Area B - Eighth and ninth semi-annual sampling event held in January and August.	2006
	Area B - Tenth semi-annual sampling event held in January.	2007
	Area B - First annual sampling event held in April.	2008
	Area B - Second annual sampling event held in January.	2009
	Area C - Wells for monitoring program installed in October and baseline sampling done in November.	2001
	Area C - First planned Hydrogen Release Compound (HRC®) injection completed for enhanced biodegradation remedy.	Feb-2003
	Area C - First year of semi-annual sampling conducted in July and December.	2003
	Area C - Third semi-annual sampling event held in July.	2004
	Area C - Fourth and fifth semi-annual sampling event held in February and August.	2006
	Area C - Sixth and seventh semi-annual sampling event held in February and August.	2007
	Area D - Wells for monitoring program installed in October and baseline sampling done in November.	2001
	Area D - First planned HRC® injection completed for enhanced biodegradation remedy.	Dec-2002
	Area D - First year of semi-annual sampling conducted in July and December.	2003
	Area D - Third semi-annual sampling event held in July.	2004

TABLE 4-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 3
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event (Sub-events indented)		Date
	Area E Phase I Groundwater Investigation	2005
	Area E Phase II Groundwater Investigation	2010
	Area F - Chemical oxidation pilot study cancelled when contractor encountered lower levels of groundwater contamination than expected.	2001
	Area F - Reassessment sampling event confirmed level of groundwater contamination reported in RI/FS.	Sep-2002
	Area G - First and second semi-annual sampling events held in July and December.	2002
	Area G - Third semi-annual sampling event held in September.	2003
	Area G - Fourth and fifth semi-annual sampling event held in January and August.	2004
	Area G - Sixth and seventh semi-annual sampling event held in January and August.	2005
	Area G - Eighth and ninth semi-annual sampling event held in January and August.	2006
	Area G - Tenth semi-annual sampling event held in January.	2007
	Area G - First annual sampling event held in April.	2008
	Area G - Second annual sampling event held in January.	2009
	PSC 16 - Tar ball removal held in April and May, and final sediment sampling held in September.	2002
	PSC 48 - O&M discontinued in January.	2005
	Building 708 - O&M discontinued in January.	2005

Notes:

Applicable report references available for items pre-dating the RI/FS on Table 2-1 of the ROD.

(1) PSC = potential source of contamination
(2) PPE = personal protective equipment
(3) Removal actions.
(4) UST = underground storage tank
(5) VOC = volatile organic compound
(6) SSFP = scoping study field program
(7) EECA = engineering evaluation and cost analysis
(8) IRA = interim remedial action
(9) RCRA = Resource Conservation and Recovery Act
(10) AS/SVE = air sparge with soil vapor extraction
(11) NA LTM = natural attenuation long term monitoring
(12) NFA = no further action
(13) LUC = land use controls
(14) FS = feasibility study
(15) USEPA = United States Environmental Protection Agency
(16) FDEP = Florida Department of Environmental Protection
(17) Area H dropped from further consideration since only low levels of contamination were encountered in the RI/FS.
n/a not applicable

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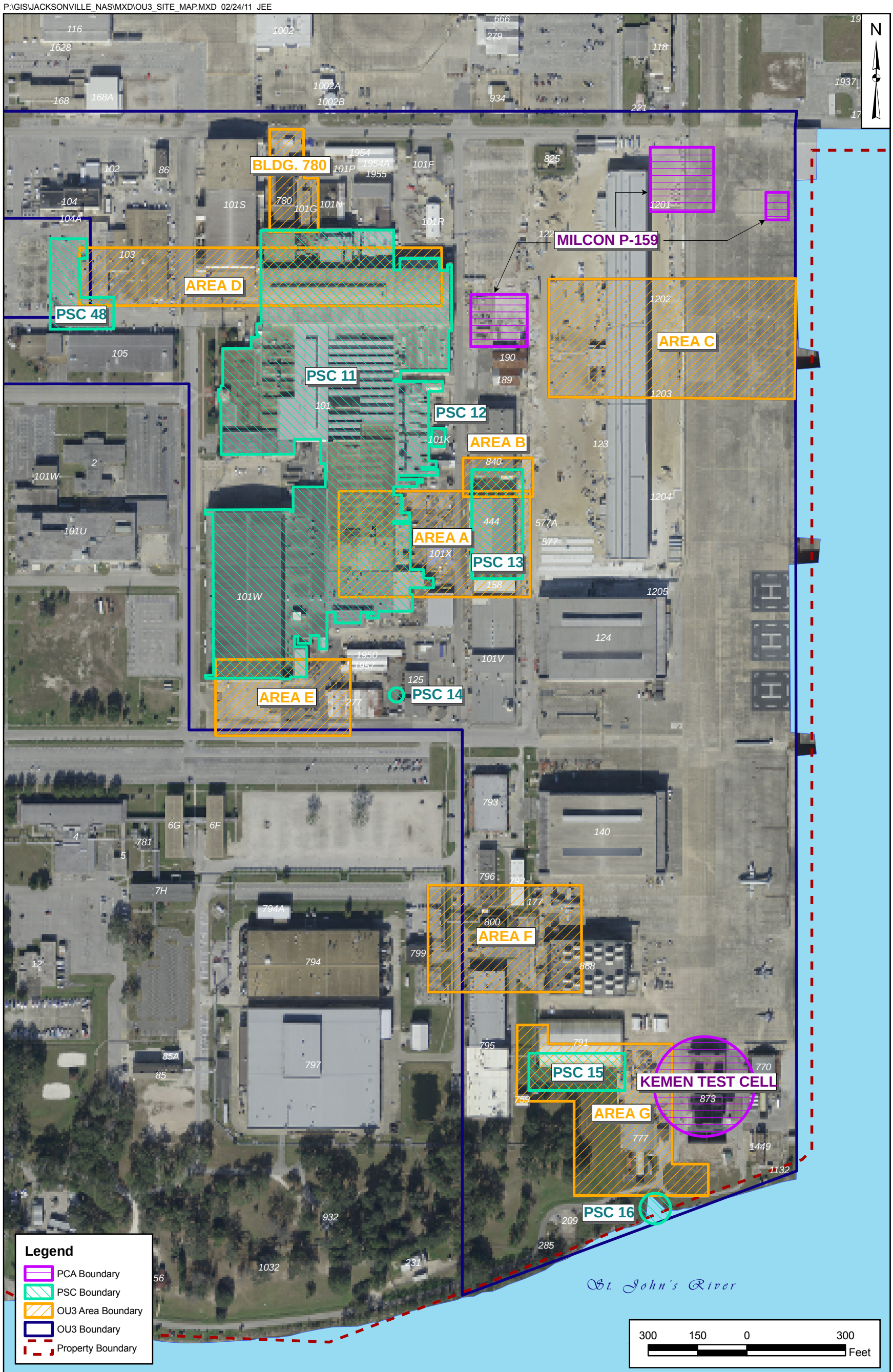

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J. LAMEY	08/26/04
CHECKED BY	DATE
J. JOHNSON	02/24/11
REVISED BY	DATE
J. ENGLISH	02/24/11
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NAVFAC

SITE MAP
OPERABLE UNIT 3
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO.	
02098	
OWNER NO.	
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FIGURE NO. FIGURE 4 - 1	REV 0

4.2.2 Land and Resource Use at OU 3

Past and current land uses at OU 3 remain mostly unchanged since FRCSE became the primary tenant in the 1940s. FRCSE is a major industrial complex with a primary mission of performing in-depth repair and modification of aircraft engines and aeronautical components. FRCSE also maintains a variety of ground support equipment. OU 3 also contains the helicopter flight line and associated hangar plus the former Station's dry cleaner and various other industrial, shop, and office buildings. Other tenants at OU 3 include various helicopter squadron commands.

OU 3 also consists of helicopter landing spots and taxiways, hangars, roads, buildings, and largely paved areas between the buildings. There is very little unpaved surface area. Being a heavily industrial area, access to OU 3 is restricted by fence and security guards and is limited to FRCSE personnel and authorized visitors with water access limited by security patrols.

FRCSE is bordered on the east and south by the St. Johns River, on the west by various NAS Jacksonville operations such as offices and a machines shop, and on the north by the flightline. The St. Johns River shoreline at OU 3 is mostly paved (pavement ends at the seawall) except on the southern shore where it is rocky.

Groundwater Use: Groundwater beneath OU 3 is not currently used at FRCSE. Although it is unlikely and infeasible (due to low aquifer yield) that drinking water wells would be installed at OU 3 in the surficial aquifer, the NAS Jacksonville Partnering Team agreed to take a conservative approach and consider groundwater to have potential beneficial use as drinking water during the RI and risk assessments.

Surface Water Use: There is no surface water located within the boundaries of OU 3; however, OU 3 does about the St. Johns River on the east and south. Currently, the state has classified the St. Johns River and its tributaries as Class III waters. FAC Chapter 62-302 classifies waters of the state by designated usage with Class III being described as use for recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife (popularly referred to as fishable/swimmable). It is not anticipated that the St. Johns River classification will change in the future.

4.3 HISTORY OF CONTAMINATION AT OU 3

The industrial nature of the OU 3 area and the past operational practices are believed to be major factors contributing to the contamination beneath OU 3. As reported in the RI/FS (HLA, 2000b), the following are events that may have contributed to the current conditions at OU 3:

PSC 11 – Hazardous materials storage, unauthorized disposal of potentially 2,000 gal of waste solvents and other materials beneath steel plates (inside Building 101), plating shop operations and its cyanide and chromium waste treatment facility, anodizing process in northern portion of the building (generated chromium and nickel waste products), and 150 pounds of mercury were spilled in the northeastern portion of Building 101.

PSC 12 – Chemical storage, spills of toxic and reactive chemicals from rusted and ruptured drums, and solvent and other waste releases due to ruptures of storm, sanitary, and industrial sewer connections.

PSC 13 – Operated as a radium paint disposal pit from World War II until the late 1950s.

PSC 14 – Was the Battery Shop and included a seepage pit. The seepage pit was used for the disposal of lead battery acid via a seepage pit (estimated at 100 gal per year) from 1959 to 1982. The pit was reportedly still in place when the RI was written. According to the ROD, lead concentrations in soil exceeds the acceptable level for residential development but is less than the industrial criteria.

PSC 15 – Operated as a 10,000-square foot paint sludge and solvent disposal pit for between 10 and 36 years. The estimated disposal amount was 2,000 gal per year. According to the ROD, the radium contaminated soil was removed except for a location beneath a thick concrete pad and in soils greater than 3 feet bgs.

PSC 16 – Multiple spills reported for this area including JP-5 fuel, hydraulic oil, chrome, and cyanide; and releases of oils and various other chemicals into the storm sewer, which discharged at PSC 16.

PSC 48 – Operated as base dry cleaners from 1962 into the 1990s. This facility reportedly used 150 gal per month of TCE. No report of on-site disposal was included in the RI/FS.

Former Plating Shop, Building 101 – Tin, copper, cadmium, lead, nickel, silver, chromium, and gold electroplating operations were conducted between the 1940s and 1990. This facility included a wastewater treatment system located outside of the building.

4.3.1 Initial Response for OU 3

According to the RI/FS (HLA, 2000b), numerous removal actions have been performed at OU 3 to reduce contaminant source areas. These actions involved the removal of contaminated soil and groundwater and removal of USTs and tank system piping and equipment. Brief descriptions of the initial responses for OU 3 are as follows:

- PSC 13 – Removal of RAD contaminated soil and asphalt was performed.

- PSC 15 – Removal of RAD contaminated soil.
- PSC 48 – IRA was performed involving the installation and operation of an AS/SVE system.

- Building 780 - IRA was performed involving the installation and operation of a groundwater pump and treat and SVE system.

- Storm Sewer – IRA to install CIPP from the storm sewer outlet to a point upstream ending at Area G.

- Former Plating Shop – Removal of tanks, building demolition, and soil removal.

4.3.2 Basis for Taking Action at OU 3

The following paragraph from the Executive Summary of the RI/FS (HLA, 2000b) indicates the contaminated media of concern and, thus, the basis for the remedial actions detailed in the ROD (HLA, 2000a): "Evaluation of the findings from the first, second, and third stages of the RI indicate there is no evidence to suggest that ongoing point sources of contamination are present within the vadose zone at OU 3. Based on the risk assessments, only the following two environmental media present risk to human health or the environment: groundwater (at Areas B, C, D, F, and G) and a localized area of sediment (containing "tar balls") in the St. Johns River near PSC 16. In addition, water in the storm sewers at the southern end of OU (3) exceeds Florida Surface Water Standards (FSWS)."

According to the RI/FS (HLA, 2000b), the COCs that pose a risk at OU 3 and exist at concentrations that are above background can be summarized as follows:

Groundwater	Tetrachloroethene (PCE) TCE 1,1-DCE Vinyl chloride
Storm Sewer Water	TCE
Soil	Lead Radium
Sediment	PAHs Lead

For more detail on the COCs observed, Appendix C provides tables and figures from the RI/FS (HLA, 2000b) that show the detected COCs for the media indicated above. The RI/FS for OU 3 was focused on the areas of significant groundwater contamination and, as such, did not reference the soil contamination

resulting in the implementation of LUCs at PSCs 14 and 15 or the two sites within OU 3 that were transitioning from IRAs to CERCLA Remedial Actions.

In addition, two other areas, Area A and Area E were left out of the Primary ROD to allow for further assessment. An RI/FS and ROD were completed for Area A with the ROD being approved in 2006. In the ROD, it was determined that VOCs present in groundwater posed a risk to surface water through the infiltration of contaminated groundwater into the storm sewer system. Area E is currently being investigated as part of the OU 3 optimization effort described in detail in Section 4.5.2.1.

4.4 REMEDIAL ACTIONS FOR OU 3

According to the primary ROD (HLA, 2000a), "the overall strategy at OU 3 is to devise and implement cleanup remedies which minimize the need for LUCs or other administrative controls. Therefore, the basis and rationale for developing remedial action objectives (RAOs) for storm sewer water, groundwater, and sediment was to bring storm sewer water effluent into compliance with FSWS, to make groundwater suitable for drinking water purposes, and to remove ecological mortality risk in sediment. Hence, RAOs were established for storm sewer water due to a maximum detected concentration of TCE that exceeded the FSWS. RAOs for groundwater were established because of the excessive human health risk due to chlorinated VOC concentrations above federal and state MCLs. RAOs for sediment were established due to a small area of lethal toxicity to aquatic receptors… The objectives are intended to be the design basis for a final remedy for media at OU 3. RAOs were not established for soil or surface water at OU 3 because no risks were predicted for human or ecological receptors exposed to those media." A brief synopsis of these objectives is provided in Table 4-2.

TABLE 4-2

**REMEDIAL ACTION OBJECTIVES FOR OPERABLE UNIT 3
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA**

Medium	Contaminants Causing Unacceptable Risk	Remedial Action Objectives
Storm Sewer Water	TCE	Manage contaminated storm sewer water to achieve FSWS within the zone of tidal influence.
Groundwater	Chlorinated VOCs	Address groundwater contamination at Areas B, C, D, F, and G containing concentrations of chemicals above ARARs.
Sediment	PAHs Lead	Reduce ecological receptor exposure to sediment containing lethal concentrations of PAHs and lead.

PSC 48 and Building 780 IRAs were selected as remedies and made permanent in the OU 3 ROD. Active cleanup consisting of an AS/SVE system for PSC 48 and a groundwater extraction and treatment/SVE system for Building 780. The interim RAOs established for these areas in the EECA (ABB-ES, 1995b) consist of the following:

- Reduce present or future risks posed to human health and to the environment.
- Reduce contaminant concentrations in hot spots or source areas to adjacent levels of contamination.
- Collect data that can be used to focus the RI/FS.

The EECA (ABB-ES, 1995b) specifically states that, "it is not the objective of the IRA (for PSC 48 and Building 780) to achieve endpoints for remediation that consist of federal MCLs, Florida "free-froms," or other final clean-up criteria." That document also stated that they anticipated after successfully lowering hot spot concentrations, a final OU-wide remedy could be selected to address residual contaminants. The Action Memorandum (ABB-ES, 1996b) states that the IRAs were not intended to fully address the statutory mandate for permanence and treatment to the maximum extent practicable, and that subsequent actions were planned to address potential risks posed by residual contamination at OU 3. However, the ROD selected these as permanent remedies without further evaluation in the RI/FS.

4.4.1 Remedy Selections at OU 3

The following sections detail the remedies chosen for each portion of OU 3.

4.4.1.1 OU 3-Storm Sewer Water

The primary ROD (HLA, 2000a) reports that a video inspection of the storm sewers verified that groundwater is infiltrating the sewer pipes through leaking joints and cracks. It was surmised that the likely source of TCE at concentrations exceeding the FSWS in the storm sewer water is infiltrating groundwater. TCE was detected in the storm sewer near groundwater hot spot Area F. It was later determined during the RI for Area A that contaminated groundwater was also infiltrating the same storm sewer. The storm sewer in question passes through Area A then proceeds south passing through Area F and Area G before discharging to the St. John River. However, the primary ROD surmised all contamination entering the storm sewer at that time originated at Area F. TCE concentrations "upstream" of Area F were either non-detect or less than FSWS; therefore, the following course of action was selected in the primary ROD as the preferred remedial alternative for the storm sewer water at OU 3:

- Conduct remediation of groundwater at Area F via chemical oxidation. Collect samples of water in the storm sewers within the zone of tidal influence and analyze for VOCs after completion of the groundwater treatment at Area F. If the concentrations of VOCs are below the FSWS, no further

action would be required for the storm sewer water. If the concentrations of the VOCs exceed FSWS, installation of CIPP would be the selected remedial alternative for the storm sewer followed by regular monitoring until the VOCs are below the FSWS.

The Primary ROD also concluded that "whether as a result of Area F groundwater remediation or installation of CIPP, the storm sewer remedy reportedly complies with ARARs (FSWS) and eliminates the potential for migration of the contaminated groundwater to the St. Johns River, via the storm sewers. Although TCE has been detected in the storm sewer water at concentrations exceeding the FSWS (maximum of 170 µg/L versus the 80.7 µg/L standard), unacceptable risks to human health or the environment were not predicted based on exposure to VOCs in the storm sewer water."

4.4.1.2 OU 3- Areas C and D

Enhanced biodegradation was chosen as the preferred remedial alternative for the contaminated groundwater at Areas C and D. It was chosen for its low cost and short implementation time (four years to remediate and five years for O&M). This alternative was accomplished by injecting nutrients to enhance bacterial growth and increase natural biodegradation of organic compounds. The contamination in these areas is in the intermediate zone of the surficial aquifer, which is under anaerobic conditions. Additionally, the primary COC was TCE; therefore, HRC® injection was used because it is easily metabolized by anaerobic bacteria in that zone. The ROD called for applying the material twice during the first four years of remediation.

Also, as part of the remedial action, the groundwater was to be monitored for both the COCs and natural attenuation parameters that indicate the likelihood of ongoing and potential future biodegradation. The ROD (HLA, 2000a) stipulated that the monitoring would occur on a quarterly basis for five years until the Five-Year Review. It also stipulated that both sites would be monitored for target compound list (TCL) VOCs, and Area D would also be monitored for target analyte list (TAL) inorganics since arsenic had exceeded drinking water standards at that site.

This remedial alternative was expected to effectively destroy the VOCs in the intermediate zone of the surficial aquifer at Areas C and D and achieve the RAO for OU 3 groundwater at both areas by achieving ARARs.

Implementation of groundwater use restrictions until RAOs have been achieved was also selected to provide protection of human health. This remedial action was expected to achieve the RAO within five years of implementation such that no controls (administrative or physical) of residual risk will be required.

4.4.1.3 OU 3- Area F

In-situ Chemical Oxidation (ISCO) was selected as the preferred alternative for the contaminated groundwater in the upper 40 feet of the surficial aquifer at Area F. ISCO was also considered a low cost alternative with short implementation time (five years for remediation, five years for treatment system O&M, and 10 years for concurrent administration which would allow for two five-year site reviews). The primary ROD reported that the ISCO process involves active in-situ treatment with the creation of a treatment cell through a combination of injection of an oxidant compound (e.g., potassium permanganate) and extraction of groundwater. This process would control the groundwater flow paths within the contaminated plume thus preventing contaminant migration during the remedial action while effectively oxidizing the VOCs.

The primary ROD (HLA, 2000a) also stipulated that annual monitoring of the groundwater for TCL VOCs would be used to track progress of the cleanup, and for TAL inorganics to track proper utilization of the ISCO compound.

This remedial alternative would be expected to destroy up to 90 to 95 percent of the VOCs in the intermediate zone of the surficial aquifer at Area F, and would achieve the RAO for OU 3 groundwater in that area by achieving ARARs.

Implementation of groundwater use restrictions until RAOs have been achieved was also selected to provide protection of human health. This remedial action was expected to achieve the RAO within five years of implementation such that no controls (administrative or physical) of residual risk will be required.

4.4.1.4 OU 3-Areas B and G

The selected remedy for both Areas B and G is MNA. The contaminated plume (in the intermediate zone of the surficial aquifer) at Area B has been modeled to slowly migrate into a ‘clay plug’ within 41 years. Meanwhile, it has been determined that the plume associated with Area G will naturally decay to non-detectable levels in 39 years. The plume in Area G appeared to be unconfined in the surficial aquifer. Even though the plumes at Areas B and G would have to be monitored for 41 and 39 years, respectively, the relative cost was considered low enough to be worthwhile. Additionally, input from the Restoration Advisory Board members during the public comment period was that active remediation was too costly since the exposure potential was extremely low, causing the human health and ecological risk to be minimal.

The primary ROD (HLA, 2000a) stipulated that sampling events would be required every 6 months for the first two years, then annually for three years until the Five-Year Review, and, finally, bi-annually. As for monitoring specifics, the primary ROD explains that "the wells will be sampled and groundwater will be analyzed for parameters which indicate the likelihood of ongoing and potential future biodegradation as well as groundwater contaminants". Modeling of the progress of each plume toward final decay (Area G) or assimilation into a clay unit (Area B) is expected every five years. If the remediation of each plume does not appear to be on track, a contingent action would be implemented.

Based on observed and modeled data for each plume, it was assumed that MNA will effectively destroy the VOCs in both areas, and the alternative would achieve the RAO for groundwater at both areas.

4.4.1.5 OU 3-PSC 16

The remedial alternative for sediment at PSC 16 was selective removal of tar balls that were believed to contain the toxic components (i.e., PAHs and lead) that resulted in 100 percent mortality in toxicity testing for the site. The alternative involved the use of a sediment-sifting device designed to selectively remove the tar balls from the river bed.

The steps for this event were as follows:

1. Baseline analytical and toxicity sampling to confirm or change the remediation boundary. Grain sized analyses were also to be performed to aid in determining the required mesh size for the sifting device.
2. Installing a silt-screen barrier at the boundary to minimize off-site migration of suspended sediment.
3. Sifting of sediment to a depth of 6 inches with the manufactured sifter. The tar balls were placed into drums for eventual proper disposal, while any marine wildlife was returned to the water.
4. Post-remediation analytical and toxicity sampling to confirm the removal of the contaminated sediments.

This alternative was expected to take as little as 1 month to implement. The toxic chemicals that were reported were believed to be primarily contained in the tar balls, so their removal would mitigate the source and prevent future risks to the local fauna. Promulgated ARARs for sediment were not available; however, the removal of the tar balls was expected to meet the RAO for the sediment by meeting the exposure endpoints selected in the baseline ecological risk assessment. Thus the PAH and lead levels were expected to decrease to levels that would not adversely affect the survival and growth of amphipods exposed to sediment in PSC 16. Also, this effort was not expected to adversely affect the overlying surface water.

4.4.1.6 OU 3-Building 106 (PSC 48)

The remedial action at PSC 48 was developed as an IRA and involved an AS system emitting air into the groundwater to volatilize dissolved VOCs in the shallow zone of the surficial aquifer. The COCs were then captured with a vapor extraction system for removal and discharged through two granular activated carbon (GAC) beds (configured in series). The GAC beds were used to adsorb the chlorinated VOCs prior to exhaust through a 10-foot high stack (HLA, 1999a). The system consisted of the following major components:

- Eleven AS wells (AIW-1061 through AIW-10611) installed into the saturation zone with 18-inch well screens on top of the shallowest confining strata (approximately 13.5 feet bgs).
- Two horizontal vapor extraction wells (designated as north and south legs) installed in trenches in the vadose zone (approximately 2 feet bgs) near the AS points (approximately 5 to 15 feet away).
- A positive displacement rotary low pressure blower for AS.
- A regenerative type vacuum blower for vapor extraction.
- Subsurface pipelines to connect the AS wells to the positive displacement blower.
- Subsurface pipelines (SVE laterals) to connect the vapor extraction trenches to the vacuum blower.
- Two 5,000 pound vapor-phase GAC treatment units for off-gas treatment.
- Nine groundwater monitoring points consisting of eight piezometers (PZ-1061 through PZ-1068) and one monitoring well (MW-028) to measure the influence and effectiveness of the AS system. Also, eight vapor probes to concentrate influence from the horizontal extraction wells and provide monitor points to characterize the vadose zone vacuum being created.

HLA (1999a) stated in construction completion report that there were several minor changes to the treatment system during the construction with no substantive changes to the design intent.

The primary ROD implemented the IRA as originally designed as the final remedial action for this site until the Five-Year Review. The ROD stated that during the Five-Year Review the system performance should be evaluated to determine if the, “VOC concentration (expressed as the total ethane equivalent) in groundwater is decreasing such that ARARs will be met in a reasonable timeframe (e.g., 30 years).”

4.4.1.7 OU 3-Building 780

The remedial action for Building 780 was developed as an IRA and involved a groundwater extraction treatment (GWT) and SVE system designed to treat VOCs in the shallow zone of the surficial aquifer.

The SVE system was designed to collect contaminated soil vapor from six, equally-spaced, vertical SVE wells installed in the vadose zone around Building 780. The vapors were transported via a piping network to a skid-mounted vacuum system and discharged through a thermal oxidation (Therm-Ox) unit and acid gas scrubber before going out a stack to the atmosphere. The GWT used a pre-existing well (U3MW029) with a pneumatic well pump to pull groundwater from the source area and send it to an equalization tank. When a certain level of liquid was reached, it was pumped to a shallow-tray air stripper to remove the VOCs in the groundwater. Afterward, the treated water was discharged to the base sanitary sewer. Contaminated gases from the SVE and GWT systems were combined and sent through the Therm-Ox and a scrubber unit for final treatment prior to venting to the atmosphere (HLA, 1999b). The system was designed with the following components:

- One groundwater extraction well (MW-029) installed previously into the saturated zone with a well screen on top of the shallowest confining strata (estimated at 15 feet bgs).

- One pneumatically operated automatic well pump and an air pressure regulator installed in well MW-029.

- Vapor extraction trenches installed in the vadose zone near the groundwater extraction well (approximately 2 feet bgs).

- Six vapor extraction wells (VEW-7801 through VEW-7806) installed to approximately 4 feet bgs and screened in the vadose zone around Building 780.

- A regenerative vacuum blower for vapor extraction.

- Subsurface and above-grade pipelines to connect the groundwater extraction network to the groundwater pretreatment system and then to the sanitary sewer.

- Subsurface pipelines [SVE laterals of which there are two and they are called 780-1 (with wells VEW-7801, VEW-7805, and VEW-7806) and 780-2 (with wells VEW-7802 through VEW-7804)] to connect the vapor extraction trenches to the vacuum blower.

- A groundwater pretreatment system consisting of a shallow-tray air stripper and blower to remove VOCs prior to discharge in the sanitary sewer for treatment at the facility's treatment works.

- A thermal oxidation unit to treat vapor off-gas from the air stripper and the vapor extraction system prior to exhaust.

- Monitoring points (MW-780-1, MW-780-2, and EW-780) to measure the influence and effectiveness of the GWT/vapor extraction system on the groundwater plume and to collect samples for biodegradation modeling.

According to the primary ROD, the long-term plan for this IRA was to continue O&M of the system with groundwater monitoring until the Five-Year Review. The Five-Year Review is to evaluate if the VOC concentrations in groundwater are decreasing such that ARARs will be met in a reasonable timeframe. If that expectation is met, then the ROD states that the system would continue to be operated with appropriate LUCs in place.

4.4.1.8 OU 3-PSC 14 and PSC 15

The remedial action for PSC 14 and PSC 15 was listed in the primary ROD as LUCs for an industrial scenario. The lead contaminated soil beneath PSC 14 and radium contaminated soil beneath portions of PSC 15 were the reasons for the LUCs.

4.4.1.9 Area A

The selected remedy in the second ROD for remediating the surficial aquifer contamination at OU 3 Area A addresses the surficial aquifer contamination by controlling exposure (reducing risk) through LUCs, MNA, and long-term monitoring (Tetra Tech, 2006a).

The major components of the remedy are as follows (Tetra Tech, 2006a):

- Component 1: Natural Attenuation: The COCs comprising the groundwater contamination at OU 3 Area A are typically conducive to reduction via natural processes. Natural attenuation of the contaminants at OU 3 Area A is expected to occur via physical processes (e.g., dispersion, adsorption, dilution, etc.) and chemical processes (e.g., biodegradation). In the RI/FS (HLA, 2000b) degradation was deemed to be occurring at Area A due to the concentration of daughter products (e.g., cis-1,2-DCE and vinyl chloride). This continues to be evident with decreasing TCE trends in most wells and detectable concentrations of cis-1,2-DCE and vinyl chloride. The RI/FS (HLA, 2000b) projected the duration of MNA at 55 years to reduce COC concentrations to acceptable levels.

- Component 2: Land Use Controls: LUCs will be implemented, monitored, reported on, and maintained by the Navy for OU 3 Area A to ensure that the surficial aquifer is not used for drinking water purposes and prevent uncontrolled worker exposure to groundwater. The LUCs will be maintained until the concentrations of hazardous substances in the groundwater are at such levels to allow for unrestricted use and exposure. The objectives of the LUCs will be to
  - Ensure no excavation activities occur below the water table (saturated soil) without special handling and disposal procedures for the saturated soil. Ensure workers performing these actions are properly protected.
  - Ensure no withdrawal of and/or use of the groundwater without FDEP and USEPA concurrence until cleanup levels are met.
  - Maintain the integrity of any current or future remedial or monitoring systems (e.g., monitoring wells included in the MNA program).
  - Ensure any workers that might potentially be exposed to the contaminated groundwater at this site are properly protected.
- Component 3: Monitoring: COC concentrations in groundwater will be monitored for natural attenuation to evaluate decreases in contaminant concentrations and verify that significant plume migration is not occurring. Natural attenuation parameters may be monitored to verify if naturally occurring processes are reducing COC concentrations. The RI/FS (HLA, 2000b) projected the duration of MNA at 55 years to reduce COC concentrations to acceptable levels. Groundwater monitoring reports will be prepared to document the plume concentrations. Reports will typically be issued after each monitoring event.

4.4.2 Remedy Implementation at OU 3

After approval of the primary ROD for OU 3, the NAS Jacksonville Partnering Team determined that some components of the selected remedies either were no longer necessary or should not be implemented due to additional data collected after the date of the ROD that indicated changed conditions existed within OU 3 from those documented in the ROD. Significant developments include the following:

- An Optimization Study conducted in 2004 by NAVFAC SE for the treatment systems at Building 106 and 780 concluded the systems were no longer effective in removing contamination and would not meet the RAOs in the primary ROD.
- Preliminary design activities for remedy implementation (chemical oxidation treatment of groundwater) at Area F determined COC concentrations in groundwater were significantly lower than expected based on historical data and as a result, implementation of chemical oxidation was not warranted.

- Additional data collected at Areas F and Areas G indicated that groundwater plumes had migrated significantly beyond the previously known boundaries and as a result additional assessment was warranted. In addition, it was shown that contaminated groundwater was entering a second storm sewer located down gradient of Areas F and G at levels above regulatory criteria.
- Monitoring data from Areas C and D indicated significant reductions in contaminant levels but concluded the RAOs for these areas would not be achieved within the five-year period specified in the primary ROD.
- The Partnering Team also evaluated evolving indoor air intrusion guidance and regulation and determined that an OU 3 wide survey would be required to evaluate the potential for risks to site workers posed by subsurface contamination.

Based in part on these developments as well as the development of risk-based site closure guidance and regulations, it was determined that the Navy should prepare an RI/FS Addendum designed to evaluate current conditions and fill identified data gaps. The intent of the RI/FS Addendum is to collect data supporting a risk-based approach evaluating the OU as a whole focused on the possibility of impacts to human health and ecological receptors including site workers and the St. Johns River. The results of the RI/FS Addendum would be to support an updated single ROD for OU 3 that will replace the two existing RODs.

The following text provides a synopsis of the current status of the selected remedies detailed in the two existing RODs for OU 3.

4.4.2.1 Areas C and D

The remedial design phase for Areas C and D has been completed and the HRC® was injected. The remedial action phase for this site continues with groundwater monitoring and potentially additional HRC® injection. The following details actions completed at this site to date.

An injection work plan with a HASP was issued by CCI (CCI, 2001) for Area C. The main components of the plan included a direct-push technology (DPT) groundwater investigation from the source area around CW-16 and monitoring well MW-31 at intervals of 22 to 26 feet bgs (or directly above the clay layer), 26 to 30 feet bgs, 30 to 34 feet bgs, 34 to 38 feet bgs, 38 to 42 feet bgs, and 42 to 46 feet bgs (to verify the vertical extent of the plume). In addition, a groundwater sample would be collected from MW-31. Following review of the DPT data, the plan anticipated the installation of four wells for baseline and periodic monitoring (following the HRC® injection) of the following parameters: TCL VOCs, dissolved iron and manganese, nitrate, sulfate, sulfide, chloride, alkalinity, TOC, dissolved gases, and metabolic acids.

The last component of the plan involved an initial HRC® injection in the source area and around the MW-31 area followed by a one-year barrier application of the same compound.

The same work plan and Health and Safety Plan (HASP) issued for Area C also addressed Area D (CCI, 2001a). The main components of that plan included a DPT groundwater investigation around the source area (adjacent to CW-43 and D01) at intervals of 23 to 27 feet bgs (or directly above the clay layer), 27 to 31 feet bgs, 31 to 35 feet bgs, 35 to 39 feet bgs, 39 to 43 feet bgs, 43 to 47 feet bgs, 47 to 51 feet bgs, and 51 to 55 feet bgs (to verify the vertical extent of the plume). In addition, groundwater samples would be collected from existing pump test well GEW002 and existing monitoring well MW-30. Following review of the DPT data, the plan anticipated the installation of four wells for baseline and periodic monitoring (following the HRC® injection) of the following parameters: TCL VOCs, TAL metals, dissolved iron and manganese, nitrate, sulfate, sulfide, chloride, alkalinity, TOC, dissolved gases, and metabolic acids. The last component of the plan involved an initial HRC® injection in four zones: the source area (CW-43 area), upgradient of Wasp Street, upgradient of Building 103, and in the Building 103 keyway. From August 2002 through 2003, CCI performed the first HRC® injection event. Monitoring began in June 2003.

A Remedial Action Completion Report was issued by CCI (CCI, 2006a) for Area C and D. CCI found that the injection of HRC® to enhance in-situ degradation of chlorinated solvents present in site groundwater has resulted in conditions favorable for reductive dechlorination processes. Within Area C, active solvent biotransformation was observed at monitoring wells U3CMW31 and U3C-MW40. Degradation activity was also observed in Area D monitoring wells U3D-MW30 and U3D-GEW002. The body of evidence collected in groundwater sampled from these locations supports this conclusion through changes in VOC concentrations and environmental parameters indicative of microbial transformation. Elsewhere within Area C and Area D groundwater, there was little evidence to support active biotransformation processes were occurring. Groundwater sampling revealed conditions effective for solvent biodegradation were focused, and overall, the areas of active solvent biotransformation within Area C and Area D are highly localized. However, based on the documentation and evaluation included in the Remedial Action Completion Report, they concluded that the completed remedial action of HRC® injection at Area C and Area D will not achieve the RAO of reducing VOCs in groundwater to the ARARs/action levels within five years such that no controls (administrative or physical) of residual risk will be required for the sites.

An Annual Monitoring and Effectiveness Report was issued by CCI (CCI, 2008a) for Area C and D for 2007. CCI concluded that the transformation of TCE to cis-1,2-DCE by reductive dechlorination has been observed at this site. Two of the monitored depth intervals have shown increasing conversion of cis-1,2-DCE to vinyl chloride. There has been no increase in ethene concentrations to date. Methane production is occurring in the two intervals monitored. In general, the majority of the site data suggests conditions

remain favorable for reductive dechlorination. However, the reductive dechlorination processes are proceeding slower than the four-year treatment duration anticipated in the ROD. Based on the results from the last three monitoring events (i.e., August 2006, February 2007, and August 2007), the HRC® injection at Area C and Area D will not reduce contaminant concentrations to achieve the RAO of reducing VOCs in groundwater to the ARARs/action levels within five years such that no controls (administrative or physical) of residual risk will be required for the sites.

4.4.2.2 Area F

In February 2001, ManTech performed the initial characterization efforts for the chemical oxidation technology demonstration at Area F. After reviewing the results of the sampling, ManTech concluded that TCE was not present at levels reported by HLA's 2000 FS (Tetra Tech, 2003a). Thus, ManTech determined the site was not viable for chemical oxidation treatment. Following discussions by the NAS Jacksonville Partnering Team, Tetra Tech was contracted by the Navy to re-assess the site to determine whether the current site conditions were as reported in the RI/FS or by ManTech. Tetra Tech conducted the first phase of the investigation in September 2002. The following conclusions were included in the Tetra Tech report:

- The groundwater concentrations Tetra Tech encountered in the 2002 re-assessment were similar to the TCE concentrations originally reported in the RI/FS (HLA, 2000b).

- Subsurface heterogeneities, which are believed to exist between 30 and 40 feet bgs, retard the downward migration of contaminants.

- The results of this study confirm the prior determination that conditions at Area F are not conducive for biodegradation of the contaminants. Although some biodegradation may occur as evidenced by limited detections of breakdown products near the downgradient edge of the plume, biodegradation processes do not appear to be active over the majority of the contaminant plume area.

The groundwater plume delineation is not complete at Area F.

On November 12, 2002, the NAS Jacksonville Partnering Team reviewed the first phase of the Tetra Tech re-assessment and decided that ISCO would remain the preferred remedial action for Area F.

CCI (CCI, 2004a) submitted a work plan to collect soil and groundwater analytical data to supplement the data collected during the RI/FS, determine the location for monitoring well installation, and develop the ISCO injection design. CCI conducted a DPT groundwater investigation in October 2006 to further define the contaminant groundwater plume at Area F (CCI, 2007a). The following conclusions were included in the CCI report:

- Chlorinated VOC concentrations are present above ARARs (i.e., GCTLs) in groundwater in Area F, east of Building 868. All chlorinated VOCs detected were generally within the boundary of the TCE plume, with the exception of cis-1,2-DCE and vinyl chloride, which were detected at less than 3 µg/L in the easternmost line of DPT locations.
- Groundwater contamination east of Building 868 appears to be limited to depths above 50 feet by an underlying finer grained sedimentary layer. The top of a similar layer was identified by Tetra Tech at 56 feet bgs in Area G.
- Reductive dechlorination of TCE is the probable source of cis-1,2-DCE and vinyl chloride.
- An additional source of TCE and 1,1-DCE may be present near the southeastern corner of Building 868.
- The concentrations of VOCs in some of the sample locations along the southern boundary of this investigation suggest the VOC plume extends to the south and southeast.

Recommendations were made for additional groundwater characterization to further refine the elements of the CSM related to areas of groundwater contamination at Areas F and G. An additional DPT groundwater sampling effort was conducted in June 2007 by CCI to further define the contaminant groundwater plume at Areas F and G, and to design a well network to verify the horizontal extent of the eastern portion of the Area F groundwater contaminant plume and observe downgradient contaminant concentrations over time. A multi-chamber well (MCW) network was installed in June 2008 (CCI, 2008b).

CCI concluded from the DPT groundwater investigation that the groundwater plume at Area F does not lend itself to be treated via ISCO. The NAS Jacksonville Partnering Team addressed the Area F ROD language in January 2007 and found that the language states that a different technology may be used if it is found to be more suitable for the site. USEPA has agreed to delay the RA start date to allow for completion of the replacement ROD.

4.4.2.3 Areas B and G and OU 3 Storm Sewer

The selected remedy for Areas B and G consisted of MNA which has been implemented at both sites. A LTMP and Quality Assurance Project Plan (QAPP) completed in 2002 detailed the design and installation of monitoring well networks for implementation of the MNA based remedy. Approval of the LTMP was granted in May 2002 and well installations were completed at both sites.

At Area B, a multi-chamber well (MCW) was installed at cone penetrometer test (CPT) location CW31 to monitor seven intervals of the surficial aquifer. Two additional wells were then installed downgradient of the MCW monitoring the interval of concern (30-35 feet in depth). The analyses (COCs and natural

attenuation parameters) are as follows: TCL VOCs, alkalinity, total iron and manganese, select anions (nitrite, nitrate, chloride, and sulfate), dissolved gases (methane, ethene, and ethane), TOC, and sulfide.

At Area G six MCWs were installed in June 2002 designed to monitor seven intervals at each location. Data used from the baseline sampling event was then used to determine the future course of the MNA at the site. The same analyses (COCs and natural attenuation parameters) listed above for Area B were applied to Area G.

Based on data collected by Tetra Tech during the 2002 and 2003 sampling events, unanswered questions remained regarding the lateral/vertical extent of groundwater contamination at Area G. Consequently, a Tetra Tech DPT groundwater investigation at Area G focused on assessment of the downgradient areas of the contaminant plume in September and October 2004 (Tetra Tech, 2006b). From this event, Tetra Tech concluded that possibly some of the contamination originating from Area G may have reached the St. Johns River, and recommended that that additional investigation is warranted to further define the extent of contamination in areas downgradient of Area G,

Subsequently, CCI conducted a DPT groundwater investigation in June of 2007 that focused on the downgradient areas of Areas F and G. Their findings presented to the Partnering Team were that Areas F and G contamination appear to have migrated to the southeast where they co-mingle, and that contaminated groundwater is infiltrating a second storm sewer located to the east of the first storm sewer previously identified as a receptor in the primary ROD.

As a result of these new findings, CCI conducted a survey of the eastern storm sewer (see Figure 4-2) finding that it was tidally influenced by the St. Johns River and that the second storm sewer's outlet is submerged beneath sediments in the St Johns River at a location roughly interpreted to be 50 feet offshore and 200 feet southeast of the first storm sewer's outlet to the St. Johns River. The storm sewer was sampled at six accessible manholes during both low and high tide. The storm sewer data indicated the presence of VOCs consistent with the Areas F and G groundwater plumes and that levels of vinyl chloride and 1,1-DCE exceeded FSWC criteria (CCI, 2008c).

Based on these new findings, the Partnering Team determined that additional assessment of the situation was needed and data would be collected and included in the RI/FS Addendum and the new ROD for OU 3.

P:\GIS\JACKSONVILLE_NAS\MXD\OU3_AREA_F&G_STORM_SEWER.MXD 10/22/10 KM

DRAWN BY S. PAXTON	DATE 4/07/09	AREAS F AND G STORM SEWER LOCATIONS OU 3 NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NUMBER CTO 152
CHECKED BY D. HARDISON	DATE 10/22/10		APPROVED BY ___ DATE ___
REVISED BY K. MOORE	DATE 10/22/10		APPROVED BY ___ DATE ___
SCALE AS NOTED			FIGURE NO. 4-2 / REV 0

4.4.2.4 PSC 16

The remedial design phase for PSC 16 has been completed and the remedial action was implemented. The following explains actions completed at this site to date.

In accordance with the work plan (CCI, 2001a), CCI was to conduct the tar ball removal. CCI completed the sediment removal (approximately 2 foot depth) and performed sampling for chemical analysis and toxicity testing in April 2002. The testing indicated that the sampling had not achieved the anticipated results (CCI, 2005). The NAS Jacksonville Partnering Team discussed the remaining contamination and determined it is as likely due to contribution from other sources.

As a result, the Partnering Team decided to conduct more sediment sampling within the stormwater outfall and immediate St. Johns River in March 2007 (Tetra Tech, 2007a) to evaluate if toxicity data collected after the tar ball removal was the result of the tar balls or the contribution of other sources discharging into the St. Johns River. The sampling event results indicated that concentrations of both PAHs and lead exceeded ecological screening values in sediment samples taken from the PSC 16 stormwater outfall; however, a comparison of PAH and lead concentrations at PSC 16 to those in the lower St. Johns River indicated that both PAH and lead concentrations in sediment at PSC 16 are within the background values determined by the St. Johns River Water Management District for this portion of the St. Johns River. Therefore, potential risk to benthic receptors (if any) was determined to not be site-related and that no additional ecological investigation and/or toxicity testing was warranted for PSC 16. It was concluded that the RAO for PSC 16 should be amended to indicate sediment would be cleaned up to background concentrations present in the St. Johns River. This conclusion was agreed to by both FDEP and EPA with direction to document the changes to the RAO in the new ROD.

4.4.2.5 OU 3-Building 106 (PSC 48) and Building 780

The remedial design phase for these sites was completed under an IRA. The remediation systems were constructed, and the remedial action phase included system O&M and groundwater monitoring. The following explains actions completed to date.

Following the EECA (ABB-ES, 1995b), ABB-ES issued the Final Design for the proposed systems at Buildings 106 and 780. The Remedial Work Plan for Buildings 106 and 780 was issued by BEI in August 1996. Also, the final changes to the design for both sites were issued (ABB-ES, 1997). Construction of the proposed AS/SVE system for Building 106 began in April 1997, and it was completed in March 1998. System startup for the AS/SVE system was in March 1998. Construction of the GWT/SVE system for Building 780 began in June 1997, and it was completed on April 28, 1998. System startup for the GWT/SVE system at Building 780 began on April 29, 1998.

In 2004 and 2005, NAVFAC SE conducted an optimization review and performance evaluation of the GWT and SVE systems at Building 780 as required by the primary ROD. The findings of the optimization review were that both systems were no longer reducing contaminate levels sufficiently to achieve the RAOs for Building 780, and therefore it was recommended to discontinue the system operations and re-assess the sites to evaluate potential additional sources of contamination.

Similarly, NAVFAC SE also evaluated the AS/SVE systems at Building 106 under their optimization program and found the system was no longer reducing contaminate levels sufficiently to achieve the RAOs for Building 106, and recommended to discontinue system operations and re-assessment of the site.

The NAS Jacksonville Partnering Team was presented the optimization study results, and during the January 2005 NAS Jacksonville Partnering Meeting, the Partnering Team agreed that the treatment systems at both sites were ineffective as a final remedy. Based on this decision, the GWT and SVE system was shut down on January 28, 2005 (CCI, 2006b). The Building 780 system was officially decommissioned in July 2008 (CCI, 2009a); however, the Building 106 AS/SVE system has not yet been fully decommissioned.

4.4.2.6 OU 3, PSC 14 and PSC 15

The remedial action (LUCs) for PSC 14 and PSC 15 were implemented in December 2004 via inclusion in the LUC inspection process. No LUCIP documents were prepared for these sites.

4.4.2.7 Area A

Area A has transitioned through the remedial design phase, which included the development of a LTMP and LUC RD for groundwater at Area A within OU 3. A LTMP was developed in anticipation of the ROD by Tetra Tech in September 2003. The LTMP for Area A made use of groundwater monitoring wells previously installed at the site and called for analyses of select COC VOCs (Tetra Tech, 2003c). Tetra Tech conducted the first groundwater monitoring event at Area A in November 2003. Groundwater monitoring events have occurred on an annual basis since 2003. A LUC RD was submitted in February 2007 by Tetra Tech and implemented (Tetra Tech, 2007b).

4.4.3 System Operation/O&M at OU 3

4.4.3.1 OU 3-Storm Sewer Water

This remedy is on hold pending the completion of the Area F remediation and subsequent storm sewer sampling. Therefore, no O&M activities are being performed.

4.4.3.2 OU 3-Areas C and D

The Navy contracted with CCI to perform the enhanced bioremediation remedy for Areas C and D. With one exception, it appears that the work is being conducted in accordance with the ROD (HLA, 2000a) and the Remedial Action Contractor's (RAC) work plan (CCI, 2001a). The exception to the plan is that the monitoring program calls for quarterly sampling during the first five years of O&M; the sampling was discontinued in 2007.

The completed activities for Area C include:

- Development of an HRC® Injection Groundwater Monitoring Program including monitoring wells U3C-MW31, U3C-MW35, U3C-MW36, U3C-MW37, U3C-MW38, U3C-MW39, U3C-MW40, U3C-MW41, and U3C-MW42.

- Baseline Groundwater Monitoring Event performed November 5 to 13, 2001.

- HRC® injection performed between December 16, 2002 and February 26, 2003, and involving the injection of 3,710 gal of HRC® into 262 injection points.

- First post-injection monitoring event performed July 15 to 30, 2003. The results were presented to the NAS Jacksonville Partnering Team at the October 28, 2003 meeting.

- Second post-injection monitoring event performed December 15 to 20, 2003, approximately 10 months following HRC® injection.

- Third post-injection monitoring event performed June 13 to July 1, 2004.

- Fourth post-injection monitoring event performed February 8 to 9, 2006. Sampling only occurred at Area C.

- Fifth post-injection monitoring event performed in August 2006. Sampling only occurred at Area C.

- Sixth post-injection monitoring event performed in February 2007. Sampling only occurred at Area C.

- Seventh post-injection monitoring event performed in August 2007. Sampling only occurred at Area C.

The completed activities for Area D are as follows:

- Development of the HRC® Injection Groundwater Monitoring Program, which includes monitoring wells U3D-MW30, U3D-GEW002, U3D-MW43, U3D-MW44, U3D-MW46, U3D-MW47, and U3D-MW48.
- Abandonment of monitoring well U3D-MW45 in January 2003 to facilitate paint booth construction in Hangar 101S.
- Baseline groundwater monitoring event performed November 5 to 13, 2001.
- HRC® injection completed from August 12, 2002 to December 13, 2002, with approximately 4,156 gal of HRC® injected into 346 injection points.
- First post-injection monitoring event performed July 15 to 30, 2003. The results were presented to the NAS Jacksonville Partnering Team at the October 28, 2003 meeting.
- Second post-injection monitoring event performed December 15 to 20, 2003, approximately 1 year following HRC® injection completion.
- Third post-injection monitoring event performed June 13 to July 1, 2004.

A Remedial Action Completion Report was issued by CCI (CCI, 2006a) for Area C and D. CCI found that the injection of HRC® to enhance in-situ degradation of chlorinated solvents present in site groundwater has resulted in conditions favorable for reductive dechlorination processes. Within Area C, active solvent biotransformation was observed at monitoring wells U3CMW31 and U3C-MW40. Degradation activity was also observed in Area D monitoring wells U3D-MW30 and U3D-GEW002. The body of evidence collected in groundwater sampled from these locations supports this conclusion through changes in VOC concentrations and environmental parameters indicative of microbial transformation. Elsewhere within Area C and Area D groundwater, there was little evidence to support active biotransformation processes were occurring. Groundwater sampling revealed conditions effective for solvent biodegradation were focused, and overall, the areas of active solvent biotransformation within Area C and Area D are highly localized. However, based on the documentation and evaluation included in the Remedial Action Completion Report, they concluded that the completed remedial action of HRC® injection at Area C and Area D will not achieve the RAO of reducing VOCs in groundwater to the ARARs/action levels within five years such that no controls (administrative or physical) of residual risk will be required for the sites.

The Navy's original cost estimate for implementation of the enhanced bioremediation alternative at Area C was $819,300, which included quarterly groundwater monitoring (for five years) and two injection treatments. Similarly, the cost for the Area D alternative was estimated at $956,600. It also included quarterly groundwater monitoring (for five years) and two injection treatments. The estimated cost to date

for the work performed to date for Area C is approximately $580,853. The estimated cost to date for the work performed to date for Area D is approximately $612,526.

4.4.3.3 OU 3-Area F

The Navy has contracted with CCI to perform the chemical oxidation remedy for Area F. However, due to changed conditions including the discovery of downgradient migration of contaminants and impacts to the second storm sewer the remedial design has been placed on hold pending completion of the RI/FS Addendum. The NAS Jacksonville Partnering Team addressed the Area F ROD language in January 2007 and found that the language states that a different technology may be used if it is found to be more suitable for the site. USEPA has agreed to push out the RA start date to allow for completion of the replacement ROD.

The Navy's original cost estimate for the remedy selected was $1,178,300, which included system installation with new wells, O&M for 10 years, and annual groundwater monitoring for 10 years. The remedy has not yet been initiated; however, the cost for confirmation of site contamination, accomplished by Tetra Tech, has been tabulated at approximately $134,000.

4.4.3.4 OU 3-Areas B and G

The LTMP and first year of monitoring for Areas B and G were completed by Tetra Tech. Subsequent data collection was performed by Apex Environmental (Apex) and Barnes, Ferland and Associates, Inc. (BFA, 2009). The work is being done in general accordance with the ROD (HLA, 2000a), the QAPP (Tetra Tech, 2002b), and the Final Site Specific Sampling and Analysis Plan for LTM Site 11- Area B and Site 15 – Area G, AS/SVE O&M – Site 48 (Building 106), September 2003, (Apex, 2003).

The completed activities for Area B since the last Five-Year Review include:

- Year 3 Semi-annual Groundwater Monitoring Event 2 performed in January 2005.
- Year 4 Semi-annual Groundwater Monitoring Event 1 performed in August 2005.
- Year 4 Semi-annual Groundwater Monitoring Event 2 performed in February 2006.
- Year 5 Semi-annual Groundwater Monitoring Event 1 performed in August 2006.
- Year 5 Semi-annual Groundwater Monitoring Event 2 performed in January 2007.
- Year 6 Annual Groundwater Monitoring Event performed in April 2008.
- Year 7 Annual Groundwater Monitoring Event performed in January 2009.

The Navy's original cost estimate for implementation of this work (including new wells and monitoring for 41 years) was $462,000. The cost for the work performed by Tetra Tech was approximately $89,000. As

reported to Tetra Tech, the monitoring previously performed by Apex and currently performed by BFA is approximately $6,500 per year.

The completed activities for Area G since the last Five-Year Review include:

- Year 3 Semi-annual Groundwater Monitoring Event 2 performed in January 2005.
- Year 4 Semi-annual Groundwater Monitoring Event 1 performed in August 2005.
- Year 4 Semi-annual Groundwater Monitoring Event 2 performed in February 2006.
- Year 5 Semi-annual Groundwater Monitoring Event 1 performed in August 2006.
- Year 5 Semi-annual Groundwater Monitoring Event 2 performed in January 2007.
- Year 6 Annual Groundwater Monitoring Event performed in April 2008.
- Year 7 Annual Groundwater Monitoring Event performed in January 2009.

The Navy's original cost estimate for implementation of this work (including new wells and monitoring for 39 years) was $462,000. The cost for the work performed by Tetra Tech was approximately $89,000. As reported to Tetra Tech, the monitoring performed by Apex is approximately $6,500 per year.

4.4.3.5 OU 3-PSC 16

No O&M activities are required for PSC 16.

4.4.3.6 OU 3-Building 106 (PSC 48)

NAVFAC SE evaluated the AS/SVE systems at Building 106 under their optimization program and performance evaluations required by the ROD at the last Five-Year Review. Recommendations of the optimization review were to discontinue the system operations and re-assess the site, which was agreed to by the Partnering Team. The AS/SVE systems have not been fully decommissioned.

4.4.3.7 OU 3-Building 780

NAVFAC SE evaluated the GWT and SVE systems at Building 780 under their optimization program and performance evaluations required by the ROD at the last Five-Year Review. Recommendations of the optimization review were to discontinue the system operations and re-assess the site. Based on this decision by the Partnering Team, the GWT and SVE systems were shut down on January 28, 2005 (CCI, 2006b). The system was officially decommissioned in July 2008 (CCI, 2009a).

4.4.3.8 OU 3, PSC 14 and PSC 15

The remedial action for PSC 14 and PSC 15 includes LUC inspections to ensure the sites remain industrial and that no excavation work is conducted without appropriate review and approval. LUC inspections documents were reviewed and found to be consistent with site requirements.

4.4.3.9 Area A

The LTMP and first year of data collection for this site was conducted by Tetra Tech, and then was transferred to Aerostar. The work is being done in general accordance with the ROD (Tetra Tech, 2006a) and the LTMP (Tetra Tech, 2003c).

The completed activities for Area A since the last Five-Year Review include:

- Year 1 Annual Groundwater Monitoring Event performed in November 2003.
- Year 2 Annual Groundwater Monitoring Event performed in November 2004.
- Year 3 Annual Groundwater Monitoring Event performed in November 2005.
- Year 4 Annual Groundwater Monitoring Event performed in November 2006.
- Year 5 Annual Groundwater Monitoring Event performed in November 2007.
- Year 6 Annual Groundwater Monitoring Event performed in December 2008.
- Year 7 Annual Groundwater Monitoring Event performed in February 2010.

The Navy's original cost estimate for implementation of this work (monitoring for 55 years) was $658,900. As reported to Tetra Tech, the monitoring performed by Aerostar is approximately $6,500 per year.

4.5 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

4.5.1 Protectiveness Statements from the Last Review

The last Five-Year Review evaluated individual remedy components for OU 3 as specified in the primary ROD for OU 3. Based on a review of the protectiveness statements from the prior Five-Year Review, it is evident that EPA guidance was not applied consistently to the protectiveness statements for OU 3, nor was sufficient consideration given to planned optimization and investigation efforts that would be implemented to gain additional information to allow a more thorough remedy protectiveness determination.

The following protectiveness statements applied to the various remedies for OU 3 during the last Five-Year Review:

1. The remedial actions for PSC 14 and PSC 15 are protective of human health and the environment.

2. The remedial actions at PSC 48 and Building 780 are not protective because of the following issues:

   - The monitoring well networks at these sites are insufficient to define the extent of groundwater contamination.
   - The response actions for PSC 48 and Building 780 are not expected to achieve cleanup levels; plume containment has not been confirmed or achieved.

   The following actions need to be taken:

   - Implement groundwater restrictions and LUCs at the site to ensure short term protectiveness.
   - Completely assess the horizontal and vertical extent of groundwater contamination at each site.
   - Through the optimization effort, provide a different remedy for each site that will meet the CERCLA criteria.

3. The remedial actions at Area B at OU 3 are expected to be protective of human health and the environment, and, in the interim, exposure pathways that could result in unacceptable risks are being controlled.

4. The remedial actions at Areas C and D at OU 3 are not protective because of the following issue: the monitoring well networks at these sites are insufficient to define the extent of groundwater contamination. The following action needs to be taken: implement groundwater restrictions and LUCs at the site to ensure short term protectiveness.

5. A protectiveness determination of the remedy for OU 3 Areas F and G cannot be made at this time until the remedial design is completed and implemented.

6. A protectiveness determination of the remedy for PSC 16 cannot be made at this time until further information is obtained by making a formal determination of the actions required for this site. Specifically, the RAO has yet to be achieved. Future actions should address this issue. It is expected that this will require approximately one year to complete, at which time a protectiveness determination will be made.

7. The remedies at OU 3 are not protective because there are multiple locations of groundwater contamination exceeding ARARs that have no remedy in place. The following actions should be taken to ensure protectiveness:

   - Determine the required extent of groundwater restrictions via literature search to find wells that were sampled for the various COCs within OU 3 and had results which were less than regulatory levels.
   - Implement groundwater use restrictions through a LUC for OU 3 to prevent exposure to groundwater at OU 3.

4.5.2 Status of Recommendations and Follow-up Actions from Last Review

4.5.2.1 OU 3 Investigation and Optimization Efforts Resulting from the Last Five-Year Review

As a result of the Five-Year Review, the development of risk-based corrective action concepts, and issuance of USEPA and Navy remediation optimization guidance, the NAS Jacksonville Partnering Team began evaluating the concept of developing a new ROD that would encompass all of the identified contamination areas within OU 3 based on utilizing a holistic evaluation of the entirety of OU 3 and the potential environmental impacts to human receptors (site workers, the potential future resident) and ecological receptors within the St. Johns River.

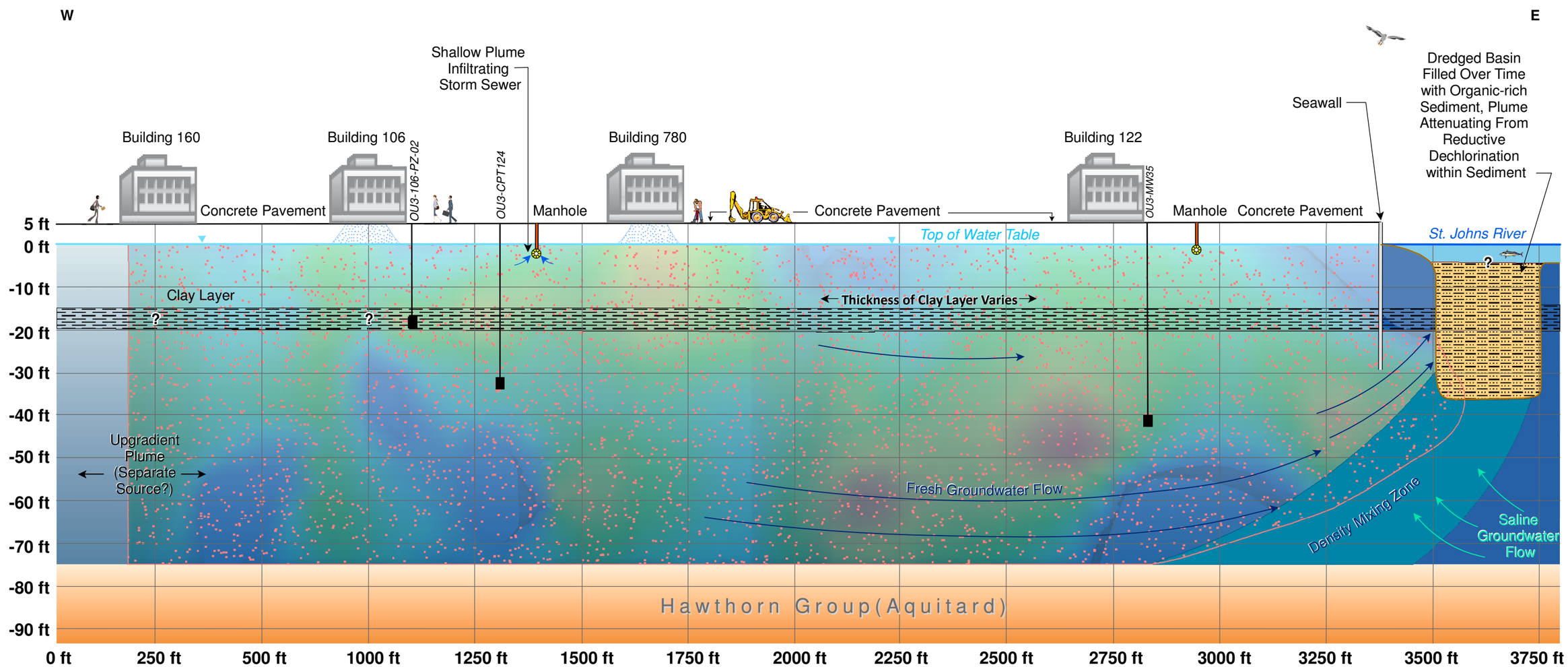
Several factors in particular contributed to the conclusion by the NAS Jacksonville Partnering Team that a new holistic evaluation of OU 3 should be performed to better characterize the nature and extent of contamination in source areas and related downgradient plumes, to refine the overall Conceptual Site Model for all of OU 3, to appropriately assess risk pathways and related risks to human health and ecological receptors, to develop appropriate RAOs, to evaluate appropriate remedial alternatives (including treatment trains and other optimization concepts), and to select optimal remedies that are effective and sustainable in ensuring protection of human health and the environment for all of OU 3. Some of the particular factors indicating the need for a holistic, comprehensive evaluation of OU 3 and updated ROD include the following:

- Performance evaluations and related optimization review of remedies at PSC 48 and Building 780 conducted as part of the last Five-Year Review indicated nature and extent of these source areas were not adequately defined to assess risks and evaluate appropriate remedial alternatives. Additional membrane interface probe (MIP) and DPT investigations since the last Five-Year Review indicate contamination in these areas is deeper than determined in the original RI/FS, which reinforces the conclusion that previous selected remedies in these areas were not appropriate for actual site conditions.

- The additional MIP and DPT investigations in Area C and D plume indicate plumes in these areas are likely related to the PSC 48 source area, and that enhanced biodegradation and natural attenuation have reduced COC concentrations but not to the extent that will allow ARARs to be achieved in the specified five-year period in the existing ROD.
- DPT sampling in the St. Johns River adjacent to Area C since the last Five-Year Review has defined the extent of the plume beneath the St. Johns River and indicates that COCs are naturally attenuating in deep organic-rich sediments before discharging through sediments at the bottom of the river.
- Groundwater monitoring in Area G indicates the plume in this area may also be migrating to the St. Johns River. Additional investigations in the St. Johns River are planned adjacent to Area G, as well as Area C, to verify if COCs discharge through river sediments at levels that pose an unacceptable risk.
- Discovery of COCs in a second storm sewer downgradient of Areas F and G indicated the need for further MIP and DPT sampling to clarify the nature and extent of plumes in these areas and the need to assess potential discharge of contaminated groundwater via storm sewers to the St. Johns River.
- Changed conditions at Area F were observed during the implementation of the pilot test for the ISCO remedy that indicated the selected remedy was no longer appropriate. COC concentrations in this area were much lower than defined in the original RI/FS, precluding the need for aggressive source reduction.
- Additional assessment was required for Area E.

Based on these and other interrelated factors, a UFP-SAP was prepared to obtain additional data required to refine the overall OU 3 Conceptual Site Model and prepare an RI/FS Addendum for OU 3. The Conceptual Site Models are presented as Figures 4-3 and 4-4. This ongoing investigation, the RI/FS Addendum, and resulting updated comprehensive OU 3 ROD will fully address any outstanding issues from the last Five-Year Review and new issues identified in the current Five-Year Review.

P:\GIS\JACKSONVILLE_NAS\MXD\OU3_NORTH_CSM_TOTAL_VOC.MXD 11/09/10 SS



Legend
- Storm Sewer
- Clay layer
- Plume

Total VOC (µg/L)

3 | 10 | 30 | 100 | 300 | 1,000 | 3,000 | 10,000 | 30,000 | 100,000

Note: This Conceptual Site Model is based on Total VOC data.

DRAWN BY S. PAXTON	DATE 03/29/10	CONCEPTUAL SITE MODEL OU3 BUILDINGS 106 AND 780 PLUME NAS JACKSONVILLE JACKSONVILLE, FLORIDA
CHECKED BY J. JOHNSON	DATE 11/09/10	CONTRACT NUMBER ___
REVISED BY ___	DATE ___	APPROVED BY ___ DATE ___
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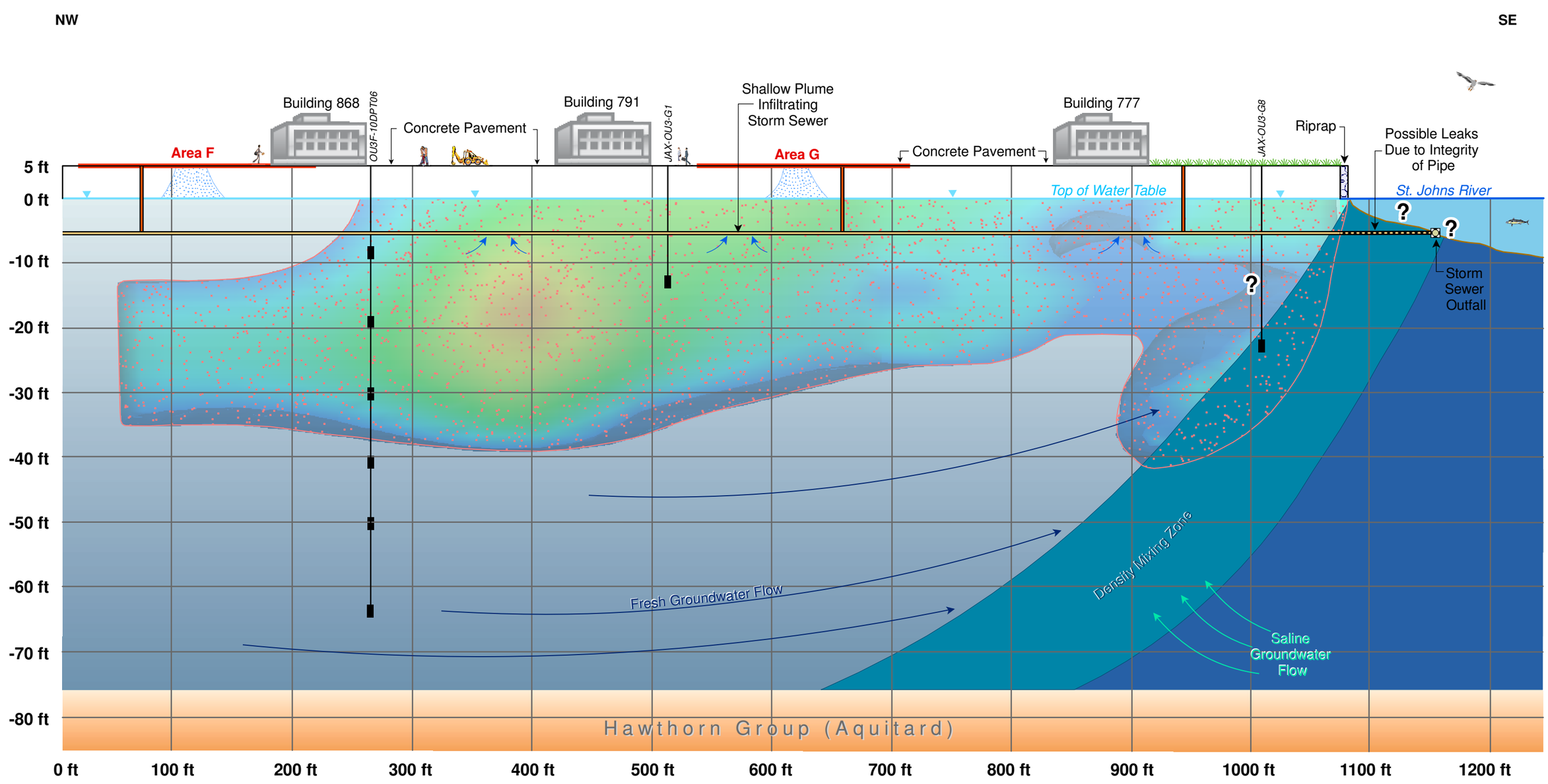
		FIGURE NO. 4-3 REV 0

NAVFAC

P:\GIS\JACKSONVILLE_NAS\MXD\OU3_SOUTH_CSM_TOTAL_VOC.MXD 11/09/10 SS



Legend
- Storm Sewer
- Plume

Total VOC (µg/L)

3 | 10 | 30 | 100 | 300 | 1,000 | 3,000 | 10,000 | 30,000 | 100,000

Note: This Conceptual Site Model is based on Total VOC data.

DRAWN BY S. PAXTON	DATE 03/29/10	CONCEPTUAL SITE MODEL OU3 AREA F AND AREA G NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NUMBER ___
CHECKED BY J. JOHNSON	DATE 11/09/10		APPROVED BY ___ DATE ___
REVISED BY ___	DATE ___		APPROVED BY ___ DATE ___
SCALE AS NOTED			FIGURE NO. 4-4 / REV 0

The Recommendations and follow-up actions from the last Five-Year Review are as follows:

1. Monitoring well networks at Buildings 106 and 780 are insufficient.

   Follow-up Actions: Multiple MIP and DPT investigations have been conducted since the last Five-Year Review to better define nature and extent of contaminants in source areas and downgradient plumes. Evaluation efforts currently underway include evaluating the potential degradation of COCs in the subsurface. Additional monitoring wells will be installed as a part of the ongoing efforts and will be documented in the RI/FS Addendum.

2. The Response Action for PSC 48 and Building 780 is not expected to achieve cleanup levels; plume containment has not been confirmed or achieved.

   Follow-up Actions – A performance evaluation and optimization study was conducted and recommended discontinuation of the system operations at Building 106 and 780. System operations have been discontinued at both sites. The remediation system at Building 780 has been decommissioned. The remediation system at Building 106 has not been decommissioned. Alternative remedies will be developed in the RI/FS Addendum and appropriate remedies will be identified in the updated ROD.

3. Areas C and D not being monitored quarterly as stipulated in the ROD. Documentation of this was not found.

   Follow-up Actions – Current site investigations at Areas C and D have been ongoing to complete the RI/FS Addendum and an updated ROD for OU 3. Annual monitoring was last conducted in August 2007. The site is not currently in a monitoring program; however, sampling of all wells has been conducted in 2010 and additional wells are planned to be installed to support the RI/FS Addendum and monitoring requirements to be specified in the updated ROD.

4. Monitoring well networks at Areas C and D do not encompass all of the groundwater contamination (e.g., the COC concentrations in the perimeter wells exceed GCTLs).

   Follow-up Actions –Groundwater sampling beneath the St. Johns River was conducted and has defined the extent of contamination. Initial results indicate that COCs naturally attenuate in deep sediments well below the river bottom and do not discharge to the river. Additional sampling is planned as part of the ongoing investigation to confirm that COCs do not discharge through river bottom sediments at levels that pose an unacceptable risk. Results will be evaluated in the RI/FS Addendum and addressed in the updated ROD.

5. The COC list for Area C (from the ROD) does not include several other chlorinated VOCs that are exceeding groundwater standards. There appears to be no documentation of the change to add these to the monitoring program.

   Follow-up Actions – The COC list will be modified for Areas C and D as appropriate in the RI/FS Addendum and will be included in the updated ROD.

6. There are no LUCs in place for PSCs 14 and 15 at OU 3 for groundwater, though it was mentioned as part of the selected remedy for other areas of elevated groundwater contamination.

   Follow-up Actions – LUC inspections have been conducted quarterly at PSCs 14 and 15 in accordance with the MOA. In addition, a LUC RD has been developed and is pending regulatory approval to address groundwater use restrictions throughout OU 3. The LUC RD will be updated after completion of the updated ROD.

7. Low levels of "VOC" contamination [less than 100 parts per billion (ppb)] exist across most of OU 3 without a selected remedy.

   Follow-up Actions – Additional investigation of current groundwater conditions at OU 3 are ongoing and will be addressed in the RI/FS Addendum and updated ROD.

8. Reported groundwater contamination exists just outside the existing boundary of OU 3.

   Follow-up Actions – Additional sampling has been conducted to evaluate groundwater contamination outside of the current OU 3 boundary. The OU 3 boundary will be amended to incorporate areas of groundwater contamination that extend outside of the existing OU 3 boundary.

9. The documentation for the future course of action for PSC 16 and regulatory approvals are incomplete to date.

   Follow-up Actions – A background study has been completed to address toxicity issues previously identified at PSC 16. The results of the background study indicate conditions at PSC 16 are within background conditions for the St. Johns River and as a result no further action is required. FDEP and EPA have approved the results of the background study.

10. The RAO for sediment at PSC 16 does not appear to have been achieved.

    Follow-up Actions – PSC 16 has been remediated to the point that COC concentrations are consistent with background concentrations of the St. Johns River as described above. The RAO will be modified in the new ROD to indicate cleanup to background levels has been achieved.

11. Missed LUC inspection for 2003.

    Follow-up Actions – Current LUCs are in place for Area A, PSCs 14 and 15 (land use only). A LUC RD has been developed to include groundwater use restrictions throughout OU 3 as specified in the ROD and is pending regulatory approval. The LUC RD will be updated following completion of the updated OU 3 ROD.

4.6 FIVE-YEAR REVIEW PROCESS

4.6.1 Document Review

Several documents including the RI/FS, ROD, quarterly monitoring reports, work plans, remedial design document, etc. were reviewed during this Five-Year Review.

4.6.2 Data Review

4.6.2.1 Storm Sewer

No remedial actions have occurred since the last Five-Year Review.

CCI completed storm sewer sampling events on April 26, 2006, August 10, 2006, and August 2, 2007 for the western storm sewer (see Figure 4-2) located in Areas F and G. CCI concluded that TCE concentrations have been less than the Florida Surface Water Criteria at all sample locations, including the PSC 16 outfall point of compliance. They also found that TCE results from the August 2007 sampling of the storm sewer water generally show a continued decreasing concentration trend when compared to historical data (CCI, 2007b).

In March 2008, CCI conducted smoke and dye tracer testing on the eastern storm sewer system (see Figure 4-2) to verify its configuration and storm sewer water testing to evaluate whether TCE and other VOCs were present in the system. CCI concluded that the smoke and dye testing and water sample collection activities completed at the eastern storm sewer system at OU 3 were successful in: 1) verifying the connection of the grated drains and manholes in the primary north-south storm sewer line and auxiliary storm sewer lines emanating from Sample Station #5, 2) locating the general location of the

storm sewer system's outlet to the St. Johns River, and 3) evaluating the magnitude of groundwater contamination in the eastern storm sewer system. Evaluation of the analytical data indicates contaminated groundwater is most likely infiltrating the eastern sewer conduit (CCI, 2008c). The analytical data coupled with the water level measurements from the sample stations suggests a tidal effect on water quality, which is reasonable for an outfall that is submerged below the surface of the St. Johns River. The exact location of the eastern storm sewer outfall was not visually identified.

4.6.2.2 Areas C and D

No remedial actions have occurred since the last Five-Year Review. CCI conducted groundwater monitoring at Areas C and D in August 2006, February 2007, and August 2007. An Annual Monitoring and Effectiveness Report was issued by CCI (CCI, 2008a) for Area C and D for 2007. CCI concluded that the transformation of TCE to cis-1,2-DCE by reductive dechlorination has been observed at these sites. However, the reductive dechlorination processes are proceeding slower than the four-year treatment duration anticipated in the ROD. Based on the results from the last three monitoring events (i.e., August 2006, February 2007, and August 2007), the HRC® injection at Area C and Area D will not reduce contaminant concentrations to achieve the RAO of reducing VOCs in groundwater to the ARARs/action levels within five years such that no controls (administrative or physical) of residual risk will be required for the sites.

Several observations were made following a review of this data set:

- The monitoring frequency (quarterly) established in Section 2.12.1 of the OU 3 ROD is not being followed, however, as described below, additional assessment activities are currently underway.
- The horizontal and vertical extent of contamination is not completely delineated with the monitoring well network, but is being addressed via additional investigation efforts currently underway.
- The RAO of reducing VOCs in groundwater to the ARARs/action levels within five years has not been achieved. There are no groundwater use restrictions in place at Areas C or D. Groundwater use restrictions are included in the LUC RD currently pending regulatory approval.

In 2008, Tetra Tech conducted DPT groundwater sampling beneath the sediment of the St. Johns River from a barge. This sampling found that the groundwater plume from Area C extended beneath the St. Johns River underneath the clay layer as the USGS groundwater model depicted. However, the groundwater plume diverged from the model-predicted path and actually migrated to the north to where sediments had been dredged in the past. The dredged channel has been subsequently filled with organic rich sediment; however, dredging appears to have removed the clay layer in this area. The sampling results indicated that the VOC groundwater plume was not coming up through these organic rich

sediments, and that the organic rich sediments were likely facilitating enhanced biodegradation of VOC contaminants. This data will be included in the RI/FS Addendum.

4.6.2.3 Area F

No remedial actions have occurred since the last Five-Year Review. Chemical oxidation treatment had been planned for Area F, but DPT groundwater investigations conducted in 2006 and 2007 by CCI (2007a) concluded that the groundwater plume at Area F does not lend itself to be treated via chemical oxidation. The NAS Jacksonville Partnering Team addressed the Area F ROD language in January 2007 and found that the language states that a different technology may be used if it is found to be more suitable for the site. USEPA has agreed to push out the RA start date to allow for completion of the replacement ROD, so that remediation will not have to occur as a result of the existing ROD. Groundwater use restrictions are included in the LUC RD currently pending regulatory approval.

4.6.2.4 Area B

The review of the groundwater monitoring reports from January 2005 through October 2010 indicates that four semi-annual long-term monitoring sampling events were conducted between January 2005 and August 2006 (Apex, 2005a, 2005b, 2006a, and 2006b). Annual long-term monitoring events were conducted between January 2007 and April 2008 (Apex, 2007 and 2008) and January 2009 (BFA, 2009). Bi-annual sampling is currently being conducted by BFA.

Several observations were made following a review of this data set:

- There has been a definite decrease in the TCE level in the source area with a reported value of 3.1 µg/L during the 2008 event.
- The presence of daughter products DCE and vinyl chloride detected at the site supports the occurrence of dechlorination processes at the site.
- There have been no detections of VOC COCs in perimeter monitoring wells (OU3-B2 and OU3-B3) since 2005.
- There are no groundwater use restrictions in place at Area B. This is addressed in the LUC RD that is pending regulatory review.

4.6.2.5 Area G

The review of the groundwater monitoring reports from January 2005 through October 2010 indicates that four semi-annual long-term monitoring sampling events were conducted between January 2005 and

August 2006 (Apex, 2005a, 2005b, 2006a, and 2006b). Annual long-term monitoring events were conducted between January 2007 and April 2008 (Apex, 2007 and 2008) and January 2009 (BFA, 2009). Bi-annual sampling is currently being conducted by BFA.

Several observations were made following a review of the data:

- Reports indicate that the plume is not delineated, as TCE levels that exceed GCTLs are present in six of the eight monitoring wells on site.
- A variable TCE concentration trend is noted within well JAX-OU3-G1 and JAX-OU3-G8. The USEPA MNA Screening Process shows Limited to Adequate Evidence of reductive dechlorination within seven of the eight site wells and strong evidence in one well.
- The contamination first encountered in the source area around OU3-G1 has been shown to migrate southeast toward the St. Johns River. However, at the location of the well OU3-G8 shallow contamination of a similar nature to detections at OU3-G1 is present. Tetra Tech and CCI have performed additional investigations to define the horizontal and vertical extent of the plume. This work is ongoing to support the RI/FS Addendum and updated ROD.
- The ROD stipulates the use of groundwater restrictions until the RAOs have been achieved. The LUC/groundwater use restriction in the ROD is listed as the last major component of the selected remedy for OU 3 and does not specify the areas to which it applies. Groundwater in OU 3 is not used for any purpose; however, the facility has yet to implement the LUCs/groundwater restrictions. Additionally, a LUC RD defining the areas in OU 3 under the control is pending regulatory approval. An investigation is currently under way to prepare an RI/FS Addendum and updated ROD. A revised LUC RD will be prepared upon completion of the RI/FS Addendum and updated ROD.

4.6.2.6 PSC 16

CCI completed the sediment removal (approximately 2-foot depth) and performed sampling for chemical analysis and toxicity testing in April 2002. The testing indicated that the sampling had not achieved the anticipated results (CCI, 2005).

Tetra Tech conducted more sediment sampling within the stormwater outfall and immediate St. Johns River in March 2007 (Tetra Tech, 2007a). This sampling event found that concentrations of both PAHs and lead exceeded ecological screening values in sediment samples taken from the PSC 16 stormwater outfall. However, a comparison of PAH and lead concentrations at PSC 16 to those in the lower St. Johns River indicated that both PAH and lead concentrations in sediment at PSC 16 are within the background values determined by the St. Johns River Water Management District for this portion of the St. Johns River. Therefore, potential risk to benthic receptors (if any) is not site-related and no additional

ecological investigation and/or toxicity testing is warranted for PSC 16 regarding PAHs and lead. Tetra Tech concluded that the RAO for PSC 16 should be amended to say sediment will be cleaned up to background concentrations present in the St. Johns River. A new ROD is currently planned for OU 3 that will supersede the current ROD. The new ROD should state that no further remedial action is required for PSC 16 sediments as background concentrations have been achieved.

4.6.2.7 PSC 48 (Building 106)

There have been no formal written reports prepared for this site since the last Five-Year Review. NAVFAC SE presented the results of an optimization study in January 2005 to the Partnering Team. Based on this presentation, the Partnering Team agreed that the AS/SVE systems were ineffective as a final remedy and that the systems should be shut down and decommissioned. Although the system was shut down, it has not been fully decommissioned.

The following are outstanding issues at the site:

- Documentation of the discontinuation of the remediation system at Building 106 is incomplete. The AS/SVE systems need to be decommissioned with approval from regulators.
- There are no groundwater use restrictions in place at Building 106. A LUC RD has been developed and is pending regulatory approval.

Ongoing OU 3 wide groundwater assessment activities have been conducted since the last Five-Year Review including the areas surrounding Building 106. This data has been reviewed and will be included in the RI/FS Addendum and updated ROD for OU 3.

4.6.2.8 Building 780

As previously described, the NAVFAC SE optimization study for Building 780 resulted in a Partnering Team decision to shut down and decommission the GWT and SVE system at this site because it was ineffective as a final remedy. Documentation of the shut down and decommissioning was reviewed and indicated that the GWT and SVE systems were shut down on January 28, 2005 (CCI, 2006b) and that the system was officially decommissioned in July 2008 (CCI, 2009a).

The following are outstanding issues at the site:

- Documentation of the discontinuation of the remediation system at Building 780 is incomplete. There has been no documentation of approval issued by USEPA.
- There are no groundwater use restrictions in place at Building 780. A LUC RD has been developed and is pending regulatory approval.

Ongoing OU 3-wide groundwater assessment activities have been conducted since the last Five-Year Review including the areas surrounding Building 780. This data has been reviewed and will be included in the RI/FS Addendum and updated ROD for OU 3.

4.6.2.9 OU 3, PSC 14 and PSC 15

LUC inspection records for PSC 14 and PSC 15 were reviewed and found to be consistent with the requirements of the primary ROD and MOA.

4.6.2.10 Area A

The ROD for Area A (2006) was reviewed to determine requirements for Area A. In addition monitoring reports for Area A were reviewed for monitoring conducted in 2005, 2006, 2007, 2008, 2009, and 2010 prepared by Aerostar.

Based on review of these reports, concentrations of COCs in the storm sewer samples did not exceed surface water criteria with the exception of vinyl chloride which was detected above monitoring criteria (USEPA MCL of 2 ug/L) established for the site during the following sampling events: November 2006 (7.2 ug/L), November 2007 (31 ug/L), and February 2010 (11 ug/L). The vinyl chloride concentration and low levels of other COCs in samples indicate the storm sewer piping is receiving groundwater infiltration at Area A. Results of the groundwater sampling analyses have shown an over-all decreasing trend in the COC at Area A in all groundwater monitoring events with the exception of the 2007 event.

Additional sampling of storm sewers and outfalls is being performed and will be addressed in the RI/FS Addendum and updated ROD.

4.6.3 Site Inspection and Interviews

Tetra Tech conducted a site inspection of OU 3 on August 26, 2010. Prior to initiating the inspection, the inspector interviewed the IR manager, Mr. Tim Curtin. Mr. Curtin accompanied the Tetra Tech inspector during the site inspection, which included visual observations of the fences, access gates, and groundwater monitoring wells. Most of OU 3 is surrounded by a security fence and the area is under controlled access. During the inspection, the building slab at Building 106 was being prepared for demolition to facilitate re-pavement to use the area as a parking lot. The fences at the sites were in good condition, and the well covers were observed to be in place. The IR Manager reported that there have been no incidents of trespassing or vandalism in the area.

4.7 TECHNICAL ASSESSMENT

4.7.1 Question A: Is the remedy functioning as intended by the ROD?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicates that the remedies are not all functioning as intended by the primary ROD.

- ***HASP/Work Plans:*** HASPs, work plans and a UFP-SAP for the RI/FS Addendum are in place for OU 3 as a whole and are maintained by the responsible contractor.

- ***Implementation of Institutional Controls and Other Measures:*** Institutional controls are specifically called for at PSC 14 and PSC 15 within OU 3. LUC inspections are conducted quarterly for Area A, PSC 14, and PSC 15 in accordance with the MOA. In addition, the ROD also refers to groundwater use restrictions for most of the contaminated groundwater areas within OU 3. Groundwater within OU 3 is not used for any purpose and the base environmental coordinator, who reviews all digging and construction related permits, routinely verifies there are no wells constructed within OU 3. However, LUCs detailing groundwater use restrictions within the remainder of OU 3 are not currently in place but will be implemented upon regulatory approval of the LUC RD.

- ***Remedial Action Performance:*** The selected remedies (active remediation) for Buildings 106 and 780 are no longer operational. Additionally, the monitoring well network at these sites does not encompass the groundwater contamination, and there is no active monitoring program. The selected remedy (MNA) for Areas B and G is early in the natural attenuation process and is anticipated to require a substantial timeframe to complete. The monitoring well network at Area G does not encompass the groundwater contamination. The selected remedy (enhanced bioremediation) for Areas C and D is complete. However, the HRC® injection at Area C and Area D will not reduce contaminant concentrations to achieve the RAO of reducing VOCs in groundwater to the ARARs/action levels within the specified five years such that no controls (administrative or physical) of residual risk will be required for the sites. The remedy for PSC 16 has been completed such that concentrations in sediment meet background levels for the St. Johns River. The RAO for PSC 16 in the updated ROD should be amended to say sediment will be cleaned up to background concentrations present in the St. Johns River. Treatment of Area F is not being implemented based on changed conditions at the site that indicate ISCO is no longer a viable remedy.

- ***System Operations/O&M:*** Operation of the AS/SVE system at Building 106 (PSC 48) and the AS/SVE system at Building 780 will not meet the RAOs based on performance evaluations performed in accordance with the ROD as part of the previous Five-Year Review. The performance evaluations and related optimization review determined that the remedies were no longer effective in reducing

source area concentrations and that additional characterization of the source areas was necessary to determine appropriate alternative remedies. The remediation systems have been shut down per the recommendation of the optimization study. Additional characterization of source areas and related downgradient plumes is in progress as part of the ongoing RI/FS Addendum and appropriate remedial alternatives will be specified in the updated ROD.

- ***Cost of System Operations/O&M:*** Costs for system Operations/O&M have been within estimates provided within the primary and secondary ROD. However, it is noted that O&M has been discontinued at Buildings 106 and 780, Areas C and D, and Area F.

- ***Opportunities for Optimization:*** The completion of the planned RI/FS Addendum and updated ROD is intended to provide comprehensive optimization of the selected remedies for OU 3.

- ***Early Indicators of Potential Remedy Failure:*** Early indicators of potential remedy failure were noted during this review as follows:
  - Groundwater extraction prohibition is currently limited to PSC 14 and 15 based on LUCs specified in the MOA. Groundwater restrictions are not currently in place for other contaminated areas in OU 3, but will be completed upon regulatory approval of the LUC RD.
  - MNA progress cannot be adequately addressed at several sites due to the sites not being in a current monitoring program. However, efficacy of MNA is being evaluated as part of the current RI/FS Addendum activities. Area C groundwater plume has been shown to have migrated beneath the St. Johns River. Sampling in the St. Johns River is being performed as part of the RI/FS Addendum to determine if the plume discharges to surface water.
  - The infiltration of contaminated groundwater into the second storm sewer in Areas F and G which was previously unknown. A storm sewer sampling program, including all outfalls to the St. Johns River, has been developed and is being implemented to support the RI/FS Addendum.
  - Remedy has not been implemented at Area F because of changed site conditions that indicate the chemical oxidation remedy is no longer appropriate.

4.7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

No. As noted previously, an RI/FS Addendum is being prepared that will update the exposure assumptions. An updated ROD will provide revised cleanup levels and RAOs based on the ongoing comprehensive evaluation of OU 3 groundwater and potential exposure pathways.

Changes in Standards and TBC Criteria

As the remedial work has not been completed for OU 3, the ARARs in the ROD still apply and must be met wherever applicable. However, the FDEP GCTLs have been developed since the existing ROD was signed and should be added as a chemical specific ARAR in the updated ROD. Additionally, FDEP SCTLs are chemical-specific TBC criteria that will replace the Soil Cleanup Goals in the updated ROD. In addition, chemical specific ARARs for FDEP Marine Surface Water CTLs will be included in the updated ROD based on the potential for contaminated groundwater to discharge to the St. Johns River from the aquifer and via storm sewers.

Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

OU 3 is a heavily industrialized area, and it is intended to retain that land use well into the future. Therefore, the human health exposure pathways identified in the RODs include the following:

- Occupational workers exposed to groundwater via limited ingestion of drinking water from hypothetical future drinking water wells (a showering scenario is not considered probable in this limited occupational setting, and dermal exposure via hand-washing would be minimal).

- Utility workers exposed to storm sewer water via limited dermal contact with storm sewer water while maintaining or repairing the storm sewers (incidental ingestion of storm sewer water is not assessed because it is considered insignificant with good hygiene/work practices).

There has been a change to the following ecological exposure pathways addressed in the ROD:

- The potential risk to ecological receptors based on exposure to PAHs and lead in the sediment adjacent to the PSC 16 outfall has been addressed. PSC 16 sediments have been remediated to background levels for the St. Johns River for PAHs and lead.

The following are new exposure pathways that will be addressed in the RI/FS Addendum and updated ROD:

- Occupational workers potentially exposed to indoor air vapor intrusion pathways in buildings within OU 3.

- Ecological receptors exposed to contaminated groundwater via potential migration into the St. Johns River through sediment at Areas C and G.

- Ecological receptors exposed to contaminated groundwater via potential migration into the St. Johns River from infiltrated storm sewers that discharge to the St. Johns River

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

The vapor intrusion pathway was considered during the original RI/FS based on available guidance and not deemed to be a potential risk pathway to building occupants because of building slabs that should prevent significant vapor migration from contaminated groundwater into buildings. However, new USEPA and Navy Vapor Intrusion guidance have since been developed that recommend detailed site-specific methods for evaluating the potential exposure risks to building occupants. The vapor intrusion pathway for all buildings in the vicinity of OU 3 is currently being evaluated as part of the RI/FS Addendum and will be appropriately addressed in the updated ROD. Preliminary results indicate vapor intrusion levels at Building 103, in the vicinity of the PSC 48 source area, do not pose an unacceptable risk based on indoor air sampling.

4.8 ISSUES

Issues were discovered during the Five-Year Review and are noted in Table 4-3.

4.9 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The recommendations and follow-up actions are outlined in Table 4-4.

TABLE 4-3

**ISSUES AT OPERABLE UNIT 3
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA**

ISSUE NUMBER	ISSUES	AFFECTS PROTECTIVENESS (Y/N)	
		Current	Future
1	Monitoring well networks at Buildings 106 and 780 are insufficient.	N	Y
2	Remediation systems at PSC 48 and Building 780 have been shut down based on performance evaluations as part of the previous Five-Year Review, but documentation is incomplete. No alternative forms of remediation have been implemented, and the RAOs have not been met.	N	Y
3	Areas C and D are not being monitored quarterly as stipulated in the primary ROD.	N	Y
4	Monitoring well networks at Areas C and D do not encompass all of the groundwater contamination (e.g., the COC concentrations in the perimeter wells exceed GCTLs). Contamination has migrated beneath the St. Johns River but has not shown to be infiltrating into the river.	N	Y
5	The RAO of reducing VOCs in groundwater to the ARARs/action levels within five years has not been achieved at Areas C and D.	N	Y
6	Monitoring well network at Area G does not encompass all of the groundwater contamination (e.g., the COC concentrations in the perimeter wells exceed GCTLs). The RAO for Area G is not being met via natural attenuation.	N	Y
7	Although groundwater within OU 3 is not used for any purpose, there are no LUCs in place to prescribe groundwater use restrictions in OU 3 for Buildings 106 and 780, Areas B, C, D, F and G.	N	Y
8	Reported groundwater contamination exists to the west of Building 106, which is outside the existing boundary of OU 3.	N	Y
9	Remedy has not been implemented at Area F due to changed conditions.	N	Y
10	Groundwater contamination has been identified infiltrating a second storm sewer downgradient of Areas F and G.	N	Y
11	Vapor intrusion pathway has not been completely evaluated for all buildings in OU 3 based on new USEPA and Navy policy and guidance.	N	Y
12	The base enforces dig restrictions over the entire OU 3. Additional sampling is being considered to reduce the size of the area that may be included in the LUC RD, to be prepared after completion of the updated ROD.	N	N

TABLE 4-4

RECOMMENDATIONS AND FOLLOW-UP ACTIONS
FIVE-YEAR REVIEW
OPERABLE UNIT 3
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Issue Number	Issues	Recommendations	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
						Current	Future
1	Monitoring well networks at Buildings 106 and 780 are insufficient.	Continue to address as part of the investigation for the RI/FS Addendum for OU 3.	Navy	USEPA/FDEP	**30-Dec-13**	N	Y
2	Remediation systems at PSC 48 and Building 780 have been shut down based on performance evaluations as part of the previous Five-Year Review, but documentation is incomplete. No alternative forms of remediation have been implemented, and the RAOs have not been met.	Continue to address as part of the RI/FS Addendum and in the updated ROD.	Navy	USEPA/FDEP	**06-Mar-15**	N	Y
3	Areas C and D not being monitored quarterly as stipulated in the ROD.	Continue to address as part of the RI/FS Addendum and in the updated ROD.	Navy	USEPA/FDEP	**06-Mar-15**	N	Y
4	Monitoring well networks at Areas C and D do not encompass all of the groundwater contamination (e.g., the COC concentrations in the perimeter wells exceed GCTLs).	Continue to address as part of the investigation for the RI/FS Addendum for OU 3.	Navy	USEPA/FDEP	**30-Dec-13**	N	Y
5	The RAO of reducing VOCs in groundwater to the ARARs/action levels within five years has not been achieved at Areas C and D.	Continue to address as part of the RI/FS Addendum and in the updated ROD.	Navy	USEPA/FDEP	**06-Mar-15**	N	Y
6	Monitoring well network at Area G does not encompass all of the groundwater contamination (e.g., the COC concentrations in the perimeter wells exceed GCTLs).	Continue to address as part of the investigation for the RI/FS Addendum for OU 3.	Navy	USEPA/FDEP	**30-Dec-13**	N	Y

TABLE 4-4

RECOMMENDATIONS AND FOLLOW-UP ACTIONS
FIVE-YEAR REVIEW
OPERABLE UNIT 3
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Issue Number	Issues	Recommendations	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
						Current	Future
7	Although groundwater within OU 3 is not used for any purpose, there are no LUCs in place to prescribe groundwater use restrictions in OU 3 for Buildings 106 and 780, Areas B, C, D, F and G.	A LUC RD has been developed to address groundwater restrictions for all of OU 3 and is pending regulatory approval. An updated LUC RD will be developed as part of the updated ROD	Navy	USEPA/FDEP	**30-Oct-11**	N	Y
8	Reported groundwater contamination exists to the west of Building 106, which is outside the existing boundary of OU 3.	Based on results of the ongoing investigation for the RI/FS Addendum, Redefine the boundary of OU 3 to include identified groundwater contamination in the updated ROD.	Navy	USEPA/FDEP	**06-Mar-15**	N	Y
9	Remedy has not been implemented at Area F due to changed conditions. Area E assessment was not completed.	Continue to address as part of the RI/FS Addendum and in the updated ROD.	Navy	USEPA/FDEP	**06-Mar-15**	N	Y
10	Storm sewers at Areas F and G are not in a monitoring program.	Continue to address as part of the RI/FS Addendum and in the updated ROD.	Navy	USEPA/FDEP	**06-Mar-15**	N	Y
11	Vapor intrusion pathway for indoor building exposure has not been completely evaluated for all buildings in OU 3 based on new USEPA and Navy policy and guidance.	A vapor intrusion study is underway based on new USEPA and Navy policy and guidance and will be documented in the RI/FS Addendum and updated ROD.	Navy	USEPA/FDEP	**30-Dec-14**	N	Y
12	The base enforces dig restrictions over the entire OU 3. Additional sampling is being considered to reduce the size of the area that may be included in the LUC RD, to be prepared after completion of the RI/FS Addendum.	Continue to address as part of the investigation for the RI/FS Addendum for OU 3.	Navy	USEPA/FDEP	**30-Dec-14**	N	N

4.10 PROTECTIVENESS STATEMENT

The following protectiveness statements apply to the various remedies for OU 3:

1. The remedies for PSC 14, PSC 15 and PSC 16 are protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

   The following action needs to be taken.

   - Update the RAOs for PSC 16 in the updated ROD to specify remediation to background levels for the St. Johns River.

2. The remedies at PSC 48, Building 780, and Area D are protective in the short term with regulatory approval of the LUC RD for OU 3 groundwater use restrictions; however, in order for the remedies to be protective in the long-term, follow-up actions need to be taken. After completion of the RI/FS Addendum and updated ROD, an updated protectiveness determination will be made via an addendum to this Five-Year Review anticipated to be completed by September 30, 2013.

   The following action needs to be taken:

   - Continue ongoing assessment activities for OU 3 and complete an RI/FS Addendum, Proposed Plan, an updated ROD, an updated LUC RD, and appropriate post-ROD documents and actions.

3. For remedies at Areas C, E. F, and G, no completed human health or ecological risk exposure pathways are known to exist; however, the potential exposure pathway for ecological receptors in the St. Johns River is still being evaluated considering the potential for contaminated groundwater to discharge to the river from the aquifer and via storm sewers. Therefore, protectiveness determinations for the remedies in these areas cannot be made at this time and are being deferred until further actions currently underway are completed supporting the development of an RI/FS Addendum. After completion of the RI/FS Addendum and updated ROD, an updated protectiveness determination will be made via an addendum to this Five-Year Review anticipated to be completed by September 30, 2013.

   The following action needs to be taken.

   - Continue ongoing assessment activities for OU 3 and complete an R/IFS Addendum, Proposed Plan, an updated ROD, an updated LUC RD, and appropriate post-ROD documents and actions.

4. The remedies for Areas A and B are protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled.

5.0 OPERABLE UNIT 4

OU 4, also known as Casa Linda Lake (PSC 21), is an 11-acre man-made lake that is approximately 1,800 feet long and 250 feet wide (Figure 5-1). The lake was designed as a storm water retention basin and it is functioning as designed. When the lake's level exceeds the height of the dam at the eastern end of the lake, the water flows over a spillway into a ditch eastward to Turtle Pond, and then to Mulberry Cove and the St. Johns River. Casa Linda Lake is approximately 1,500 feet from the St. Johns River. The average elevation of the lake's top of bank is about 15 feet msl and the lake averages about 9 feet deep. Hydrogeologic data from the RI (AGM, 1999a) indicates that groundwater typically discharges to the lake.

Casa Linda Lake is surrounded by Casa Linda Oaks Golf Course. Most fairways and greens of the golf course are south of the lake, and one green is on a peninsula in the lake itself. Two roads border the golf course, Birmingham Avenue to the north and Mustin Road to the east. The lake and surrounding golf course are within the property boundary of NAS Jacksonville (Figure 1-2).

It is reasonable to assume that the site will remain a storm water retention basin and that the golf course will be maintained as such. Development of some of the green space north of the basin is possible, which would increase storm water runoff into the basin (AGM, 2000).

5.1 SITE CHRONOLOGY FOR OU 4

Casa Linda Lake was identified as a PSC during the IAS because of a fish kill that occurred there on May 6, 1979. The fish kill was caused by the application of Dasanit™ (a pesticide). The chemical name for this product is fensulfothion, which is an organophosphorus nematicide. Following applications of the pesticide between April 23 and May 3, 1979, heavy rains between May 5 and 11, 1979, washed the compound into Casa Linda Lake. Approximately 300 to 1,000 fish were reportedly killed in addition to 12 ducks. Surface water and sediment samples were immediately collected and analyzed, and the results indicated the chemical was present at 1,000 times the level that would kill fish or ducks. However, the half-life of fensulfothion is about three to five weeks; thus, this chemical has been ruled out as a continuing source of contamination. Investigations conducted in 1993 and 1997 (see Table 5-1) detected various chemical contaminants in the lake that were attributed to surface water run-off from the surrounding areas; none were associated with fensulfothion (AGM, 1999a).

DRAWN BY	DATE			CONTRACT NO.
A. JANOCHA	8/27/04		TOPOGRAPHIC MAP	7302
CHECKED BY	DATE		OU 4	OWNER NO.
J. JOHNSON	2/11/05		FIVE YEAR REVIEW	CTO 0342
REVISED BY	DATE		NAS JACKSONVILLE	APPROVED BY / DATE
			JACKSONVILLE, FLORIDA	
SCALE		NAVFAC		DRAWING NO. / REV
AS NOTED				FIGURE 5 - 1 / 0

P:\GIS\JACKSONVILLE_NAS\APR\OU4.APR DRG LAYOUT 2/21/05 CF

TABLE 5-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 4
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event (Sub-events indented)		**Date**
Pre-discovery of contaminants at OU 4		
	Fish Kill	May 1979
Initial discovery of problem or contamination		
	IAS by Hartman found several COCs above ARARs in surface water and sediment.	1983
Pre-NPL responses		
	Environmental Consulting and Technology, Inc reports several ARARs exceeded in surface water & sediment, and the RA revealed a cancer risk for PCBs.	1993
NPL Listing		Nov 1989
Post-NPL responses		n/a
	RI began for OU 4.	Jul 1997
	RI completed for OU 4.	Oct 1997
Remedial design start		(1)
Remedial design complete		(1)
MOA signed between USEPA, FDEP, and Navy to ensure LUC compliance		Aug 1998
Final RI and RA report submitted		Jun 1999
Focused Feasibility Study (FFS) submitted		Nov 1999
Proposed Plan for Remedial Action (public comment period)		Mar to April 2000
ROD signature for OU 4		Sep 2000
Final Close Out Report		Jul 2003
Current remedial activities		n/a
Previous Five-Year Reviews		Sep 2005
Stormwater Pollution Prevention Program (SWPPP) monitoring		2004-present
Quarterly LUCIP Inspections		2004-present

Notes:
(1) RD/RA process was waived for this site since implementation of the selected remedy was transferred to the SWPPP.
n/a = not applicable.

Groundwater at the site is not used as a potable water supply. Though some COCs did occasionally exceed a TBC criterion, groundwater was determined by AGM (AGM, 1999a) to be discharging to surface water where those same COCs were not detected. Therefore, groundwater was not considered a medium of concern for OU 4.

Site soil contained various COCs that occasionally exceeded a TBC criterion. For those COCs that exceeded residential risk-based criteria (RBC), they were ruled out since they did not exceed the industrial RBC and the site is considered an industrial setting. Various potential routes of migration were evaluated (i.e., soil leaching into groundwater, surface run-off to surface water and sediment, and fugitive dust from unvegetated and unpaved areas). These various pathways were ruled out as not occurring or not likely to occur; thus, soil was ruled out as a medium of concern (AGM, 1999a).

Various pesticides and metals were detected in the surface water of Casa Linda Lake. However, since none of the COCs were detected in concentrations above ARARs, the surface water was ruled out as a medium of concern at the site (AGM, 1999a).

5.2 BACKGROUND

5.2.1 Physical Characteristics of OU 4

Casa Linda Lake (Figure 5-1) is located along the northern edge of the NAS Jacksonville Golf Course in the eastern portion of NAS Jacksonville (Figure 1-2). The area surrounding the lake is relatively flat and consists of grass covered soils. The banks of the lake are steep and lined with grass and trees. There is no significant industrial or residential development around OU 4. To the north of the site is Birmingham Avenue, across which are industrial buildings and parking areas. The areas to the south, east, and west are mostly developed as golf course. Mulberry Cove is approximately 1,500 feet east of Casa Linda Lake.

5.2.2 Land and Resource Use at OU 4

Land use at OU 4 has remained mostly unchanged since the golf course construction was completed. There have been golf course expansions and changes to the surface water controls associated with Casa Linda Lake over its operational life. There are no other significant land uses at OU 4. Groundwater and surface water are not used as potable water sources. However, the surface water in Casa Linda Lake is used to irrigate the golf course. The future use of the various resources (e.g., water, fish) is controlled via the LUCs in effect for the PSC.

5.3 HISTORY OF CONTAMINATION AT OU 4

Casa Linda Lake was designated a PSC during the IAS because of a fish kill that occurred in 1979. A pesticide application caused the death of approximately 300 to 1,000 fish and 12 ducks. COCs previously identified at the site included SVOCs, pesticides, PCBs, and metals in sediment, surface water, and/or fish tissue.

5.3.1 Initial Response for OU 4

As previously indicated, the fish kill in 1979 at Casa Linda Lake resulted in immediate testing that confirmed the source of contamination was the pesticide, Dasanit™. However, given the very short half-life of the product, no other follow-up action was deemed necessary.

5.3.2 Basis for Taking Action at OU 4

Hazardous substances that have been detected at the site and were retained as constituents of interest (COIs) in each media (AGM, 1999a) include:

Surface Soil
Benzo(a)pyrene
Arsenic
Beryllium

Shallow Groundwater
Aluminum
Arsenic
Beryllium
Chromium
Iron
Manganese
Vanadium

Surface Water
No COIs were selected

Sediment
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Indeno(1,2,3-cd)pyrene
Aluminum
Aroclor 1254
Cadmium
Arsenic
Lead
Chromium
Iron
Vanadium
Beryllium

Fish Tissue Samples
4-Methylphenol
Alpha chlordane
4,4'-DCE
Aroclor 1260
Aroclor 1254
Arsenic
Cyanide
Iron
Lead
Mercury
Selenium

The purpose of remedial action at OU 4 was to eliminate the human exposure pathway (fish consumption) and to ensure protection of the St. Johns River from the COIs identified in the lake. A secondary RAO was to protect ecological receptors from the constituents of ecological interest (COEIs) detected within and around the lake basin (AGM, 2000).

5.4 REMEDIAL ACTIONS

The RAOs identified in the OU 4 ROD were as follows: "The primary remedial action objectives (RAOs) are to eliminate the human exposure pathway (fish consumption) and to ensure protection of the

St. Johns River from the COIs identified in the environmental media in the lake. Since minimal wildlife and aquatic habitat has evolved at Casa Linda Lake, a secondary remedial response objective is to protect the neighboring wildlife habitat from the COEIs detected in the media within and around this basin."

5.4.1 Remedy Selections at OU 4

Four remedial alternatives were evaluated in the FFS for OU 4 to address the primary and secondary RAOs. Of the four alternatives evaluated, the selected remedial action for OU 4 was Alternative 2 with Option 1. This alternative involves "monitoring with institutional and habitat controls" (AGM, 2000).

Monitoring with institutional and habitat controls assumes that the lake sediments remain in place. Institutional controls include use restrictions and advisory signs which are currently enforced by NAS Jacksonville for Casa Linda Lake. Monitoring of Casa Linda Lake takes place in accordance with NAS Jacksonville storm water management programs, including the Storm Water Pollution Prevention Plan (SWPPP) and Best Management Practices (BMPs). Control of the habitats in the vicinity of Casa Linda Lake is achieved via Passive Habitat Control, as described below.

Institutional controls are used to reduce potential human and ecological exposure pathways. The existing institutional controls include use restriction and advisory signage around the lake, and a catch and release program for all fishing activities around the lake. In addition to these measures, BMPs at NAS Jacksonville, which are designed to prevent point source discharges (from industrial areas at NAS Jacksonville) from entering the storm water management system, will be continued. To ensure that the institutional controls for Casa Linda Lake are properly maintained, these controls have been incorporated into the overall Base Master Plan for NAS Jacksonville (EDAW, 2009).

Passive habitat controls have also been implemented as part of this selected remedy to reduce human health and ecological risks due to exposure to the COIs/COEIs in lake sediments and the food chain. Control of the wildlife and aquatic habitat at Casa Linda Lake is maintained through removal of herbaceous shoreline vegetation from the lake via mowing, and placement of statues of predatory birds and animals around the lake banks to discourage wildlife from seeking refuge there. Periodic visual inspection of the lake banks is performed to monitor the effectiveness of the passive habitat controls, and to identify the frequency of bank maintenance necessary to minimize vegetation along the perimeter of the lake. To ensure these habitat controls for Casa Linda Lake are properly maintained, the controls have been incorporated into the overall Master Plan for NAS Jacksonville (as discussed above for institutional controls) (EDAW, 2009).

The selected remedy is implied to remain in place, as part of the Master Plan, as long as the Casa Linda Golf Course is maintained and NAS Jacksonville remains a military base. However, "in the event the base is to be redeveloped or expanded such that the storage volume or capacity of Casa Linda Lake needs to be increased, the Master Plan will specify the proper removal, handling, and disposal procedures for the lake sediments. In the event, NAS (Jacksonville) is to be decommissioned or sold for other uses, the institutional controls would be conveyed to the governmental agency that maintains the closed base, or the new property owner, whichever is applicable, as a condition of the property transfer. The reason for such a conveyance would be to restrict future development in the vicinity of Casa Linda Lake until sediment impacts have been sufficiently addressed" (AGM, 2000).

5.4.2 Remedy Implementation at OU 4

The selected remedy satisfies the statutory requirement for protection of human health and the environment through the use of institutional controls, monitoring, and passive habitat controls.
Monitoring of institutional and habitat controls is expected to reduce risks to humans and wildlife. Natural recovery is expected to protect human health and the environment over time. Also, the use of BMPs will continue to minimize the potential for impacted sediments to enter and leave Casa Linda Lake and ultimately the St. Johns River.

5.4.3 System Operation/O&M at OU 4

The costs from the selected remedy included O&M and capital costs. The administrative actions from the Navy included incorporation of institutional controls, habitat controls, and monitoring programs into the NAS Jacksonville Master Plan. As for O&M, the advisory and restriction signs were already in place, no design was required since the predatory animal statues were available locally, and lake bank maintenance is handled by the golf course maintenance personnel. The Navy's original 2000 present worth cost estimate for implementation and operation of the aforementioned system was approximately $227,297. This figure assumed a discount rate of 5 percent and monitoring for a 30 year period.

5.5 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

Since the last Five-Year Review, NAS Jacksonville has fully implemented the selected remedy at OU 4, including institutional controls, habitat controls, and monitoring controls.

5.5.1 Protectiveness Statements from the Last Review

The selected remedy for OU 4 is protective of human health and the environment for the site.

5.5.2 Status of Recommendations and Follow-up Actions from Last Review

To ensure that the institutional controls for Casa Linda Lake are properly maintained, these controls have been incorporated into the overall Base Master Plan for NAS Jacksonville (EDAW, 2009).

5.6 FIVE-YEAR REVIEW PROCESS

5.6.1 Document and Data Review

LUC documentation was reviewed for OU 4. The documentation was complete and there are no concerns.

5.6.2 Site Inspection and Interviews

Tetra Tech conducted a site inspection of OU 4 on August 25, 2010. Prior to initiating the inspection, the inspector interviewed the IR manager, Mr. Tim Curtin. Mr. Curtin accompanied the Tetra Tech inspector during the site inspection, which included visual observations of the lake, the signs for catch-and-release-only, and the animal statues for OU 4. The signs and statues were observed to be in good condition.

LUC inspections began for OU 4 in December 2004. The land use for the site has remained unchanged. The LUCs at OU 4 are inspected quarterly and records kept by NAS Jacksonville.

5.7 TECHNICAL ASSESSMENT

5.7.1 Question A: Is the remedy functioning as intended by the ROD?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD.

- ***HASP/Contingency Plan:*** Since there is no active remediation taking place at OU 4, no HASP/Contingency plan is required at this time.

- ***Implementation of Institutional Controls and Other Measures:*** Institutional controls are in place for OU 4 as part of the LUC program at NAS Jacksonville. The site was made part of the LUC inspection program in December 2004 and has been inspected on a quarterly basis since then. The implementation appears incomplete, however, due to the lack of preparation of the LUC RD for OU 4.

- ***Remedial Action Performance:*** According to the Final Close Out Report (NAVFAC EFD SOUTH, 2003), the following actions have been performed: vegetation was removed from around the lake, and the bank continues to be maintained by the station to keep vegetation to a minimum around the

lake; predatory statues have been emplaced and maintained; and quarterly LUC inspections are being performed.

- ***System Operations/O&M:*** Ongoing operating procedures will maintain the effectiveness of the remedy.

- ***Opportunities for Optimization:*** The remedy is functioning as required in the ROD, and there appear to be no opportunities for optimization at this time.

- ***Early Indicators of Potential Remedy Failure:*** None noted.

5.7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC Criteria

No location-specific ARARs were identified in the ROD for OU 4.

The only chemical-specific ARARs identified in the ROD for the site apply to the COIs and COEIs identified in sediment, fish tissue, and plant tissue. The following standards were identified as chemical-specific ARARs in the ROD. They were reviewed for changes that could affect protectiveness:

- NOAA effects-based sediment quality values (Buchman, 1999)
- Florida effects-based Sediment Quality Assessment Guidelines (SQAGs) (MacDonald, 1994)
- NAS Background Screening Concentrations for Sediments (ABB-ES, 1996a)

The Florida SQAGs and NAS Background Screening Concentrations for Sediments have not changed since their inception. NOAA has updated its sediment quality values (Buchman, 2008), but a review of Buchman (1999) versus Buchman (2008) indicates that toxicity values for the sediment COIs shown in Section 5.3.2 have not changed.

Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included current exposures (worker exposure to surface soil, diver exposure to sediment and surface water, and fish ingestion by off-site residents) and future exposures (same scenarios). There have been no changes in the toxicity factors for the COCs that were used in the baseline risk assessment. These assumptions are

considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

USEPA's dioxin reassessment has been developed and undergone review over many years with the participation of scientific experts in USEPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current cancer guidelines and incorporated the latest data and physiological/biochemical research into the assessment. The results of the assessment have currently not been finalized and have not been adopted into state or federal standards. USEPA anticipates that a final revision to the dioxin toxicity numbers may be released by the end of 2010. In addition, USEPA/OSWER has proposed to revise the interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds, based on technical assessment of scientific and environmental data. However, USEPA has not made any final decisions on interim PRGs at this time. Therefore, the dioxin toxicity reassessment for this Site will be updated during the next Five Year Review.

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

No other information has come to light that would affect the protectiveness of this remedy.

5.8 ISSUES

Although LUCs have been implemented, a LUC RD was not completed. A LUC RD has been submitted for regulatory approval.

5.9 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Continue LUC inspections in accordance with an approved LUC RD.

5.10 PROTECTIVENESS STATEMENT

The selected remedy for OU 4 is protective of human health and the environment.

TABLE 5-2

RECOMMENDATIONS AND FOLLOW-UP ACTIONS
FIVE-YEAR REVIEW
OPERABLE UNIT 4
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Issue Number	Issues	Recommendations	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
						Current	Future
1	LUCs are being implemented; however, a LUC RD was not completed. A LUC RD has been developed and is pending regulatory approval.	Continue LUC inspections in accordance with an approved LUC RD	Navy	USEPA/FDEP	**30-Oct-11**	N	Y

6.0 OPERABLE UNIT 5

This Five-Year Review provides a current status update for OU 5, also known as PSC 51, which consists of the former Fire Fighting Training Area (FFTA) and the former Oil Disposal Area (ODA).

The final remedy for the site included MNA for the groundwater and surface water until the PRGs from the ROD are obtained or site conditions suggest that an alternative remedial strategy may be considered. LUCs are also in place restricting residential use and use of groundwater.

6.1 SITE CHRONOLOGY

A list of important OU 5, PSC 51 historical events and relevant dates in the site chronology is shown in Table 6-1. The identified events are illustrative, not comprehensive.

6.2 BACKGROUND

6.2.1 Physical Characteristics of OU 5

OU 5 includes PSC 51, the former FFTA and the former ODA. The FFTA was a nearly circular area with a diameter of approximately 60 feet used by the Station's fire department to train firefighters. The ODA was also a circular area approximately 50 feet in diameter. It was used to drain hydraulic fluid, fuel, and oil from aircraft. Both sites were identified by their barren soil and debris. Figure 1-2 shows the location of OU 5 within NAS Jacksonville.

OU 5 is a relatively flat grass field, gently sloping to the southeast and with an unnamed creek at the southern boundary of the site. Figure 6-1 shows the site layout. According to the NAS Jacksonville Base Master Plan (EDAW, 2009), OU 5 is not within the 100-year floodplain.

6.2.2 Land and Resource Use at OU 5

The land use at OU 5 is considered industrial. Institutional Controls, including LUCs, are monitored, implemented, reported on, and maintained by the Navy for OU 5. The LUCs will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure. Under the LUC Program, the station has agreed to implement and maintain the following LUCs:

- Restrict construction at PSC 51.
- Restrict groundwater access.
- Prevent residential use at PSC 51.

The objectives for the LUCs include preventing trespasser and residential exposure and providing worker notification of potential hazards. The land use for the site has remained unchanged.

TABLE 6-1

CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 5
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Event (Sub-events indented)	**Date**
Pre-discovery of contaminants	n/a
The FFTA was used by the Station's fire department to train firefighters	1943 to 1952
The ODA was used to drain hydraulic fluid, fuel, and oil from aircraft	1943 to 1952
Initial Assessment Study	Mar 1983
Identified as FFTA, but misidentified the location as the site of PSC 28	Mar 1983
NPL Listing	Nov 1989
FFA signature	1990
Post-NPL responses	n/a
First identified as a PSC by ABB-ES after a review of past facility activities	Early 1995
Site screening of soil indicating evidence of metal and VOC in the surface soil	Feb 1996
Sampling event involving soil sampling, groundwater sampling, and a RAD survey	Mar 1997
IRA – excavation of radiologically contaminated soil at the FFTA and the ODA	Early 1998
Additional RAD Groundwater Sampling activities	Jul 1999
RI Field Activities	Dec 1999
Additional RI/FS sampling	Aug 2001
RI/FS complete for PSC 51	Sep 2002
Proposed Plan for PSC 51 (Public comment period)	Jan to Feb 2003
Record of Decision for PSC 51	Sept 2005
LUC RD	Dec 2006
Long-Term Monitoring Plan for Selected Remedy for OU 5, PSC 51	Aug 2003
Quarterly monitoring for PSC 51	Oct 2003
Semi-annual monitoring for PSC 51	Oct 2004
Annual Monitoring Report for Groundwater at PSC 51 (first year of quarterly monitoring)	Sept 2005
Semi-Annual Monitoring Report for Long-Term Monitoring Program, PSC 51	Oct 2005
Annual Monitoring for PSC 51	Apr 2006
Annual Monitoring Report for Long-Term Monitoring Program	Oct 2007
Annual Monitoring Report for Long-Term Monitoring Program	Sep 2008
Annual Monitoring Report for Long-Term Monitoring Program	Oct 2009

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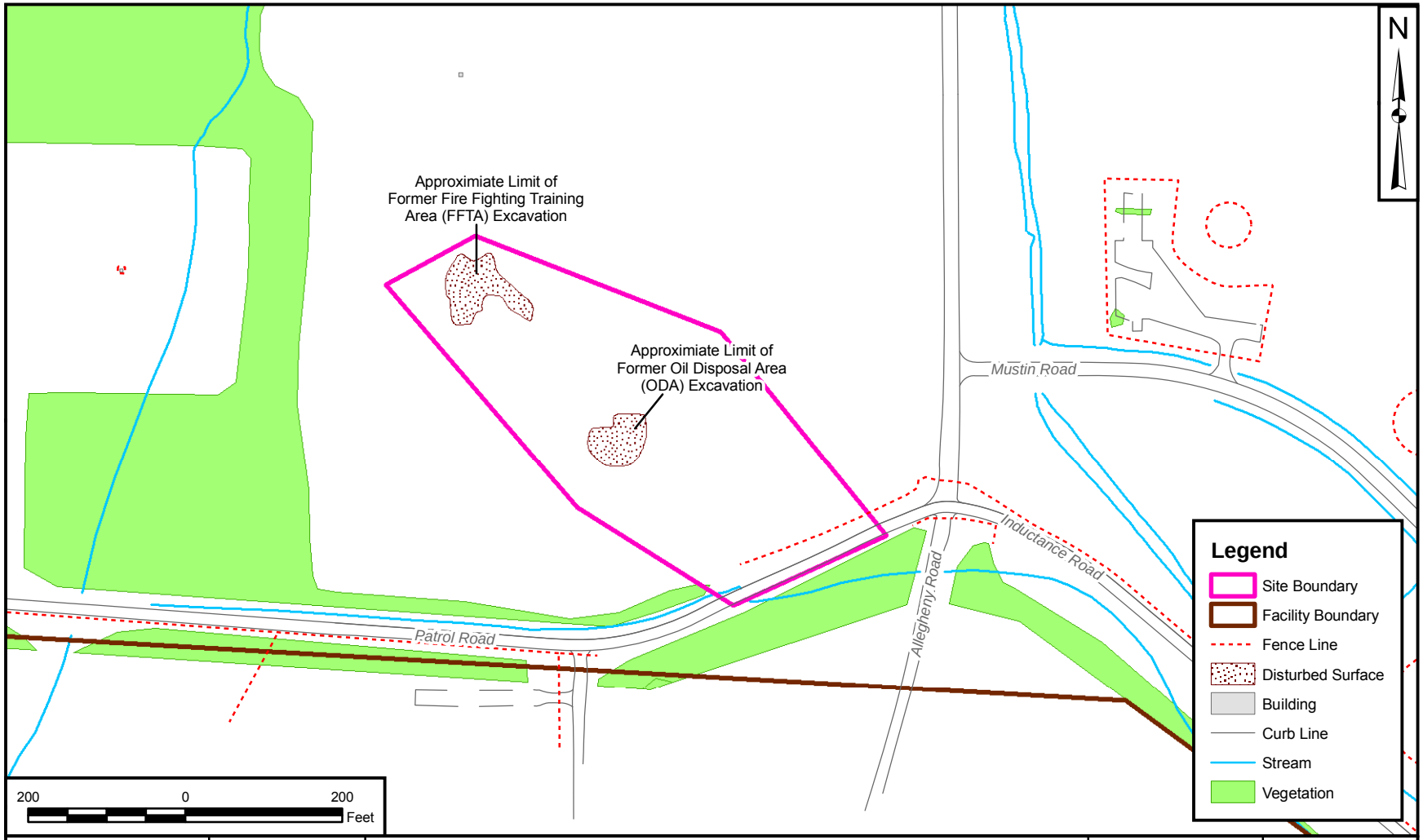

DRAWN BY J. ENGLISH	DATE 02/24/11	SITE LOCATION MAP PSC 51 NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NUMBER —
CHECKED BY J. JOHNSON	DATE 02/24/11		CTO NUMBER 0252
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			FIGURE NO. FIGURE 6-1 / REV 0

6.3 HISTORY OF CONTAMINATION AT OU 5

The FFTA and ODA were in operation from 1943 to 1952. In March 1983, an IAS identified an FFTA at NAS Jacksonville, but misidentified the location as the site of PSC 28, which is in a different location on NAS Jacksonville (Tetra Tech, 2002c). The FFTA and ODA were first identified as a PSC in 1995 during a review of past facility activities in the area. In 1996, an initial site screening was conducted (Tetra Tech, 2002c). Results indicated evidence of metal and VOC contamination in surface soil. From March to October 1997, HLA collected soil and groundwater samples in support of a Sampling Event Report on PSC 51. Results of the investigation revealed metal contamination in soil and VOC contamination in groundwater (Tetra Tech, 2002c). A RAD survey was conducted during the sampling event because it was thought that burned aircraft and aircraft parts at the FFTA may have contained instruments with radium dials. The survey indicated radioactivity at both the FFTA and the ODA. Included in this effort were two hydrocone groundwater samples collected from south of the unnamed creek, downgradient of the contaminant plume. These samples were analyzed for VOCs. No analytes were detected in the samples from either location.

The soil at PSC 51 is contaminated with metals including aluminum, antimony, arsenic, barium, chromium, copper, iron, lead, mercury, nickel, and vanadium. At the ODA, the metals arsenic and vanadium are present at concentrations in excess of FDEP SCTLs for direct residential exposure. Metals are present at concentrations exceeding the FDEP residential SCTLs in soil near the FFTA. Chemical concentrations in the soil samples were compared to SCTLs, USEPA RBCs, and basewide background concentrations to define the extent of soil contamination. The site use was considered industrial; however, the extent of soil contamination evaluated in the FS was derived using residential criteria. SCTLs and RBCs were used as “TBC” criteria in the FS.

6.3.1 Initial Response for OU 5

In 1998, BEI excavated radiologically-contaminated and lead-contaminated soil at the FFTA and ODA (Tetra Tech, 2002c). Approximately 1,000 yd^3 of soil were removed, resulting in removal of radioactive and lead-bearing soil, as well as VOC-contaminated soil. A 20-gallon drum was found and removed from the ODA during the 1998 excavation. The excavated areas were then backfilled with clean soil (BEI, 1999b). BEI also collected soil and groundwater samples for use in the RI.

6.3.2 Basis for Taking Action at OU 5

BEI re-sampled two monitoring wells (MW-51-05 and MW-51-06) for Radium-226 at the request of the USEPA in 1998. Tetra Tech began monitoring these two wells in July 1999 for VOCs. Concentrations of VOCs were detected in exceedance of GCTLs. RI field activities began at PSC 51 in December 1999.

Eight monitoring wells were installed at specified locations to define the horizontal and vertical extent of groundwater contamination (Tetra Tech, 2002c).

After the initial scope of work was completed and the draft-final RI/FS was issued, the NAS Jacksonville Partnering Team agreed that additional data collection was necessary (NAS Jacksonville Partnering Team March 6, 2001 meeting minutes). From August 2001 to January 2002, 14 additional soil samples were collected from the ODA and analyzed for arsenic. Twelve soil samples were collected from the FFTA and analyzed for TAL metals. Two shallow and two deep monitoring wells were installed downgradient of the groundwater plume on the opposite side of the unnamed creek, and 21 DPT borings were installed at depths up to 40 feet to delineate the horizontal extent of vertical migration of contaminant concentrations. The additional data collection was included in the revised RI/FS for PSC 51 (Tetra Tech, 2002c).

The last field event occurred due to the presence of total chromium in surface soil at the FFTA that exceeded industrial SCTLs for hexavalent chromium. Tetra Tech collected three soil samples in July 2002 for analysis of hexavalent chromium (Tetra Tech, 2002c) to differentiate total chromium from hexavalent chromium.

Soil contamination was defined in the RI/FS by samples where the concentrations of COCs were in excess of residential SCTLs and Region III RBCs. The horizontal extent of soil contamination was defined to less than industrial criteria and is assumed to extend to the water table. Groundwater contamination at the site was defined by samples with concentrations of COCs in excess of GCTLs and MCLs. Horizontal-oriented groundwater contamination is defined by the monitoring well network shown on Figure 6-2 except to the south. The leading edge of the contamination is beyond PSC51-MW-08S. However, the groundwater in the surficial aquifer beneath PSC 51 discharges into the unnamed creek south of the site. Surface water samples at PSC 51 provide the downgradient control points for this groundwater plume. The vertical extent of groundwater contamination has been defined to a depth of approximately 20 feet bgs across most of the site. Analytical results from groundwater samples collected from wells south of the creek confirm that no contamination extends beyond the creek to the south.

6.4 REMEDIAL ACTIONS

6.4.1 Remedy Selections at OU 5

Groundwater at PSC 51 is contaminated with COCs exceeding regulatory criteria and presents a potential human health hazard. Natural attenuation has been evaluated at this site and appears to be an effective alternative. In addition, groundwater monitoring is taking place at PSC 51. If it is determined in the future that natural attenuation is ineffective, contingency actions will be conducted. The remedy consists of four

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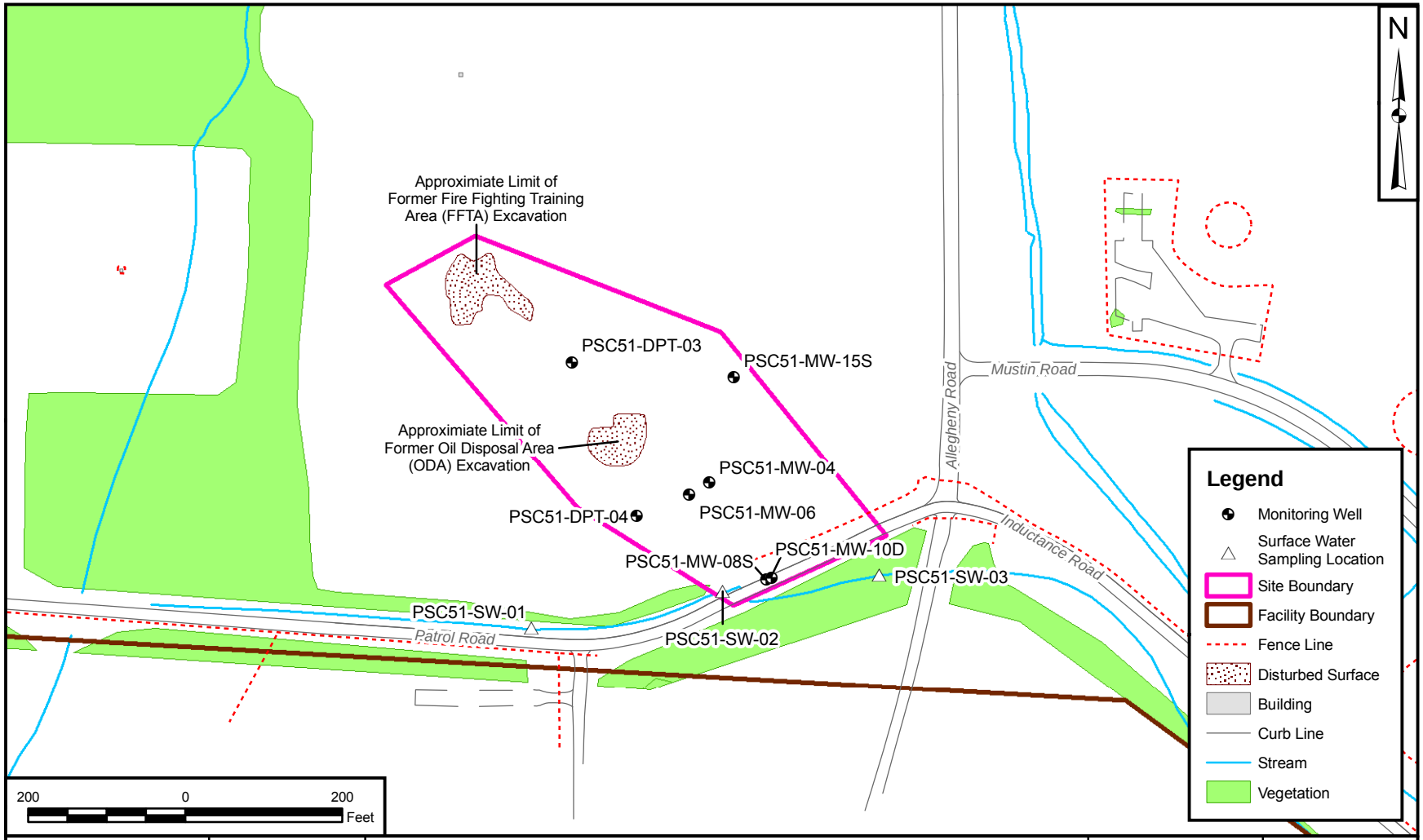

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NAVFAC

GROUNDWATER AND SURFACE WATER SAMPLING LOCATIONS
PSC 51
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NUMBER	CTO NUMBER
—	0252
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FIGURE NO.	REV
FIGURE 6-2	0

major components: (1) institutional controls, (2) natural attenuation and long-term monitoring (3) groundwater and surface water monitoring and reporting, and (4) contingency remedy.

This remedy includes LUCs since it leaves hazardous substances in place that pose a potential future risk and prevent unrestricted use. The objectives of the institutional controls for PSC 51 at NAS Jacksonville are to:

- Ensure no construction on or excavation of the contaminated soil without special handling and disposal procedures for the soil.
- Ensure that PSC 51 use remains industrial.
- Ensure no withdrawal of and/or use of the groundwater.
- Ensure any workers that might potentially be exposed to the contaminated soil or groundwater at this site are properly trained.

NAS Jacksonville has developed a LUC program to ensure that land use restrictions are maintained and periodically verified. The Navy is responsible for implementing, monitoring, maintaining, reporting on, and enforcing the LUC element of the remedy.

Under the LUC program, PSC 51 is monitored to assure that restrictive measures are maintained. Warning signs stating language similar in nature to the following: “Contaminated Area. Avoid contact with soil and groundwater. Call 542-4228 for further information.” are posted at regular intervals along the PSC 51 boundary to warn NAS Jacksonville personnel and workers of the hazards associated with the site. In addition, the station has a procedure in place where all construction projects must be reviewed by the Environmental Division, which evaluates whether the contaminated groundwater will be encountered or used. This remedy was selected for the following reasons:

- Although the concentrations of COCs remaining in soil exceed the FDEP residential SCTLs or background values, they do not present an unacceptable threat to human health or the environment under the current and foreseeable future industrial use of PSC 51. LUCs should be adequate to provide the required protection.

- The groundwater is contaminated with organic constituents, which should degrade naturally over time. The LUCs will maintain protectiveness while the contamination is degrading.

- PSC 51 does not currently provide a significant ecological habitat and the area is contained within a controlled location within NAS Jacksonville. Future land use scenarios are expected to remain similar in nature.

Groundwater at PSC 51 is contaminated with COCs exceeding regulatory criteria and presents a potential human health hazard. Natural attenuation has been evaluated at this site and appears to be an effective alternative. In addition, with groundwater monitoring, if it is determined in the future that natural attenuation has become ineffective, contingency actions will be conducted.

Contingent Actions

Contingency actions will be performed if groundwater discharges to the unnamed creek at levels exceeding the PRGs established in the ROD, or if natural attenuation does not effectively reduce groundwater contaminants. Contingency actions would be implemented through another CERCLA document (Tetra Tech, 2005b).

6.4.2 Remedy Implementation at OU 5

Based on the requirements of CERCLA, the NCP, a detailed analysis of alternatives, and USEPA, FDEP, and public comments, institutional controls for soil and natural attenuation, monitoring, and institutional controls for groundwater were selected to address contamination at PSC 51.

NAS Jacksonville has developed a LUC program to ensure that land use restrictions are maintained and periodically verified. NAS Jacksonville's LUC inspection program establishes quarterly inspections of the LUC Program. PSC 51 is included in this program and is being inspected quarterly to ensure that:

- No construction on or excavation of the contaminated soil takes place without special handling and disposal procedures for the soil.
- PSC 51 use remains industrial.
- There is no withdrawal of and/or use of the groundwater.
- Any workers that might potentially be exposed to the contaminated soil or groundwater at this site are properly trained.

Groundwater is being monitored for COCs and natural attenuation parameters to assess its effectiveness as a treatment for the surficial aquifer at PSC 51. Groundwater was sampled quarterly from October 2003 through July 2004. Semi-annual sampling was conducted in October 2004 and April 2005. Annual sampling was conducted in April 2006, May 2007, May 2008, and April 2009. Groundwater samples are being analyzed for VOCs, PAHs, and various natural attenuation parameters.

Surface water monitoring in the unnamed creek is performed along with the groundwater monitoring at PSC 51. The surface water monitoring is to ensure that groundwater discharges to the unnamed creek south of the site do not cause COC concentrations to exceed federal and state surface water criteria.

Three surface water samples are collected during each monitoring event and analyzed for the VOCs and PAHs.

The third component in the remedy at PSC 51 is groundwater and surface water monitoring reporting. Groundwater and surface water monitoring reports are prepared after each monitoring event. If deemed necessary based on monitoring, groundwater modeling may be performed. No modeling has been performed to date.

If results of the Five-Year Review indicate that natural attenuation has failed or will fail to clean up the groundwater contamination within the prescribed time frame, the Navy will implement a contingent remedy. Groundwater Alternative 3 (In-Situ Enhanced Bioremediation) was identified as the contingent remedy. Implementation of a contingent remedy will be made through another CERCLA document. In the event that natural attenuation is not effectively remediating the groundwater, in-situ enhanced bioremediation will be implemented to increase the degradation of COCs in groundwater.

If it is determined during the groundwater and surface water monitoring at PSC 51 that the groundwater COCs reach the unnamed creek south of PSC 51 and are present at concentrations in excess of the surface water PRGs, in-situ enhanced bioremediation will be considered for groundwater. If so, the remedial design may include surface water collection or flow control measures as required.

6.4.3 System Operation/Operation and Maintenance at OU 5

The estimated capital, O&M, and Net Present Worth costs of the selected remedy are as follows:

- Capital Cost: $30,000
- 30-Year Net Present Worth of O&M Costs: $380,000
- 30-Year Net Present Worth: $485,000

6.5 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first Five-Year Review since the ROD signing for OU 5. Therefore, there is no progress to report.

6.6 FIVE-YEAR REVIEW PROCESS

6.6.1 Document Review

This Five-Year Review consisted of a review of relevant documents including the RI/FS, monitoring reports, the ROD, and quarterly LUCIP inspection reports. Applicable groundwater and surface water

cleanup standards, as listed in the 2005 ROD, were reviewed. The PCP 72437-HO-010 was also reviewed.

6.6.2 Data Review

6.6.2.1 Review of COC Data for Groundwater

The OU 5 documents covering the groundwater and surface water monitoring for PSC 51 were reviewed to determine if natural attenuation is occurring and if the unnamed creek is being impacted by groundwater contamination. Also, a review of the LUC Inspection Checklists for OU 5 was conducted to determine if periodic inspections are being performed as required. The LUC Inspection Checklists for OU 5 show that quarterly inspections have been conducted at OU 5 each quarter since 2006.

Review of records and monitoring reports indicate that long-term monitoring has occurred since 2003. Groundwater was sampled quarterly from October 2003 through July 2004. Semi-annual sampling was conducted in October 2004 and April 2005. Annual sampling was conducted in April 2006, May 2007, May 2008, and April 2009. Groundwater samples are being analyzed for VOCs, PAHs, and various natural attenuation parameters.

Seven monitoring wells are being sampled as part of the Annual Monitoring program at PSC 51. These sample locations include monitoring wells PSC51-MW-04, PSC51-MW-06, PSC51-MW-08S, PSC51-MW-10D, PSC51-MW-15S, PSC51-DPT-03, and PSC51-DPT-04. The wells are being sampled for ten specific COCs; their associated PRGs are listed in Table 6-2. Table 4 in Appendix D includes groundwater monitoring data from the past five years.

In 2009, groundwater samples collected from monitoring wells PSC51-DPT-04, PSC51-MW-04, PSC51-MW-06, and PSC51-MW-08S showed benzene and vinyl chloride concentrations above the established PRG of 1 μg/L in the 2009 monitoring event. In addition, monitoring well PSC51-MW-04 had TCE concentrations above the PRG of 3 μg/L. PSC51-MW-06 also showed a total xylenes concentration greater than the established PRG of 20 μg/L.

TABLE 6-2

**PRELIMINARY REMEDIATION GOALS (PRGs) FOR GROUNDWATER AT OPERABLE UNIT 5
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA**

Compound	PRG (μg/L)
Volatile Organic Compounds	
1,1-Dichloroethene	7
Benzene	1
Cis-1,2-Dichloroethene	70
Ethylbenzene	30
Naphthalene	20
Toluene	40
Trans-1,2-dichloroethene	100
Total Xylenes	20
Trichloroethene	3
Vinyl Chloride	1

Note: PRGs shown were established in the ROD for OU 5

As shown in Table 4 in Appendix D, benzene concentrations detected in monitoring well PSC51-DPT-04 have increased since 2008. However, benzene concentrations have decreased in monitoring wells PSC51-MW-06 and PSC51-MW-08. TCE in groundwater collected from PSC51-MW-04 decreased from 20 μg/L in 2008 to 14 μg/L in 2009. Vinyl chloride concentrations have remained below 10 μg/L since monitoring began, increasing and decreasing slightly in the groundwater. Concentrations of vinyl chloride detected in groundwater at PSC 51 during the last two annual sampling events were significantly less than the FDEP Milestone Objective for vinyl chloride of 25 μg/L for Year 5. Although total xylenes were detected above the PRG at 21 μg/L in one monitoring well in 2009, the concentration has decreased significantly from the 2008 concentration of 92 μg/L. In addition, concentrations detected in groundwater during the last two events were significantly less than the FDEP Milestone objective for total xylenes of 200 μg/L for Year 5 of the monitoring period. Results for the groundwater sampling over the past five years have shown an overall decrease of the COCs (Aerostar, 2009a).

6.6.2.2 Review of Natural Attenuation Data for Groundwater

Based on review of the groundwater monitoring reports, field and laboratory natural attenuation parameters are also being analyzed to monitor the biodegradation of regulated petroleum hydrocarbons

and chlorinated solvents in the groundwater at PSC 51. Groundwater samples are being analyzed for a series of biodegradation indicators such as nitrogen species (nitrate/nitrite/ammonia), orthophosphate, alkalinity, TOC, chloride, dissolved sulfide, sulfate, dissolved manganese, and dissolved gases (methane/ethane/ethene). In addition, natural attenuation field parameters, including temperature, pH, specific conductivity, oxidation reduction potential, dissolved oxygen, carbon dioxide, ferrous iron, and hydrogen sulfide are being analyzed. Trend analyses have been conducted including the use of trend graphs. Based on the historical data and water quality data collected since 2004, conditions are present to support both aerobic and anaerobic biodegradation processes in the groundwater beneath PSC 51. Results of groundwater sampling over the past five years have shown an overall decreasing trend of the COCs. Table 4 in Appendix D presents historical natural attenuation data for groundwater at PSC 51 (Aerostar, 2009a).

6.6.2.3 Review of Surface Water COC Data

Since the unnamed creek located south of PSC 51 is the ultimate receptor of the groundwater contamination, the surface water is monitored at the point of expected intersection to verify that groundwater discharges to the unnamed creek do not cause the COC concentration in surface water to exceed surface water ARARs. The most recent monitoring event in April 2009 showed no concentrations of COCs above PRGs in surface water. Table 2 in Appendix D shows historical surface water monitoring results (Aerostar, 2009a).

6.6.2.4 LUC Inspections

The completed LUC Inspection Checklists for OU 5 appear to be complete. Completed quarterly inspections were conducted at OU 5 in 2006, 2007, 2008, and 2009.

6.6.3 Site Inspection and Interviews

Tetra Tech conducted a site inspection of OU 5 on August 25, 2010. Prior to initiating the inspection, the inspector interviewed the IR manager, Mr. Tim Curtin. Mr. Curtin accompanied the Tetra Tech inspector during the site inspection, which included visual observations of warning signs, groundwater monitoring wells, and the soil cover at the area of soil excavation. The signs at the site were in good condition, and several wells were observed with locks in place. The soil cover at OU 5 is in good condition with no evidence of erosion. The IR Manager reports that there have been no incidents of vandalism in the area.

6.7 TECHNICAL ASSESSMENT

6.7.1 Question A: Is the remedy functioning as intended by the ROD?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD as modified by the NAS Jacksonville Partnering Team.

- **HASP/Work Plans**: Both a project specific HASP and Groundwater Monitoring Plan have been developed.
- **Remedial Action Performance:** Review of annual groundwater monitoring reports indicates that COCs in groundwater meet MNA target levels and therefore the remedy is performing as designed.
- **System O&M**: There are no active remediation systems at OU 5 and therefore no system O&M is required.
- **Cost of System Operations/O&M**: There are no active remediation systems at OU 5 and therefore no system O&M is required.
- **Opportunities for Optimization**: Annual groundwater monitoring efforts are reviewed to determine if monitoring optimization opportunities exist.
- **Early Indications of Potential Remedy Failure**. No early indications of remedy failure were noted.

6.7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

Exposure Assumptions

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and TBC Criteria

In accordance with the ROD, the only chemical-specific ARARs identified for the site apply to the groundwater which still must be met. The following standards were identified as chemical-specific ARARs in the ROD. They were reviewed for changes that could affect protectiveness:

- RCRA Regulations, Releases from SWMUs (40 CFR Part 264, Subpart F)
- Safe Drinking Water Act Regulations, Maximum Contaminant Level Goals (40 CFR Part 141, Subparts B and F)
- USEPA Region III Risk-Based Concentrations

- Florida Surface Water Standards, FAC, Chapter 62-302
- Florida Groundwater Classes, Standards, and Exemptions, FAC, Chapter 62-520
- Florida Drinking Water Standards, FAC, Chapter 62-550
- Florida Groundwater Cleanup Target Levels, FAC, Chapter 62-777
- Florida Soil Cleanup Target Levels, FAC, Chapter 62-777

Since the last review, there has been a change to the naphthalene GCTL from the 20 to 14 µg/L. The groundwater data in Table 4 in Appendix D was screened against the new value for naphthalene (14 µg/L) and there were no exceedances. Also, several chemicals now have surface water cleanup target levels that may not have been promulgated at the time the OU 5 Proposed Plan and ROD were being issued. Results were screened against new standards where applicable and there were no exceedances of screening criteria.

Changes in Exposure Pathways, Toxicity, and other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (trespasser, maintenance worker) and future exposures (resident, trespasser, maintenance worker). There have been no changes in the toxicity factors for the COCs that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. The carcinogenic risk to an individual due to exposure to soil and groundwater exceeds $1x10^{-6}$ (state of Florida requirements) for child, adult, and lifelong residents. Additionally, the occupational worker's risk exceeds $1x10^{-6}$ for exposure to soil. The cancer risk exceeds both State and EPA risk levels greater than $1x10^{-4}$ for adult and lifelong residents.

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

There is no information that calls into question the protectiveness of the remedy.

6.8 ISSUES

No issues regarding OU 5 (PSC 51) were discovered during this Five-Year Review.

6.9 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

There are no recommendations or follow-up actions for OU 5 (PSC 51).

6.10 PROTECTIVENESS STATEMENT

The remedy at OU 5 (PSC 51) is protective of human health and the environment. The MNA effectiveness determination after collection of five years of data has been completed at this site and MNA was found to be meeting the RAOs, therefore the remedy for the short and long terms are protective. The institutional controls, groundwater monitoring, and surface water monitoring at PSC 51 provide an acceptable degree of protection of human health and the environment as long as they are conducted as required.

7.0 OPERABLE UNIT 6

OU 6 (Hangar 1000, PSC 52) is part of a complex that services large aircraft at NAS Jacksonville and is located slightly southwest of the flight line along the northern side of Yorktown Avenue slightly more than one mile east of the main entrance to the base off of Roosevelt Boulevard (Figure 1-2). OU 6 consists of the former locations of two USTs, Tank A and Tank B, which were operated from the late 1960s until they were closed in 1994. These tanks were located on the northeastern and eastern sides of the "keyway", which is the main entrance into Hangar 1000. Tank A was a 750-gallon concrete tank used as an oil and water separator and Tank B was a 2000-gallon steel UST, which received oil overflow from Tank A and waste oils and solvents discharged from other operations at the facility.

7.1 SITE CHRONOLOGY

A list of significant OU 6 historical events and relevant dates in the site chronology are provided in Table 7-1. The identified events are illustrative, not comprehensive.

7.2 BACKGROUND

7.2.1 Physical Characteristics of OU 6

The site is flat and the hangar itself is surrounded on the east, north, and west by a concrete apron/taxiway and on the south by asphalt parking for automobiles. The gated keyway is on the southern side of the hangar facing the parking area and Yorktown Avenue. Surface features are shown in Figure 7-1.

Surface water runoff is directed toward an extensive stormwater drainage system. Stormwater runoff in the vicinity of Hangar 1000 is primarily diverted to an underground storm sewer conduit on the southern side of Yorktown Avenue, which, in turn, empties into a drainage ditch located southeast of Hangar 1000. The storm sewer system was observed during a dry period and was found to contain flowing water, which indicates that the storm sewer also receives groundwater. Runoff from the drainage ditch flows south toward the St. Johns River, located approximately 2200 feet southeast of Hangar 1000. The drainage ditch was previously evaluated as PSC 44 and was determined to require no further action. There are no surface water bodies in the vicinity of Hangar 1000.

TABLE 7-1

**CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 6
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA**

Event (sub-events indented)	Date
Pre-discovery of contaminants at OU 6	
Tanks A and B go into service	Late 1960s
Last known discharge of waste into the tanks	Nov 1987
Initial discovery of problem or contamination	
RCRA inspection discovered that Tanks A and B were used to process Hangar 1000 discharges	1989
NPL listing	Nov 1989
FFA signature	1990
Post-NPL responses	
IAS discovers VOC contamination in soil and groundwater	1991 – 1992
Human Health Risk Assessment conducted	1992
Closure Plan submitted and approved by FDEP	Dec 1993
Various assessments to define extent of plume	1995 – 1999
Hangar 1000 tank system closed as a landfill and closure certification accepted by FDEP with post-closure actions	Oct 1997
Post-closure permit issued for NAS Jacksonville	2000
Interim Remedial action	
Tanks A and B, piping, and surrounding soil excavated	1994
Chemical oxidation treatments by CCI	2000 – 2001
Nanoscale Iron Injection Demonstration	2004 – 2005
MOA signed between USEPA, FDEP, and Navy to ensure LUC compliance	Sep 1999
Final RI/FFS report submitted	Mar 2004
Proposed Plan for Remedial Action (public comment period)	May to Jun 2006
ROD signature for OU 6	Mar 2007
Post-ROD activities	
LUC RD published	Oct 2007
MNA Work Plan published	Jun 2008
Current remedial activities	
Semi-Annual Annual Performance Monitoring	Jul 2009
Semi-Annual Annual Performance Monitoring	Nov 2009
Semi-Annual Annual Performance Monitoring	Apr 2010
Semi-Annual Annual Performance Monitoring	Aug 2010
Previous Five-Year Reviews	None for OU 6

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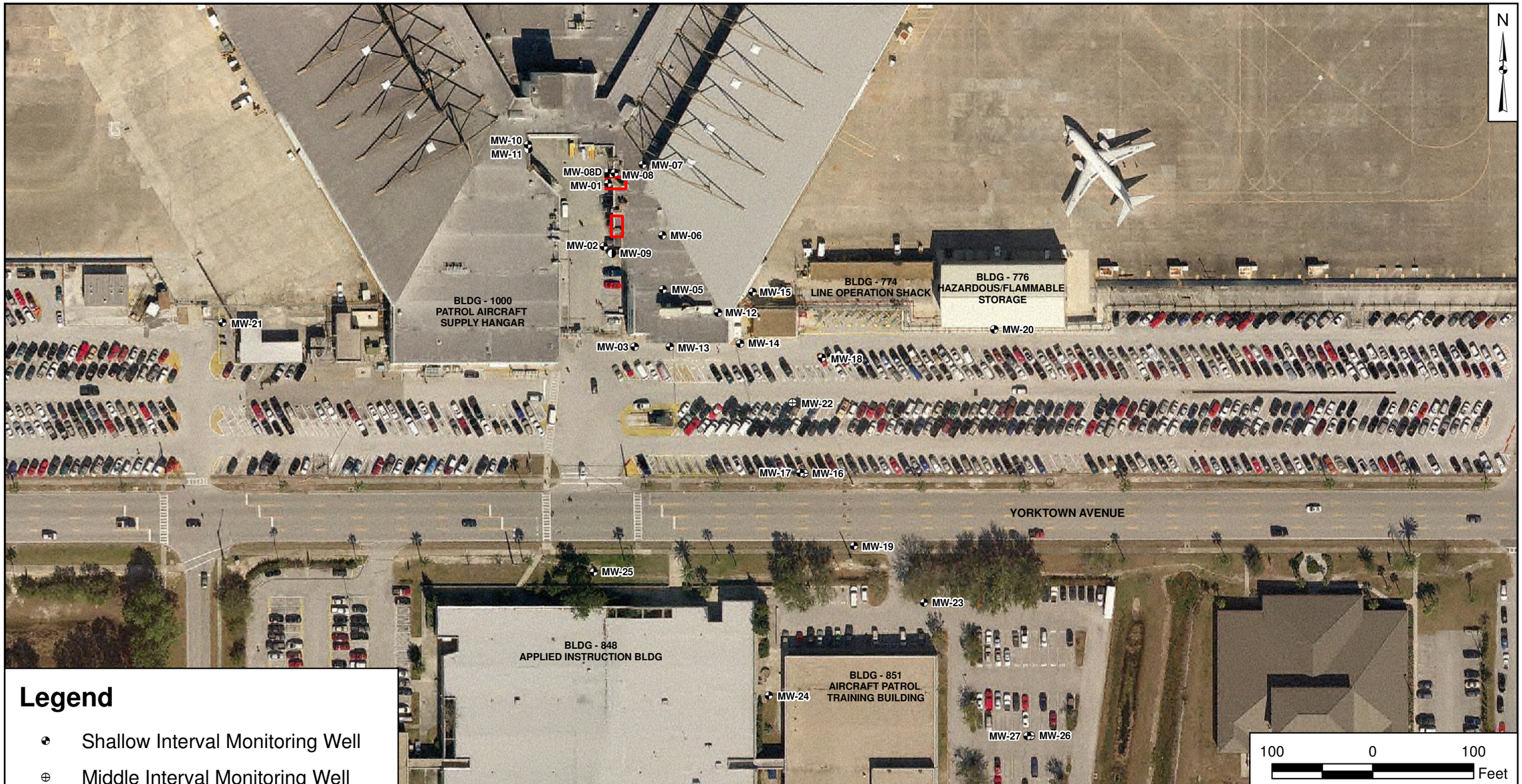

Legend

- Shallow Interval Monitoring Well
- Middle Interval Monitoring Well
- Deep Interval Monitoring Well
- Second Sand Unit Monitoring Well
- Approximate Former UST Location

DRAWN BY	DATE
T. WHEATON	10/11/10
CHECKED BY	DATE
J. JOHNSON	10/11/10
COST/SCHEDULE-AREA	
SCALE AS NOTED	

NAVFAC

MONITORING WELL LOCATION MAP
OU 6 - HANGAR 1000
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NUMBER CTO 152	
APPROVED BY —	DATE —
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FIGURE NO. FIGURE 7-1	REV 0

Groundwater is encountered at approximately 6 feet below the pavement surfaces at Hangar 1000. Shallow groundwater within the surficial aquifer flows to the southeast toward the drainage ditch located southeast of the site.

7.2.2 Land and Resource Use at OU 6

Hangar 1000 continues to be used as an industrial area, which is its anticipated future use. Access to OU 6 is restricted by fence and security guards and is limited to FRCSE personnel and authorized visitors. The Navy's plans provide for continued non-residential use of the site. Any changes to the current land use at Hangar 1000 would require prior approval from the USEPA and FDEP. Any changes to the property conveyances would require prior notification to the USEPA and FDEP.

The surficial aquifer at the site is not used as a groundwater source and NAS Jacksonville does not anticipate future use of the surficial aquifer. Except for the purposes of assessing groundwater quality or remediating groundwater contamination, the withdrawal or use of groundwater from the surficial aquifer for any purpose (including, but not limited to, human consumption, dewatering, irrigation, heating/cooling purposes, and industrial processes) is prohibited unless prior written approval is obtained from USEPA and FDEP.

7.3 HISTORY OF CONTAMINATION

During the late 1960s, two USTs, Tank A and B, were placed into service at Hangar 1000 as receptacles for solvents and waste oil discharged from operations at the facility. The last known discharge of waste into the tanks occurred in November 1987. Tank A was a 750-gallon concrete tank used as an oil and water separator that discharged water to a nearby storm sewer. Tank B was a 2000-gallon steel UST, which received oil overflow from Tank A and waste oils and solvents discharged from other operations at the facility. Historical documentation indicates that during periods of heavy rainfall, water in the storm sewer would back into the oil-water separator (Tank A), which was not designed to prevent back flow. Back flow into the separator presumably resulted in releases to the environment, and releases may have occurred over the life span of the tank system. Usage of the tanks for storage of waste liquids resulted in contamination of soil and groundwater. Groundwater contamination extends to approximately 29 feet bgs where a clay layer acting as an aquitard is present.

Evidence of contamination including the presence of petroleum constituents in the groundwater of OU 6 was discovered during post-closure actions of the tank system. Although the exact sources of contamination from OU 6 are unknown, it is presumed they resulted from historical spills that migrated into the storm sewer adjacent to the Tank A or from other operational areas at Hangar 1000.

Eight chlorinated solvent contaminants have been identified at concentrations exceeding GCTLs (Chapter 62-777, FAC) established by the FDEP in groundwater samples collected from monitoring wells. In addition, petroleum constituents have also been identified in groundwater at concentrations exceeding GCTLs. The approximate size of the groundwater-contaminated plume, as presented in the RI/FFS report (Tetra Tech, 2004a), is shown in Figure 7-2. The contaminant source area is approximately 400 square feet in size and was centered on Tank A in the northeastern quadrant of Hangar 1000 keyway. Groundwater flow direction in the surficial aquifer underlying Hangar 1000 is to the southeast toward Yorktown Avenue, which accounts for the contaminant plume extending and broadening to the southeast from the source area, as indicated in Figure 7-2.

7.3.1 Initial Responses at OU 6

In 1989, a RCRA inspection discovered that Tanks A and B were used to process discharges from Hangar 1000 wash racks and maintenance shops. Between 1991 and 1992, initial assessment activities discovered VOC contamination in soil and groundwater at Hangar 1000.

In 1994, Tanks A and B and associated piping were excavated and removed, except for piping that had to be cleaned and abandoned in place due to the presence of structures. During excavation and removal of the tanks, soil with contaminant concentrations exceeding industrial use risk-based target concentrations was delineated, excavated, and transported off-site for disposal. Based on confirmation soil samples collected in 1995, the tank/soil removal and abandonment of piping achieved current FDEP SCTLs for residential use. As a result, subsequent cleanup efforts, outlined by post-closure permits, have been exclusively directed at reducing concentrations of contaminants in groundwater below residential risk-based target levels. A total of 26 monitoring wells have been installed near Hangar 1000 for the purpose of groundwater quality assessment.

An IRA consisting of chemical oxidation treatment of groundwater was conducted in the source area in 2000 and 2001 (CCI, 2004b). Following this IRA, additional assessment was performed to define the extent of groundwater contamination. An RI/FFS for Hangar 1000 was completed in 2004 (Tetra Tech, 2004a). In 2005, a nanoscale particle (NP) study was completed (Tetra Tech, 2005c). The purpose of the NP treatability study at Hangar 1000 was to determine whether the NP injection into a source area could significantly reduce chlorinated VOC mass and concentrations in saturated soil and groundwater.

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DRAWN BY T. WHEATON	DATE 10/11/10	BOUNDARY OF CONTAMINANT PLUME OU 6 - HANGAR 1000 NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NUMBER CTO 152
CHECKED BY J. JOHNSON	DATE 10/11/10		APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			FIGURE NO. FIGURE 7-2 / REV 0

7.3.2 Basis for Taking Action at OU 6

VOCs (primarily chlorinated solvents), SVOCs, and petroleum-based constituents are present in shallow groundwater of the surficial aquifer at OU 6 at concentrations exceeding FDEP GCTLs (Tetra Tech, 2007c). According to the RI/FFS, the COCs that warrant PRGs for groundwater and surface water are 1,2-DCA, 1,1-DCE, 1,2-DCE, 1,1,1-TCA, 1,1,2-TCA, TCE, PCE, vinyl chloride, benzene, 3-methylphenol, 4-methylphenol, and naphthalene (Tetra Tech, 2004).

The ROD stated that response actions were necessary to prevent contaminants from presenting an imminent and substantial endangerment to public health, welfare, or the environment. In particular, unacceptable human health risks could result from uncontrolled exposures to surficial aquifer groundwater at Hangar 1000.

7.4 REMEDIAL ACTIONS

Based upon the soil removal activities conducted as part of the RCRA-regulated tank closures, which removed contaminated soil above residential use criteria, the NAS Jacksonville Partnering Team agreed that no further actions are necessary for soil at Hangar 1000 under CERCLA. The selected remedy for site groundwater is expected to reduce unacceptable levels of COCs in the surficial aquifer to levels below FDEP GCTLs.

As stated in the ROD, the RAOs for OU 6 are to prevent unacceptable risks from human exposure to COCs in groundwater at Hangar 1000, and to prevent contaminants at levels above PRGs from migrating from groundwater to surface water (in the drainage ditch).

7.4.1 Remedy Selection at OU 6

The ROD for OU 6 was signed in March 2007 and describes the final selected remedy for Hangar 1000. It is based upon a Human Health Preliminary Risk Evaluation, a Screening Level Ecological Risk Assessment, an RI/FFS, a Treatability Study Report, and the Proposed Plan completed for Hangar 1000. The individual components of the selected remedial action for groundwater at OU 6 include source reduction through NP injection, MNA of groundwater, LUCs, and surface water monitoring. The selected remedy was determined based upon evaluation of the site conditions, site-related risks, future land use, ARARs, and agreed upon RAOs.

The major components of the selected remedy were as follows:

- Source reduction with NP technology: This component has already been implemented and consisted of injecting controlled amounts of an emulsion of catalyst-coated ultra fine-grained iron particles in the source area to promote reductive dechlorination of the chlorinated VOCs that are the main groundwater contaminants. Application of NP technology is protective of human health and the environment as it actively removes sources of groundwater contamination and considerably accelerates the reduction of COC concentrations. To ensure good contact between the emulsion and the contaminated matrix, the NP emulsion was applied by both direct injection and a recirculation pumping system.

- Groundwater MNA: Natural Attenuation is expected to reduce remaining contamination levels over time to below applicable cleanup goals through biological and other natural processes. Monitoring will consist of collecting and analyzing groundwater samples from within the contaminant plume for contamination breakdown to assess the effectiveness of this attenuation process after the implemented NP treatment. Monitoring is expected to be protective of the environment by evaluating the progress of remediation and detecting potential migration of contaminated groundwater so that appropriate actions can be taken, if required. Quarterly monitoring will be performed for a period of one year to establish a baseline. After completion of quarterly monitoring, recommendations will be made for modifications to the MNA program and the MNA Work Plan will be updated. Groundwater monitoring will continue until cleanup is complete, unless during a Five-Year Review, site conditions suggest that a different cleanup method should be considered. The effectiveness of MNA is significantly enhanced by the removal of contaminant sources, and monitoring is estimated to last 18 years. Procedures for the implementation, monitoring, and reporting on MNA is detailed in the Monitored Natural Attenuation Work Plan for Hangar 1000 (Tetra Tech, 2008c).

  For contingency action of the groundwater remedy, milestone objectives have been established for groundwater COCs to attain PRGs within 18 years from the date of the ROD approval. The milestone objectives will be reviewed during the Five-Year Reviews to determine if contingency actions should be considered. In the event that MNA is not occurring at an acceptable rate, additional NP injections or other treatment technologies will be considered to increase the degradation of COCs in groundwater.

- Land Use Controls: LUCs to prohibit groundwater extraction or use or future interference with the groundwater monitoring system at the site will be implemented, monitored, maintained, reported on, and enforced by the Navy. These LUCs will be maintained until concentrations of COCs in groundwater are at such levels as to allow for unrestricted use and unlimited exposure. These LUC

restrictions will be removed only upon approval by the USEPA and the FDEP. The specific objectives of the LUCs are as follows:

- Prohibit the future extraction or use of groundwater beneath Hangar 1000 until acceptable cleanup target levels, i.e. PRGs, have been achieved.
- Prohibit the disturbance of and/or interference with, the current or future groundwater monitoring systems at the site.

Procedures for the implementation, maintenance, monitoring, reporting on, and enforcing of the selected LUCs to include periodic site inspections is detailed in the LUC RD (Tetra Tech, 2007d).

- Surface Water Monitoring: The assessment of surface water, which potentially could be impacted by the migration of contaminated groundwater from the site, will be conducted at those sites designated in the MNA Work Plan for Hangar 1000 to verify that area surface waters are not being contaminated by residual site groundwater (Tetra Tech, 2008c).

7.4.2 Remedy Implementation at OU 6

Source reduction with NP technology has already been implemented at Hangar 1000 and the Navy believes further NP treatment is unnecessary at this time. Additional information regarding this NP treatability study can be found in the Nanoscale Iron Injection Demonstration Cost and Performance Report (Tetra Tech, 2005c). The Navy may conduct additional NP treatment as a contingency action should future monitoring results indicate that additional source treatment is warranted.

The quarterly groundwater monitoring began in 2009 with the first events conducted in July 2009, November 2009, April 2010, and August 2010. As per the MNA Work Plan, COC concentrations in groundwater and natural attenuation conditions will be documented in a groundwater and surface water monitoring report, which has not yet been completed.

7.4.3 System O&M at OU 6

According to cost estimates from the ROD, the approximate annual cost for the long-term monitoring and LUCs associated with the remedy at OU 6 is $25,080 for the first five years with semi-annual sampling and $11,160 after that time with annual sampling. Additionally, a site review every five years is estimated to cost $7,000.

The Navy's 2007 present worth cost estimate for implementation and operation of the aforementioned system was approximately $598,000. This figure assumed a discount rate of 7 percent, includes monitoring for an 18 year period, and includes pricing for the completed NP injections.

7.5 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first Five-Year Review since the OU 6 ROD was signed.

7.6 FIVE-YEAR REVIEW PROCESS

7.6.1 Document Review

This Five-Year Review consisted of a review of relevant documents including the ROD, the LUC RD document, and the MNA Work Plan for OU 6.

7.6.2 Data Review

As mentioned above, a comprehensive report describing four semi-annual monitoring events has not yet been completed. Thus, there are no data to review for this Five-Year Review.

7.6.3 Site Inspection and Interviews

Tetra Tech conducted a site inspection of OU 6 on August 25, 2010. Prior to initiating the inspection, the inspector interviewed the IR manager, Mr. Tim Curtin. Mr. Curtin accompanied the Tetra Tech inspector during the site inspection, which included visual observations of the former locations of Tanks A and B. The fence at the south end of Hangar 1000 is in good condition, and access is restricted by a gate that requires special access procedures to pass through.

7.7 TECHNICAL ASSESSMENT

7.7.1 Question A: Is the remedy functioning as intended by the ROD?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD.

- **HASP/Work Plans**: Both a project specific HASP and Groundwater Monitoring Plan have been developed.
- **Remedial Action Performance:** The site is in the initial year of groundwater monitoring. Performance of the remedial action will be evaluated at the completion of one year of monitoring.

- **System O&M**: There are no active remediation systems at OU 6 and therefore no system O&M is required.
- **Cost of System Operations/O&M**: There are no active remediation systems at OU 6 and therefore no system O&M is required.
- **Opportunities for Optimization**: Optimization of the groundwater monitoring effort will be completed after the initial year of monitoring and updates to the Groundwater Monitoring Plan will be completed as necessary.
- **Early Indications of Potential Remedy Failure**. No early indications of remedy failure were noted.

7.7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no significant changes to the standardized risk assessment methodology or toxicity criteria data that could affect the protectiveness of the remedy.

A vapor intrusion assessment was conducted during the RI/FS and found that no unacceptable risks were posed to site workers as a result of the potential for indoor air vapor intrusion of site related COCs.

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

No other information has come to light that would call into question the protectiveness of the remedy.

7.8 ISSUES

No issues concerning OU 6 were discovered during this Five-Year Review.

7.9 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Since no issues were discovered, there are no recommendations and follow-up actions.

7.10 PROTECTIVENESS STATEMENT

The remedy at OU 6 is protective for short term and for long term it is expected to be protective and will be determined when we have reviewed 5 years of groundwater monitoring data. The institutional controls,

groundwater monitoring, and surface water monitoring at OU 6 provide an acceptable degree of protection of human health and the environment as long as they are conducted as required.

8.0 OPERABLE UNIT 7

OU 7 (PSC 46), the Defense Reutilization and Marketing Office (DRMO), is an outparcel located on the west side of Roosevelt Boulevard (U.S. Highway 17) at the southwestern corner of the NAS Jacksonville property (Figure 1-2). The site was developed in 1939 by the United States Army and first served as a decommissioning facility for used aircraft. The aircraft were drained of fluids at PSC 51, located east of the current DRMO, and transported to the southern portion of the DRMO. The decommissioning process included segregating airplane parts such as rubber, leather, metal, and glass to be recycled or disposed. Parts made of aluminum were then melted (smelting) into aluminum ingots. Materials were then shipped off-site by railroad cars from the west side of the site.

In the late 1940s, the site was adapted for its current use. DRMO's mission is to provide a means for the disposal of surplus Navy equipment, supplies, and scrap materials. Materials are stored within the fenced yard prior to sale to the public. A wide array of surplus material has been dispensed to the public by DRMO, including vehicles, appliances, electrical devices, transformers, batteries, scrap materials, various chemicals, furniture, storage vessels, and other items. Some reconditioning and maintenance work has been performed on surplus materials at the site, albeit on a relatively small scale.

Past operations at OU 7 resulted in a wide range of organic and inorganic contamination of shallow soil, surface water, and groundwater. VOC, SVOC, metal, PCB, and RAD contaminants exceed FDEP SCTLs for residential exposure, FDEP GCTLs, USEPA Region IV freshwater Screening Values, and FDEP Class III Surface Water Criteria.

8.1 SITE CHRONOLOGY

A list of significant OU 7 historical events and relevant dates is provided in Table 8-1.

8.2 BACKGROUND

8.2.1 Physical Characteristics of OU 7

OU 7 is a relatively flat parcel surrounded by a chain link fence. The site is a wedge-shaped tract with the long dimension oriented north to south, and with approximate dimensions of 650 feet wide on the southern edge, 1,500 feet (north-to-south), and 120 feet wide on the northern edge. With the exception of a grassy area covering approximately 6,000 square feet in the south central portion of the

TABLE 8-1

**CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 7
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA**

Event (sub-events indented)		Date
Pre-discovery of contaminants at OU 7		
	Site developed to decommission used aircraft	1939
	Site adapted to use as DRMO	Late 1940s
Initial discovery of problem or contamination		
	Personnel observed that storage areas of hazardous materials drained into perimeter storm water ditch	1991
	Oil/water separator sludge determined to be hazardous waste	1994
NPL listing		Nov 1989
FFA signature		1990
Post-NPL responses		
	Site screening by HLA for chemical constituents	Jul 1997
	RAD survey by U.S. Army Center for Health Promotion and Prevention Medicine	Jun 1998
	Backup RAD survey done by BEI	Dec 1998
	Sampling Event Report published by HLA	Jul 1999
	Site designated as OU 7	2001
	Site-wide RAD survey and soil/sediment sampling event by CCI	Sep 2003
	Restoration Advisory Board meeting	Sep 2003
	Additional RAD evaluation by CCI	Jun 2004
	Second site wide RAD survey by CCI	Oct 2007
Interim Remedial action		
	Inadvertent removal of non-RAD contaminated sediment by Florida Department of Transportation	Nov 2003
	Interim Measures Soil Removal	2005
	Soil removal to facilitate concrete replacement project	2007
MOA signed between USEPA, FDEP, and Navy to ensure LUC compliance		Sep 1999
Final RI/FFS report submitted		May 2003
Proposed Plan for Remedial Action (public comment period)		Sep to Oct 2003
ROD signature for OU 7		Sep 2005
Post-ROD RCRA activities		
	Draft LUC RD published	Mar 2007
	Remedial Action Work Plan published	Oct 2007
	Unexploded ordnances (UXO) unearthed at OU 7	Oct 2007
Current remedial activities: UXO clearance		2011 (expected)
Previous Five-Year Reviews		None for OU 7

property, the 11.5 acre site is either paved or covered with buildings. Surface features are shown in Figure 8-1 and discussed below.

Drainage ditches are located along the east, west, and south sides of OU 7. The eastern perimeter ditch is situated outside the DRMO property boundary between Roosevelt Boulevard and the chain link fence. The southern ditch is located on the DRMO property just inside the fence. The easternmost part (250 feet) of the southern perimeter ditch is lined with concrete. Two ditches are present on the west side of the property. The western ditch outside the property boundary is not hydraulically connected with the other perimeter ditches. A second ditch is located inside the western property boundary parallel with the longer ditch outside the property. This inner ditch originates within the DRMO approximately 400 feet north of the southwestern corner of the property and receives runoff from the DRMO yard. Flowing surface water is generally present in these ditches only during and recently after rain events. Storm water in these ditches eventually flows to the south toward Interstate 295. There are no permanent surface water bodies in the vicinity of OU 7.

A railroad line parallels the western boundary of DRMO. Historically, a spur from this main line entered the DRMO along the west-central property boundary. This spur provided rail access to site structures on the west side of the facility, but this spur has been removed.

Two aboveground storage tanks (ASTs) and an underground oil/water separator are located in the southeast corner of the DRMO yard. Storm water runoff from a large portion of the yard drains to the separator and is discharged into the concrete-lined portion of the south perimeter ditch. During heavy rain events, surface water runoff may bypass the oil-water separator and discharge directly into the drainage ditch.

Storage cells bounded by concrete barricades are present along the southern property boundary west of the oil/water separator and along the western property boundary south of the railroad spur. These cells extend approximately 50 feet north from the property boundaries and vary in width from approximately 30 to 50 feet. Materials stored in these cells include used tires, scrap metal, and various surplus parts.

Buildings 174, 174D, and 1903 contain offices for administrative transactions and Building 238 is used for shipping/receiving. Various materials, including hazardous materials, are stored in Building 174A. Building 986 and two sheds surrounded by chain-link fence to the north of Building 986 are used for storage of non-hazardous materials. Items not adversely affected by exposure to weather are stored in delineated aisles in the extensive asphalt-covered area north of Building 1900 and north of the two sheds.

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SITE PLAN
OU7 - DRMO YARD
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NUMBER	
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FIGURE NO.	REV
FIGURE 8-1	0

Shallow groundwater at OU 7 is present under unconfined conditions and is typically encountered at depths ranging from 2 to 5 feet. Based on the water level measurements taken during the RI, groundwater flows radially to the southwest, west, northwest, and north-northwest from a relative high in the central portion of the site. It is believed this is an artificial condition caused by mounding of storm water infiltration on a shallow clay layer in the center of the site.

8.2.2 Land and Resource Use at OU 7

DRMO continues to be used as an industrial area, which is its anticipated future use. Access to OU 7 is restricted by fence and security check-in at a manned gate, and is limited to DRMO personnel and authorized visitors. The Navy's plans provide for continued non-residential use of the site. Any changes to the current land use or excavations at OU 7 would require prior approval from the USEPA and FDEP. Any changes to the property conveyances would require prior notification to the USEPA and FDEP.

The surficial aquifer at the site is not used as a groundwater source at this time and NAS Jacksonville does not anticipate future use of the surficial aquifer. The Navy will ensure that until the site cleanup levels are met, there will not be any withdrawal of and/or use of groundwater without FDEP and USEPA concurrence.

8.3 HISTORY OF CONTAMINATION

Waste materials previously stored or disposed at the DRMO include VOC, SVOC, pesticide, PCB, inorganics, and RAD materials. Historical activities may have impacted the environment. Releases of various contaminants to the ground surface could have occurred as a result of leaks, spills, and/or direct placement of waste materials on surface soils. Based on review of a 1946 aerial photograph, the site was not paved then, and releases or spills could have resulted in seepage of contaminants directly into soils.

In 1991, NAS Jacksonville personnel observed that storage areas for lead acid batteries, hazardous materials, drums, and transformers drained into the western perimeter ditch inside the fenced area of DRMO, and eventually offsite. In 1994, sludge from an underground oil/water separator was characterized as a hazardous waste. Although the oil/water separator is connected to the southern drainage ditch at the southeastern corner of the site, it is not believed to be a major source of contamination in the ditches. Sludge removed from the oil/water separator was disposed of at a licensed disposal facility.

8.3.1 Initial Responses at OU 7

8.3.1.1 Site Investigations Focusing on Chemical Contamination

HLA performed site screening for chemical constituents at DRMO from April to July 1997. The intent of this investigation was to evaluate if hazardous constituents, other than radiologically active media, were present in the DRMO perimeter ditches. Groundwater, surface water, surface soil, and sediment samples were collected from various locations throughout the site's perimeter ditch system and submitted for laboratory analysis. No analytical data were collected from the interior portion of the site. One or more targeted compounds (various SVOCs, pesticides, PCBs, and inorganic compounds) were reported at values exceeding federal and/or state criteria in the media types sampled.

Tetra Tech completed RI/FFS field activities from February to March 2001. The approach for the RI/FFS was to spatially screen the site for potential impacts from historical operations, and to evaluate known areas of potential concern. This approach included the use of non-biased and biased approaches to sample collection and an analytical program designed to target known COPCs and also screen the site for other constituents. The results of the RI and previous sampling events show that the media investigated have been impacted with COCs above regulatory thresholds. An Ecological Risk Assessment was performed as part of the RI to estimate the potential impacts of contaminants on plant and animal life. The results of the ecological risk assessment showed that contamination in soil, sediment, and surface water did not pose a significant risk to ecological receptors.

As part of the remedial design, a non-RAD sampling event was conducted by CCI in September 2003. The intent of this sampling effort was to delineate the horizontal and vertical extent of contaminated soil and ditch sediment that exceed FDEP Direct Exposure-Commercial/Industrial SCTLs for the areas identified for removal in the RI/FFS.

8.3.1.2 Site Investigations Focusing on Radiological Contamination

In June 1998, representatives from the U.S. Army Center for Health Promotion and Prevention Medicine conducted an industrial radiation survey at DRMO and identified areas with elevated radiation exposure readings. A follow-up study was conducted later in December 1998 by BEI in which radiation readings were obtained in three distinct areas on the western side of the DRMO yard. Radiological impacts are thought to have originated during airplane disassembly operations conducted at the DRMO site in the 1940s because paints used on these aircraft contained radium. RAD "hotspots" identified by BEI were confined to the western side of the DRMO yard, with three areas identified as potential candidates for clean up.

In 2001, Tetra Tech with B. Koh and Associates, Inc. completed a RAD assessment to determine the nature and extent of RAD contamination in the three areas historically identified as potential candidates for clean up. The results of this assessment show that Radium-226 was the only RAD species at values exceeding regulatory criteria.

Because of the focused nature of the historical RAD investigations and no evidence of a DRMO site-wide RAD investigation, CCI with Radiological Assessment Services, Inc. (RASI) completed a more comprehensive RAD characterization survey of the DRMO facility in August and September 2003. In July 2007, CCI and RASI completed a second site-wide gamma walkover survey of the site to identify locations of point sources (a point source is a discrete particle with elevated radioactivity) and delineate limits of concrete replacement where there is potential for RAD exposure. Surveyed areas included the site perimeter, unpaved areas, and paved areas with cracks, depressions, or cover deformities that might eliminate or reduce attenuation of source material.

8.3.1.3 Completed Remedial Actions

During routine maintenance of ditches adjacent to highways, Florida Department of Transportation inadvertently removed non-RAD contaminated sediment from the eastern perimeter ditch adjacent to Roosevelt Boulevard in November 2003. Based on a visual inspection performed following the removal, sufficient sediment was removed during the maintenance action, and no additional remedial actions for the eastern perimeter ditch are necessary.

An Interim Measure soil removal action was performed by the Navy Environmental Multiple Awards Contract contractor, WRS Infrastructure & Environment, Inc. in 2005. Five areas were remediated for chemical and/or RAD contamination within the confines of the DRMO.

This area was designated as the Phase II-A removal area and is shown, along with the other removal areas, in Figure 8-2.

8.3.2 Basis for Taking Action at OU 7

Investigations at OU 7 indicated the presence of soil, sediment, and groundwater contamination from past operating practices. If not addressed by implementing the response actions detailed in the ROD, contaminants from this site may present an endangerment to public health, welfare, or the environment. Unacceptable human health risks could result if residential development occurred at OU 7, if uncontrolled excavation was allowed at the site, or if the groundwater was used as a potable water source.

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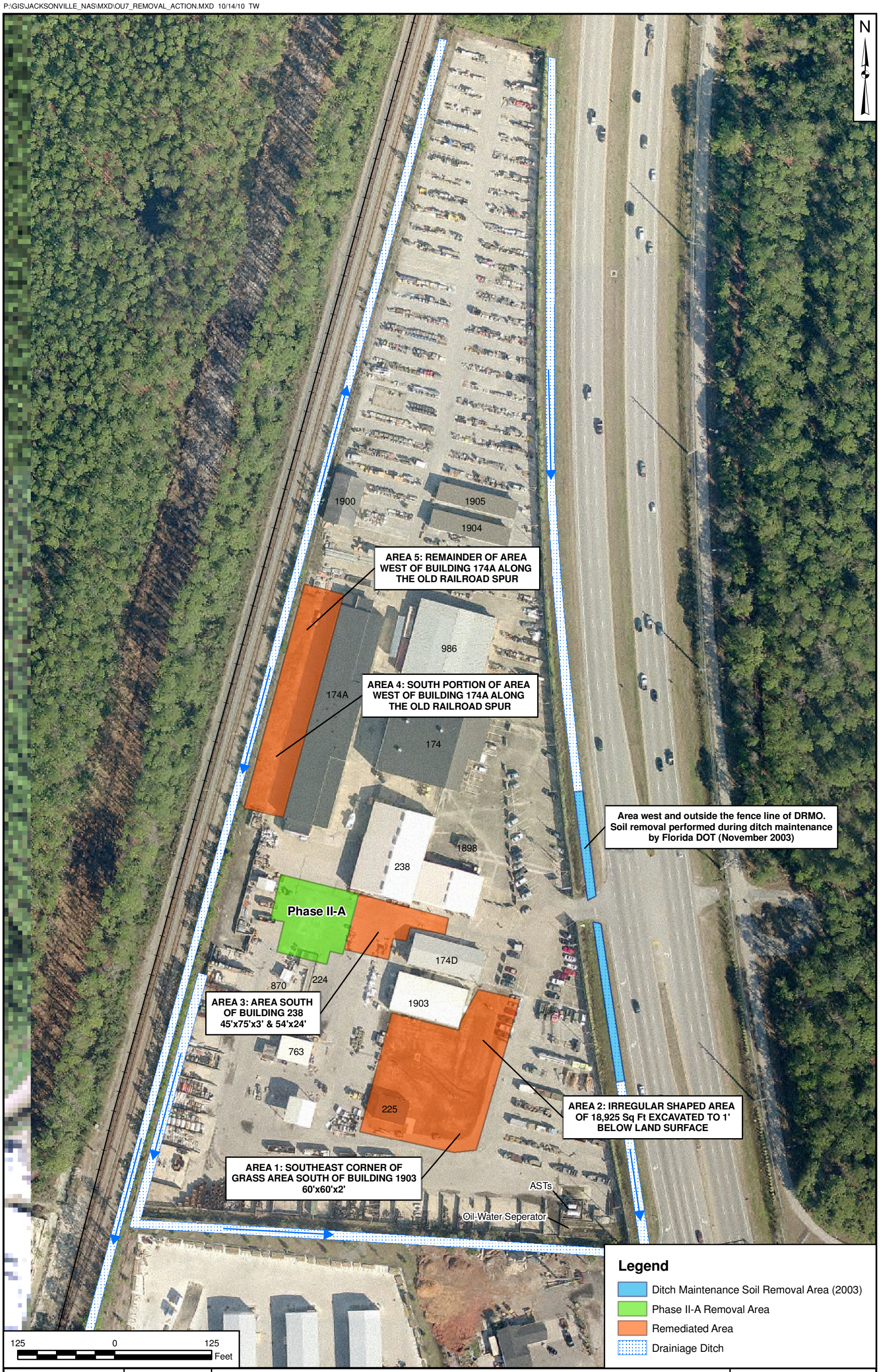

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PRIOR REMOVAL ACTION LOCATIONS
OU7 - DRMO YARD
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

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FIGURE 8-2	0

8.4 REMEDIAL ACTIONS

The RAOs stated in the OU 7 ROD are as follows:

- To prevent unacceptable risk from exposure to soil and sediment with concentrations of metals (aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, copper, iron, lead, manganese, nickel, and vanadium), PAHs [including benzo(a)anthracene; benzo(a)pyrene; benzo(b)fluoranthene; dibenzo(a,h)anthracene; indeno(1,2,3-cd)pyrene; dieldrin; Aroclor 1254; and Aroclor 1260], total PCBs, and radium-226 greater than the FDEP residential SCTLs and concentrations of arsenic greater than the background value.

- To prevent unacceptable risk from ingestion of groundwater with concentrations of vinyl chloride, 1,1-DCE, and arsenic greater than both FDEP GCTLs and NAS Jacksonville Background Concentrations.

- To reduce concentrations of vinyl chloride; 1,1-DCE; and arsenic in groundwater to less than the FDEP GCTLs and NAS Jacksonville Background Concentrations.

The PRGs issued in the ROD for OU 7 were FDEP 1999 SCTLs for residential and industrial receptor scenarios for soil. Subsequent to the ROD being published, SCTLs were re-issued by FDEP in 2005 that revised the risk-based concentrations allowable in soils for several of the constituents identified as COCs by the ROD of OU 7. Taking into account the areas where prior remedial actions have been completed, the soil and sediment analytical data collected to date were compared against both the 1999 and 2005 FDEP Direct Exposure-Commercial/Industrial SCTL criteria in the Remedial Action Work Plan (Tetra Tech, 2007e). Based on the comparison, contamination remaining at DRMO includes carcinogenic PAHs, PCBs, arsenic, chromium, and lead in excess of the 2005 FDEP Direct Exposure-Commercial/Industrial SCTLs. The GCTLs for vinyl chloride, 1,1-DCE, and arsenic remained unchanged.

8.4.1 Remedy Selection at OU 7

The ROD for OU 7 was signed in September 2005 and describes the final selected remedy for OU 7. The selected remedial action for OU 7 includes excavation of surface soil/sediment in storm water ditches; MNA for groundwater; and restriction of site access through LUCs to prevent exposure to surface soil, prevent any residential reuse activities, and prevent extraction or consumption of groundwater from taking place at this location. LUCs include institutional controls and engineering controls. The selected remedy was determined based on evaluation of the site conditions, site-related risks, future land use, ARARs, and RAOs.

The major components of the selected remedy are as follows:

- Excavation and Disposal: Soil contaminated with concentrations of COCs above FDEP direct exposure industrial SCTLs would be excavated. Pre-excavation sampling would be conducted in order to verify the extent of contamination, and determine whether the soil should be disposed as non-hazardous, hazardous, and radiologically contaminated. The areas highlighted as shown on Figure 8-3 would be excavated down to an estimated 1 foot bgs, except for one area near in the center of the site, which would be excavated to an estimated 3 feet bgs. The highlighted areas on Figure 8-3 also indicate preliminary assumptions for disposal requirements of excavated soil. A preliminary estimate indicates approximately 589 cubic yards of soil to be disposed of as non-hazardous waste, 319 cubic yards of soil disposed of as hazardous waste, and 717 cubic yards of soil disposed of as radiologically-impacted waste. Following excavation, the excavated areas would be backfilled with clean fill and regraded to achieve desired surface elevations. Depending on its characteristics, the excavated soil would be transported to one of three off-site facilities; a RCRA Subtitle D landfill, RCRA Subtitle C landfill, or licensed Radioactive Waste Disposal Facility for non-hazardous, hazardous, or radiologically contaminated, respectively. Procedures for pre-excavation surveying, waste sampling, soil/sediment excavation, concrete cover placement, and disposal are detailed in the Remedial Action Work Plan (Tetra Tech, 2007e).

- Land Use Controls: LUCs will be implemented to prohibit both residential development at OU 7 and usage of the surficial aquifer beneath the site and thereby reduce unacceptable risks from exposure to contaminated soil and/or groundwater. LUCs will be monitored, implemented, reported on, and maintained by the Navy for OU 7 to ensure the following objectives are met.

  - Prevent non-industrial development of OU 7 until acceptable risk levels or CTLs are achieved.
  - Ensure no construction on or excavation of the contaminated soil without special handling and disposal procedures for the soil.
  - Prevent drilling, excavation, or any activity which would interfere with the remedial or monitoring systems.
  - Ensure no withdrawal of and/or use of the groundwater without FDEP and USEPA concurrence until cleanup levels are met.

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AREAS EXCEEDING INDUSTRIAL SCTLs AND RADIOLOGICAL CRITERIA
OU7 - DRMO YARD
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NUMBER	
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FIGURE NO.	REV
FIGURE 8-3	0

- Ensure any workers that might potentially be exposed to the contaminated soil or groundwater at this site are properly trained.
- Maintain paving in areas with soil contamination above residential risk levels in order to limit the potential for exposure to contaminated soil.
- Place warning signs at the site.

Procedures for the implementation, maintenance, monitoring, reporting on, and enforcing of the selected LUCs to include periodic site inspections are detailed in the LUC RD (CCI, 2007c).

- MNA: Natural Attenuation is expected to reduce remaining contamination levels over time to below applicable cleanup goals through biological and other natural processes. Monitoring will consist of collecting and analyzing groundwater samples from eight existing monitoring wells for contamination breakdown to assess the effectiveness of this attenuation process after implementing the excavation and disposal of contaminated soil. Monitoring would be protective of the environment by evaluating the progress of remediation and detecting potential migration of contaminated groundwater so that appropriate actions can be taken, if required. Sampling frequency will be quarterly the first year, semi-annually the second year, and annually thereafter, continuing until PRGs are attained. The effectiveness of MNA will be enhanced by the removal of contaminated soil/sediment and due to the low level of contaminants detected above the GCTL values, it is anticipated attenuation will occur within five years. If, however, the site review indicates that a more aggressive alternative should be considered, the monitoring schedule would be reconfigured. The number of wells to be sampled, the parameters to be analyzed, and the sampling frequency may change over time dependent upon sample results and with approval by the Navy, USEPA, and FDEP. Procedures for the implementation, monitoring, and reporting on MNA is detailed in the Remedial Action Work Plan for OU 7 (Tetra Tech, 2007e).

- Contingency Remedy: Progress of the remedy will be evaluated through a review of LUC Checklists and groundwater monitoring data on an annual basis. If the results of the site review show that (1) the implemented LUCs have failed to prevent unacceptable risks from exposure to on-site soil and/or groundwater contamination; (2) contaminated groundwater has migrated to an unacceptable degree as determined by sentinel well sampling results; or (3) the COC contamination in groundwater is not attenuating as expected, then additional active remedial measures would need to be evaluated and possibly implemented. Potential contingency remedial measures could include additional excavation and off-base disposal of contaminated soil and the extraction, on-site treatment, and surface discharge of contaminated groundwater. Should a contingency remedy be required, implementation will be accomplished through another CERCLA document.

8.4.2 Remedy Implementation at OU 7

In October 2007, four UXO items were unearthed during excavation activities at OU 7. Further excavation and disposal of contaminated soil or sediment has ceased until the site has obtained UXO clearance, which is anticipated by 2011. As outlined in the Remedial Action Work Plan, groundwater sampling is scheduled to commence after excavation is completed (Tetra Tech, 2007e). A draft LUC RD (CCI, 2007c) has been published; however, LUCs are not currently in place due to delay in the implementation of the soil remedy.

8.4.3 System O&M at OU 7

According to cost estimates from the ROD, the approximate annual cost for the long-term monitoring and LUCs associated with the remedy at OU 7 is $64,000 for quarterly sampling during the first year, $32,000 for semi-annual sampling during the second and third years, and $21,000 after that time with annual sampling. Additionally, a site review every five years is estimated to cost $5,000.

The Navy's 2005 worth cost estimate for implementation and operation of the aforementioned remedial action was approximately $1,857,000. This figure assumed a discount rate of 7 percent, includes monitoring for a five year period, reviews over a 30 year period, and pricing for the excavation and disposal of contaminated soil and sediment. However, the discovery of potential UXO at OU 7 during soil removal operations has resulted in a delay of the project and an associated increased cost. The additional cost associated with the delay and modified excavation approach was not available during preparation of the five-year review.

8.5 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first Five-Year Review since the ROD signing of OU 7. Therefore, there is no progress to report.

8.6 FIVE-YEAR REVIEW PROCESS

8.6.1 Document Review

This Five-Year Review consisted of a review of relevant documents including the ROD, LUC RD and Remedial Action Work Plan for OU 7.

8.6.2 Data Review

Because the selected remedy has been delayed due to discovery of UXO, no analytical data have been generated. The groundwater monitoring has not yet commenced at OU 7.

8.6.3 Site Inspection and Interviews

Tetra Tech conducted a site inspection of OU 7 on August 26, 2010. Prior to initiating the inspection, the inspector interviewed the IR manager, Mr. Tim Curtin. Mr. Curtin accompanied the Tetra Tech inspector during the site inspection, which included visual observations of OU 7 including fences and access gate. The fence is in good condition, and access into the facility is restricted by a manned security gate. The IR Manager reports that there have been no incidents of trespassing or vandalism in the area.

8.7 TECHNICAL ASSESSMENT

8.7.1 Question A: Is the remedy functioning as intended by the ROD?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD.

- **HASP/Work Plans**: Site specific HASPs and Site Safety Submittal documents has been developed.
- **Remedial Action Performance:** Remedial action performance cannot be determined at this time.
- **System O&M**: There are no active remediation systems at OU 7 and therefore no system O&M is required.
- **Cost of System Operations/O&M**: There are no active remediation systems at OU 7 and therefore no system O&M is required.
- **Opportunities for Optimization**: Optimization of the groundwater monitoring effort will be completed after the initial year of monitoring and updates to the Groundwater Monitoring Plan will be completed as necessary.
- **Early Indications of Potential Remedy Failure**. No early indications of remedy failure were noted. The LUCs are not currently in place; due to the discovery of UXO, the implementation of the soil remedy has been delayed. OU 7 is located on an active military base, and access to OU 7 is restricted.

8.7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

The PRGs issued in the ROD for OU 7 were obtained from the FDEP 1999 SCTLs for residential and industrial receptor scenarios for soil. Subsequent to the ROD being published, SCTLs were re-issued by FDEP in 2005 that revised the risk-based concentrations allowable in soil for several of the constituents identified as COCs by the ROD of OU 7. The Remedial Action Work Plan, published in October 2007 compared the soil and sediment analytical data collected to date against both the 1999 and 2005 FDEP Direct Exposure-Commercial/Industrial SCTL criteria and incorporated those differences into the work plan (Tetra Tech, 2007e). However, the discovery of potential UXO could change the exposure assumptions.

USEPA's dioxin reassessment has been developed and undergone review over many years with the participation of scientific experts in USEPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current cancer guidelines and incorporated the latest data and physiological/biochemical research into the assessment. The results of the assessment have currently not been finalized and have not been adopted into state or federal standards. USEPA anticipates that a final revision to the dioxin toxicity numbers may be released by the end of 2010. In addition, USEPA/OSWER has proposed to revise the interim preliminary remediation goals (PRGs) for dioxin and dioxin-like compounds, based on technical assessment of scientific and environmental data. However, USEPA has not made any final decisions on interim PRGs at this time. Therefore, the dioxin toxicity reassessment for this Site will be updated during the next Five Year Review.

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

Yes, potential UXO was discovered during soil removal. Excavation methods and procedures have been modified to address the possible risk posed by any remaining UXO.

8.8 ISSUES

Implementation of the soil removal aspects of the remedy have been delayed by the discovery of potential UXO at the site. As a result, the groundwater remedy has yet to be implemented. Resumption of remedy implementation is anticipated to begin in 2011. See Table 8-2.

8.9 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

After UXO clearance has been obtained, resumption and completion of the remedies specified for OU 7 is recommended. See Table 8-2.

8.10 PROTECTIVENESS STATEMENT

The remedy at OU 7 is protective is expected to be protective of human health and the environment upon completion, and in the interim exposure pathways that could result in unacceptable risks are being controlled. After implementation the protectiveness of the MNA component of the remedy will be evaluated after review of 5 years of groundwater monitoring data.

TABLE 8-2

RECOMMENDATIONS AND FOLLOW-UP ACTIONS
FIVE-YEAR REVIEW
OPERABLE UNIT 7
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Issue Number	Issues	Recommendations	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
						Current	Future
1	Implementation of the soil removal aspects of the remedy have been delayed by the discovery of potential UXO at the site. As a result, the groundwater remedy has yet to be implemented. Resumption of remedy implementation is anticipated to begin in 2011.	After UXO clearance has been obtained, resumption and completion of the remedies specified for OU 7 is recommended	Navy	USEPA/FDEP	**06-Mar-15**	N	Y

9.0 OPERABLE UNIT 8

This section describes OU 8 (PSC 47), a former pesticide mixing, usage, and storage area that was housed in Building 536 and a former pesticide UST area at Building 937. OU 8 is located on Child Street approximately 600 feet south of Birmingham Avenue, a main east-to-west artery at NAS Jacksonville. Building 937, the Naval Entomology Center of Excellence (NECE) [known as Disease Vector Ecology and Control Center (DVECC) until renamed in 2007], occupies the adjoining property to the south. A chain-link fence, situated approximately 75 feet south of the Building 536, separates the two areas which comprise PSC 47 (Figure 1-2).

Suspected sources of contamination at OU 8 (PSC 47) are the former NECE tank area south of Building 937 and the areas around Building 536 where pesticides were once mixed and stored, pesticide application equipment was tested and calibrated, chlordane was applied to concrete slabs for termite control training, drums of unknown content were stored, chlordane was allegedly spilled, and diesel and diesel-malathion mixtures were stored in ASTs or USTs. Previous investigations by HLA (1999c) and BEI (1999c) indicated that the greatest pesticide concentrations in soil were present south of the western half of Building 536. The former soakage pit locations near the southeastern and southwestern corners of Building 536 are additional areas where COCs were identified at elevated concentrations. The distribution of COCs in groundwater has been documented and is contained within the boundaries of OU 8.

Past operations at OU 8 resulted in a wide range of organic and inorganic contamination of shallow soil and groundwater. VOC, SVOC, metal, and pesticide contaminants exceed FDEP SCTLs for residential exposure and FDEP GCTLs.

9.1 SITE CHRONOLOGY

A list of significant historical events and relevant dates in the site chronology are provided in Table 9-1. The identified events are intended to be illustrative, rather than comprehensive.

TABLE 9-1

**CHRONOLOGY OF SITE EVENTS FOR OPERABLE UNIT 8
FIVE-YEAR REVIEW
NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA**

Event	Date
Pre-discovery of contaminants at OU 8	
Pesticide Shop began operations in Building 536	1960s
Building 937 (DVECC) dedicated.	Jan 1978
A pesticide UST at Building 937 taken out of service	1989
NPL Listing of NAS Jacksonville	Nov 1989
Initial discovery of problem or contamination	
30 rusted, empty 55-gallon pesticide drums removed from near Building 536	1991
Post-NPL responses	
Pesticide Shop identified as a PSC and added to base HSWA permit	1993
FDEP authorized closure of DVECC tank	Sep 1995
DVECC tank closure and removal completed	Dec 1995
DVECC Tank Closure Report issued	Jan 1996
DVECC RCRA Facility Investigation issued	Jan 1997
RCRA Application for Closure Permit	Sep 1998
Interim Remedial action	
Soil Excavation (1st interim remedial action) around Building 536	Jul 1999
Remedial Investigation completed, Phase I	Dec 2001
Remedial Investigation completed, Phase II	Jul 2003
Remedial Investigation completed, Phase III	Apr 2007
Soil Excavation and Capping completed (2nd interim remedial action) around Building 536	Apr 2008
RI/FS issued for PSC 47	Feb 2008
Proposed Plan (public comment period)	Jul to Aug 2008
ROD signature for OU 8, PSC 47	Sep 2008
Post-ROD activities	
FS Addendum/IRA Completion Report, PSC 47	Dec 2008
LUC RD published	Sep 2009
MNA Work Plan published	Nov 2009
Quarterly groundwater monitoring	May 2008 – Mar 2009
Previous Five-Year Reviews	None for OU 8

9.2 BACKGROUND

9.2.1 Physical Characteristics

OU 8 consists of Buildings 536 and 937, and the area immediately surrounding these two buildings (Figure 9-1). The site encompasses approximately 4.2 acres, is adjacent to Child Street, and is approximately 600 feet south of Birmingham Avenue, which is a main east-to-west artery at NAS Jacksonville. The terrain is relatively flat. Much of OU 8 is covered by turf grass and maintained as lawn. Areas at OU 8 not covered by turf grass consist of structures, concrete, asphalt, or gravel. A narrow strip of oak and pine trees is located along the southern and western boundaries of the site, and recreational ball fields are located to the west and south of the site. Child Street forms the east boundary of the site, and a golf course (Casa Linda Oaks) is located east of Child Street. Turf grass and a grove of oak trees are located immediately north of the site. A southern-flowing drainage ditch, dry except during rain events, is present along the eastern boundary of OU 8 parallel to Child Street.

9.2.2 Land and Resource Use

OU 8 is currently used for industrial purposes. Portions of the site are used by NAS Jacksonville to administer landscaping services and to store and maintain landscaping equipment. Adjacent land use is primarily recreational in nature (golf course and ball fields). There is no surface water at the site. Groundwater from the shallow aquifer beneath OU 8 is not used at the site or in adjacent areas. Due to the presence of groundwater contamination, LUCs have been placed for groundwater to prevent the use of shallow groundwater.

Due to the location of OU 8 in the center of NAS Jacksonville, it is unlikely that the site would be developed for residential use in the future. According to the ROD for OU 8 (Tetra Tech, 2008d), potential future uses for the site are limited to commercial/industrial land use. Any other use (e.g., residential or recreational land use) would require a re-evaluation of the risks posed from residual contamination remaining at the site and would potentially require additional site assessment and/or remedial action.

9.3 HISTORY OF CONTAMINATION

Building 536, also known as the Pesticide Shop, has been in use since 1960. It is currently used to store grounds maintenance equipment and to store pesticides used on the nearby golf course. Building 536 was identified as a PSC and added to NAS Jacksonville's HSWA permit in 1993 because past practices included the use and storage of pesticides and herbicides, and calibration and testing of pesticide application equipment; specific examples follow. Chlordane was applied to and around test slabs of concrete, cinder block, and brick in the southeastern corner of the property during termite control training exercises (HLA, 1999c). Approximately 30 empty rusted 55-gallon drums were removed from the

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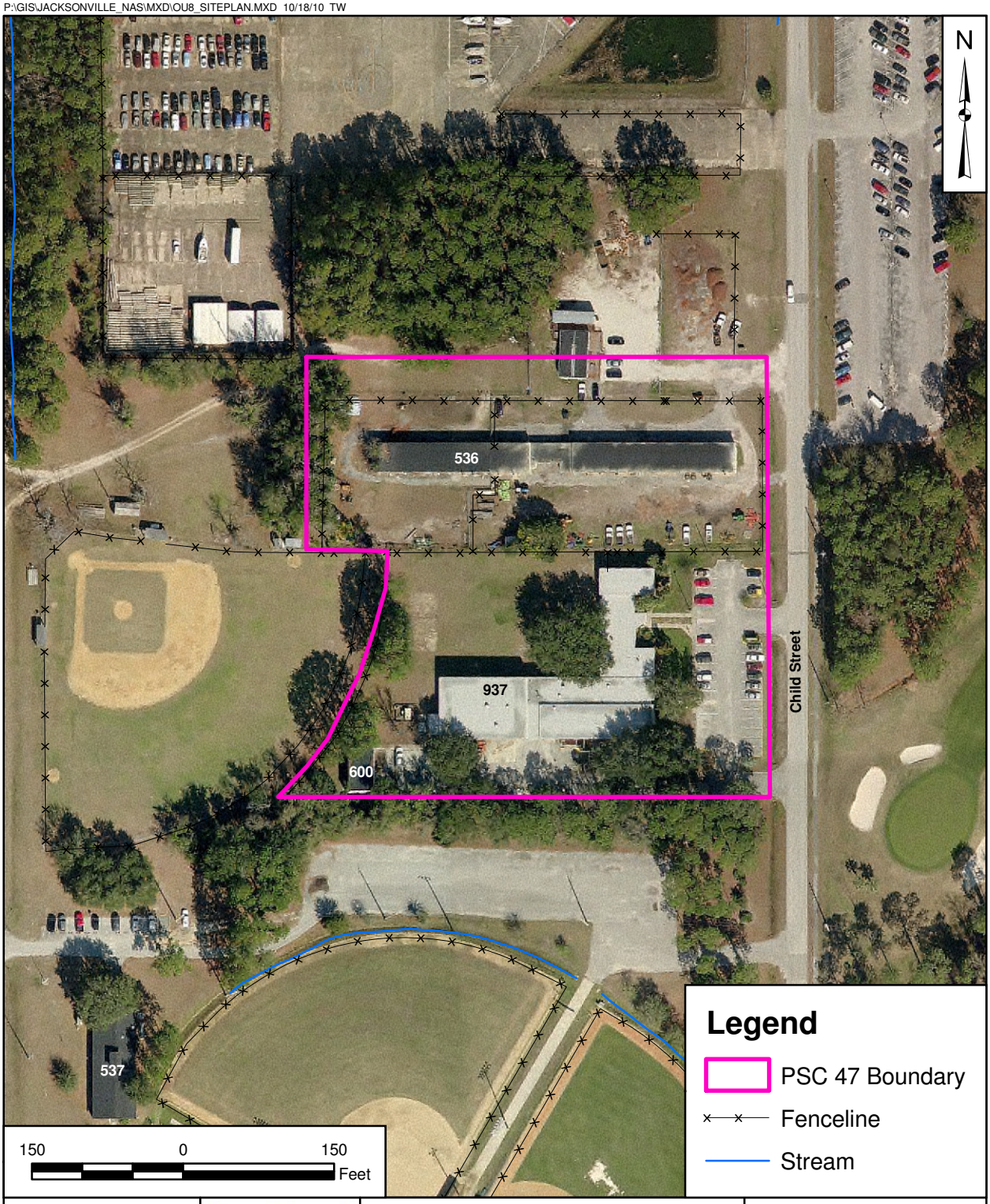

DRAWN BY T. WHEATON	DATE 10/18/10	SITE MAP OU8 - PSC 47 NAS JACKSONVILLE JACKSONVILLE, FLORIDA	CONTRACT NUMBER CTO 152
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SCALE AS NOTED			FIGURE NO. FIGURE 9-1 / REV 0

southwestern corner of the Building 536 area in 1991; the drums previously contained malathion and other pesticides. An unspecified amount of chlordane was reportedly spilled in the northwestern corner of OU 8 at an unknown date. Other potential sources of contamination in the vicinity of Building 536 include soakage pits formerly located at the southeastern and southwestern corners of the building and one UST and two ASTs formerly located south of the building. The soakage pits were 2 feet square by 3 feet deep. The purpose of the pits is not known, although it is believed that the southeastern pit received drainage from inside the bays of Building 536 and both could have been used during training exercises. The UST and one of the ASTs reportedly contained diesel fuel, and the other AST contained a mixture of diesel fuel and malathion for use as a "hot fogger" for mosquito control prior to 1972.

A pesticide UST was formerly located at Building 937, the NECE. Building 937 was dedicated as the DVECC on January 25, 1978, and was renamed the NECE in 2007. One of the functions performed at Building 937 is the development of effective pest management programs. Prior to 1978, these activities were conducted at the Pesticide Shop. From approximately 1978 to 1988, a pesticide mixing room with a sink and three floor drains was located in the south-central portion of Building 937. Rinse water and excess liquids from the sink and floor drains discharged to a 1,000-gallon fiberglass UST known as the "DVECC Tank." The UST was taken out of service in 1989.

9.3.1 Initial Response

The DVECC tank was removed in late 1995. Confirmatory soil and groundwater samples collected after excavation and removal of the DVECC tank revealed the presence of pesticides in soil and groundwater, the most prevalent being chlordane. Because "clean closure" was not achieved, an additional subsurface investigation was performed in December 1996 to evaluate the extent of contamination in the area. Soil and groundwater samples were collected from locations in and around the DVECC tank excavation area. Pesticide concentrations exceeded regulatory criteria in soil and groundwater samples, although the distribution of contaminants appeared random and was not centered on the location of the former DVECC tank. The random contaminant distribution in the vicinity of the DVECC tank suggested that the tank might not be the source of pesticide contamination in the area. Detailed information about each of the investigations and cleanup activities performed at OU 8 since 1995 (Table 9-1) is provided in the RI/FS (Tetra Tech, 2008e). Figures 5-10, 5-11, and 5-12 from the RI/FS showing the plume boundaries for the various COCs is provided in Appendix E.

Two interim actions were conducted at OU 8. The first interim action began in 1998, was completed in July 1999, and consisted of the exavation of contaminated shallow soil around Building 536 to prevent risks to on-site workers. A second interim action began in September 2007 and was completed in April 2008 using risk based corrective action (RBCA) guidance under Chapter 62-780, FAC to further reduce site risks. The second interim action consisted of an additional excavation around Building 536 to

remove contaminated soil (identified by further testing following the first interim action) and installation of a cap to prevent leaching of soil contaminants into groundwater (Figure 9-2). The second interim action is a component of the selected remedy for OU 8.

9.3.2 Basis for Taking Action

As stated in the ROD for OU 8, the soil at the site has been found to contain COCs consisting of PAHs, pesticides, and arsenic, and groundwater COCs consist of VOCs, SVOCs, pesticides, and arsenic. The types of pesticides detected at the site reflect the materials handled at OU 8 during its historical use for pesticide mixing, application training, and equipment cleaning and maintenance. The presence of petroleum hydrocarbons, PAHs, and chlorinated solvents are also consistent with the fact that substances containing these compounds were formerly stored on site in ASTs and USTs. Unacceptable risk due to potential exposure to COCs in soil and groundwater exists and necessitates the implementation of a remedy to prevent exposure (Tetra Tech, 2008d).

9.4 REMEDIAL ACTIONS

The RAOs indentified in the OU 8 ROD were as follows:

Soil RAO Number 1: Prevent unacceptable risk from exposure to surface and subsurface soil at concentrations of benzo(a)pyrene equivalents, pesticides, and arsenic greater than FDEP SCTLs for direct industrial/commercial exposure.

Soil RAO Number 2: Prevent surface and subsurface soil-to-groundwater migration of pesticides at concentrations greater than FDEP SCTLs or site-specific criteria for leachability to groundwater.

Groundwater RAO Number 1: Prevent unacceptable risk from exposure to groundwater at concentrations of VOCs, SVOCs, pesticides, and arsenic greater than FDEP GCTLs and USEPA MCLs.

Groundwater RAO Number 2: Prevent migration of groundwater COCs to surface water and restore groundwater quality at OU 8 to meet drinking water standards based upon FDEP classification of the aquifer as a potential source of drinking water (Class G-II).

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NAVFAC

PSC 47 EXCAVATION AND CAPPING AREAS
OU 8
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

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FIGURE NO. 9 - 2	REV 0

9.4.1 Remedy Selection at OU 8

The selected remedy for soil at OU 8 was excavation and off-site disposal to allow industrial use, capping to prevent leaching, LUCs, and monitoring. As noted in above (Section 9.3.1), the first two components (excavation and capping) were implemented as interim actions. The selected remedy for groundwater at OU 8 was MNA and LUCs.

A groundwater monitoring program has been developed and is being implemented to verify the long-term effectiveness of the cap and to evaluate the potential leaching of soil COCs into groundwater. Monitoring will consist of regularly collecting and analyzing groundwater samples both from within the northern and southern plumes to assess natural attenuation and downgradient of the leading edge of the plumes to detect potential migration of groundwater COCs.

Because soil and groundwater contamination will remain at OU 8 at concentrations that preclude unrestricted use and unlimited exposure, the remedy includes LUCs (institutional and engineering controls) to prevent unacceptable exposure to residual contaminated soil and groundwater. As stated in the ROD, the specific performance objectives of the LUCs to be implemented at OU 8 are as follows:

- Prohibit residential, recreational, or agricultural use of the LUC portions of the site.
- Prohibit disturbance of the cap and/or underlying soils at the site to prevent unacceptable occupational exposure unless prior written approval is obtained from the Navy, USEPA, and FDEP.
- Prohibit withdrawal of groundwater from the surficial aquifer underlying the site for all uses.
- Maintain the integrity of any existing or future monitoring or remediation system.

To achieve the above LUC performance objectives, the following LUCs apply to OU 8:

- Incorporate the LUC boundary and land use restrictions for the site into the installation's Master Plan (and any other relevant documents governing land use at NAS Jacksonville).
- Utilize the installation Dig Permit process to require review/approval and implementation of worker protection practices before any intrusive activities are performed at the Site.
- Post signs adjacent to contaminated areas.
- Monitor and maintain cap and signs.
- In the event any portion of OU 8 is transferred, land use restrictions consistent with LUC performance objectives will be included in the deed and/or lease.

9.4.2 Remedy Implementation at OU 8

Twelve monitoring wells were installed at OU 8 in May 2008 to a depth of 13 feet using DPT. The wells were installed to evaluate whether unsaturated soil, following removal and capping activities, is a continuing source of groundwater contamination (CCI, 2008d). Quarterly sampling of these wells plus 13 previously installed wells was conducted in May 2008, September 2008, December 2008, and March 2009 (CCI, 2009b).

LUCs for OU 8 were developed and documented in a LUC RD document (Tetra Tech, 2009). These LUCs were designed to ensure protection of human health and the environment by restricting future site use and accessibility, educating NAS Jacksonville personnel, and maintaining records of contamination. The LUCs prevent future residential use at this site. In addition, access to OU 8 is restricted, since the site is on an active military base with no planned change in site usage for the foreseeable future. Furthermore, personnel from the NAS Jacksonville Public Works Department are required to visually inspect OU 8 on a quarterly basis to ensure that the LUCs are being implemented and properly maintained.

9.4.3 System O&M at OU 8

Cost information reported here is taken from the OU 8 ROD.

The excavation and capping components have already been implemented. Thus, estimated O&M for soil consist of LUCs and monitoring. Initial year one estimated costs are $42,973, and subsequent years two and three are estimated at $27,905 each year. After year three, annual costs are estimated at $13,386 per year. The total estimated 30 year cost is $460,205.

For groundwater, estimated costs include the development of a MNA Performance Work Plan; sampling and analysis of groundwater samples, data management, data analysis and reporting; and LUC inspections and reporting. Initial year one cost is estimated at $188,390. Subsequent years two and three are estimated at $95,658 each year and years four and five are estimated at $49,292 each year. The total five year cost is estimated at $478,290 with subsequent years of monitoring estimated at $36,687 per year (years 6 to 30). After five years, the Navy will complete an evaluation of the data. If it is determined that the selected remedy is not adequately protective, then contingency actions will be invoked. Should contingency actions not be necessary, the total 30 year cost is estimated at $1,392,965. In addition to these above costs, statutory Five-Year Reviews will be conducted with a combined cost of $44,385 per Five-Year Review period.

9.5 PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the first Five-Year Review since the OU 8 ROD was signed.

9.6 FIVE-YEAR REVIEW PROCESS

9.6.1 Document Review

This Five-Year Review consisted of a review of relevant documents including the ROD, the LUC RD document, the FS Addendum/IRA Completion Report, and the groundwater monitoring report that documented the four monitoring events conducted from May 2008 to March 2009. There have been no changes in ARARs since the RI/FS was conducted and the ROD was signed.

9.6.2 Data Review

One year of quarterly groundwater monitoring has been completed at OU 8. Quarterly sampling of 25 monitoring wells has been conducted from May 2008 through March 2009; the samples were analyzed for arsenic, pesticides, VOCs, and SVOCs.

Groundwater analytical tables from CCI (2009b) summarize groundwater analytical data and are provided in Appendix E. Trend graphs showing historical data and data from the 2008 to 2009 quarterly monitoring were generated by CCI (2009) and are contained herein as Appendix E. Results from the 2008-2009 groundwater sampling indicate the contaminant plumes are stable, some COC concentrations are decreasing (presumably as a result of natural attenuation), and it appears that soil contaminants are no longer contributing to groundwater contamination (CCI, 2009b). The large majority of constituents seem to be decreasing through natural attenuation.

9.6.3 Site Inspection and Interviews

Tetra Tech conducted a site inspection of OU 8 on August 25, 2010. Prior to initiating the inspection, the inspector interviewed the IR manager, Mr. Tim Curtin. Mr. Curtin accompanied the Tetra Tech inspector during the site inspection, which included visual observations of site conditions including fences, warning signs, cap, and groundwater monitoring wells. The fence, signs, cap, and wells appear to be in good condition.

9.7 TECHNICAL ASSESSMENT

9.7.1 Question A: Is the remedy functioning as intended by the ROD?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD.

- **HASP/Work Plans**: A Site specific HASP and Groundwater Monitoring Work Plan has been developed.
- **Remedial Action Performance:** Review of the first annual groundwater monitoring report indicates that the remedial action is performing as intended.
- **System O&M**: There are no active remediation systems at OU 8 and therefore no system O&M is required.
- **Cost of System Operations/O&M**: There are no active remediation systems at OU 8 and therefore no system O&M is required.
- **Opportunities for Optimization**: Optimization of the groundwater monitoring effort was completed.
- **Early Indications of Potential Remedy Failure**. No early indications of remedy failure were noted.

9.7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no significant changes to the standardized risk assessment methodology or toxicity criteria data that could affect the protectiveness of the remedy.

The potential risks posed by soil vapor intrusion were evaluated in the RI/FS for PSC 47. The Johnson Ettinger volatilization model was used to estimate risks from exposures from vapor intrusion. The Hazard Index and Incidental Lifetime Cancer Risks for residents were less than USEPA's target risk range and FDEP's level of concern.

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

No other information has come to light that would call into question the protectiveness of the remedy.

9.8 ISSUES

No issues regarding OU 8 were discovered during the Five-Year Review.

9.9 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

There are no recommendations or follow-up actions for OU 8.

9.10 PROTECTIVENESS STATEMENT

The remedy at OU 8 is protective for short term and for long term it is expected to be protective and will be re-evaluated after review of 5 years of groundwater monitoring data. The institutional controls, groundwater monitoring, at OU 8 provide an acceptable degree of protection of human health and the environment as long as they are conducted as required.

10.0 BASEWIDE CONCLUSIONS

This Five-Year Review shows that that the Navy is meeting the requirements of the Records of Decisions (RODs) for OUs 2, 4, 5, 6, and 8. The NAS Jacksonville Partnering Team is evaluating the environmental conditions at OU 3 and is preparing to implement additional remedial actions to protect human health and environment. In addition, the five-year review shows that the remedy for OU 1 remains protective in the short term, and the remedy for OU 7 is expected to be protective upon completion.

Pending completion of an RI/FS Addendum, Proposed Plan, and updated ROD addressing OU 3, an updated Protectiveness Determination will be made via an addendum to this Five Year Review.

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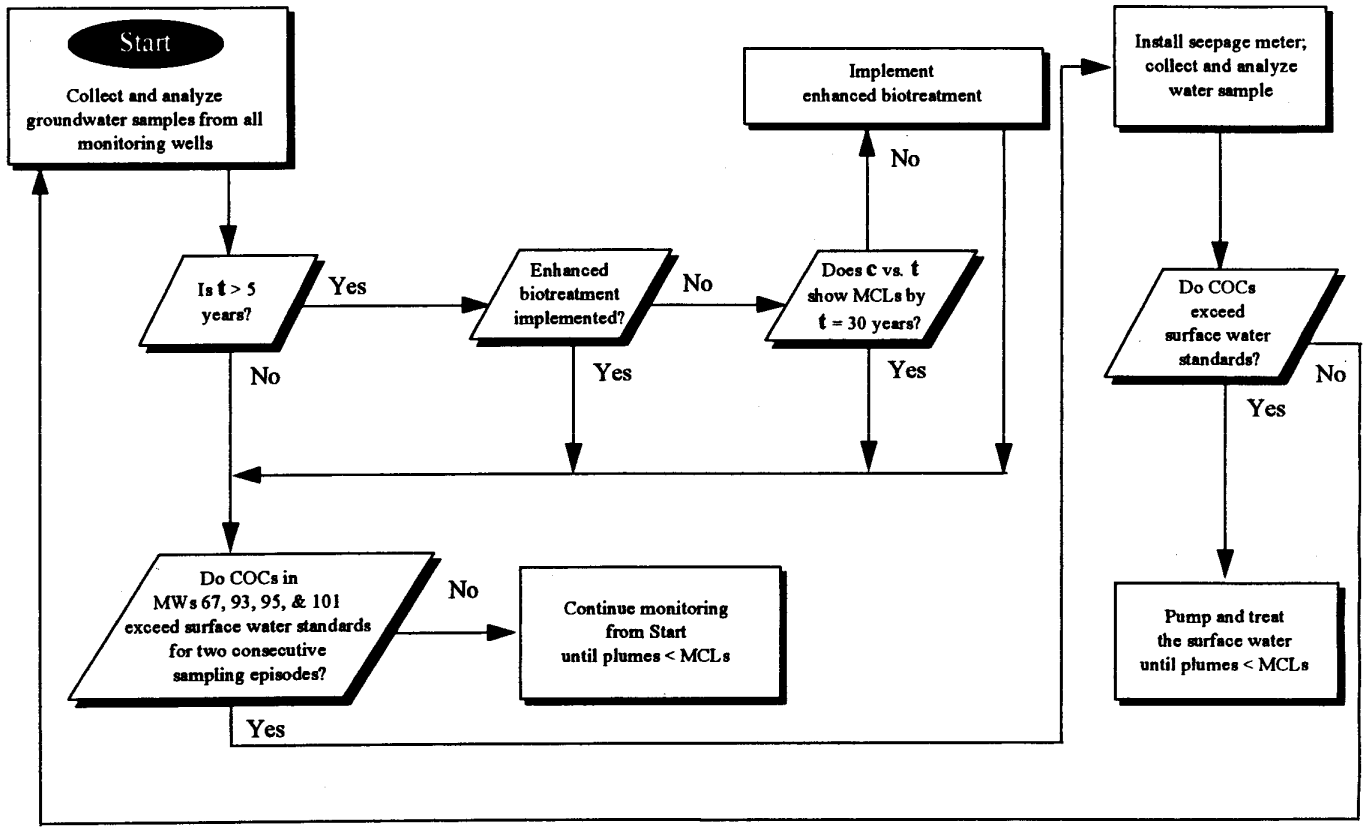
APPENDIX A

OU 1 INFORMATION



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

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TABLE 4: GROUNDWATER ANALYTICAL RESULTS SUMMARY

SITE NAME: OU1, NAVAL AIR STATION JACKSONVILLE

Parameter	FDEP GCTLs old/current	USEPA MCLs	Sample ID / Date Collected / Units	OU1-MW-12 11/10/2004	OU1-MW-12 11/18/2005	OU1-MW-12 11/21/2006	OU1-MW-12 11/15/2007	OU1-MW-12 12/3/2008	**OU1-MW-12 2/11/2010**	OU1-MW-18 11/10/2004	OU1-MW-18 11/17/2005	OU1-MW-18 11/21/2006	OU1-MW-18 11/15/2007	OU1-MW-18 12/3/2008	**OU1-MW-18 2/10/2010**
VOCs															
1,1,1-Trichloroethane	200/200	200	µg/L	<0.3	<0.3	<0.3	<0.34	<0.37	<0.15	<0.3	<0.3	<0.3	<0.34	<0.37	<0.20
1,1,2-Trichloroethane	5/5	5	µg/L	<0.3	<0.3	<0.3	<0.35	<0.40	<0.068	<0.3	<0.3	<0.3	<0.35	<0.40	<0.40
1,1,1,2-Tetrachloroethane	1.3/1.3	NL	µg/L	<0.1	<0.1	<0.1	<0.22	<0.33	<0.091	<0.1	<0.1	<0.1	<0.22	<0.33	<0.20
1,1,2,2-Tetrachloroethane	0.2/0.2	NL	µg/L	<0.1	<0.2	<0.2	<0.14	<0.21	<0.085	<0.1	<0.2	<0.2	<0.14	<0.21	<0.32
1,1-DCE	7	7	µg/L	<0.3	<0.3	<0.2	<0.36	<0.34	<0.15	2.6	6.0	6.3	<0.36	1.9	<0.21
1,1 Dichloroethane	70/70	NL	µg/L	1.9	2.0	1.2	0.81 I	0.61 I	0.65 I	0.3 i	0.6 i	0.6 i	3.2	<0.37	<0.30
1,2-Dichlorobenzene	600/600	NL	µg/L	5.6	5.0	3.3	3.2	<0.08	2.2	<0.3	<0.2	<0.2	<0.30	<0.08	<0.24
1,1-Dichloropropene	NL	NL	µg/L	<0.2	<0.2	<0.2	<0.56	<0.29	<0.063	<0.2	<0.2	<0.2	<0.56	<0.29	<0.21
1,2-Dibromoethane	0.02/0.02	NL	µg/L	<0.1	<0.1	<0.1	<0.34	<0.10	<0.42	<0.1	<0.1	<0.1	<0.34	<0.10	<0.27
1,2-Dichloroethane	3/3	5	µg/L	<0.2	<0.2	<0.1	<0.19	<0.43	<0.082	<0.2	<0.2	<0.2	<0.19	<0.43	<0.28
1,2-Dichloropropane	5/5	5	µg/L	<0.4	<0.4	<0.4	<0.44	<0.52	<0.098	<0.4	<0.4	<0.4	<0.44	<0.52	<0.30
1,2-Dibromo-3-chloropropane	0.2/0.2	0.2	µg/L	<0.2	<0.2	<0.3	<0.56	<0.18	<0.48	<0.2	<0.2	<0.3	<0.56	<0.18	<0.60
1,2,3-Trichloropropane	0.2/0.02	NL	µg/L	<0.3	<0.3	<0.3	<0.25	<0.20	<0.15	<0.3	<0.3	<0.3	<0.25	<0.20	<0.30
1,2,3-Trichlorobenzene	70/70	NL	µg/L	<0.6	<0.4	<0.2	<0.35	<0.14	<0.25	<0.6	<0.4	<0.2	<0.35	<0.14	<0.50
1,2,4-Trichlorobenzene	70/70	NL	µg/L	<0.4	<0.4	<0.1	<0.17	<0.67	<0.097	<0.4	<0.4	<0.1	<0.17	<0.67	<0.41
1,2,4-Trimethylbenzene	10/10	NL	µg/L	<0.2	<0.2	<0.2	<0.38	<0.26	<0.067	<0.2	<0.2	<0.2	<0.38	<0.26	<0.28
1,3-Dichlorobenzene	10/210	NL	µg/L	1	0.7 i	1.0 I	0.86 I	<0.23	0.72 I	<0.1	<0.1	<0.2	<0.25	<0.23	<0.27
1,3-Dichloropropane	NL	NL	µg/L	<0.3	<0.3	<0.3	<0.14	<0.18	<0.15	<0.3	<0.3	<0.3	<0.14	<0.18	<0.25
1,3,5-Trimethylbenzene	10/10	NL	µg/L	<0.2	<0.2	<0.2	<0.22	<0.21	<0.10	<0.2	<0.2	<0.2	<0.22	<0.21	<0.26
1,4-Dichlorobenzene	75/75	NL	µg/L	8.1	6.0	6.3	5.7	0.82 I	3.0	<0.2	<0.2	<0.1	<0.18	<0.20	<0.23
2-Butanone	4,200/4,200	NL	µg/L	<2.0	<2.0	<2.0	<2.4	<0.78	<1.0	<2.0	<2.0	<2.0	<2.4	<0.78	<0.38
2-Chloroethyl vinyl ether	175	NL	µg/L	<0.8	<0.8	<0.8	<2.1	<1.5	<0.94	<0.8	<0.8	<0.8	<2.1	<1.5	<1.5
2-Chlorotoluene	NL	NL	µg/L	<0.1	<0.1	<0.1	<0.37	<0.27	<0.10	<0.1	<0.1	<0.1	<0.37	<0.27	<0.33
2-Hexanone	280/280	NL	µg/L	<0.6	<0.6	<0.6	<0.95	<1.1	<0.69	<0.6	<0.6	<0.6	<0.95	<1.1	<0.50
2,2 Dichloropropane	NL	NL	µg/L	<0.3	<0.3	<0.2	<0.71	<0.26	<0.12	<0.3	<0.3	<0.2	<0.71	<0.26	<0.40
4-Chlorotoluene	NL	NL	µg/L	<0.2	<0.2	<0.1	<0.20	<0.35	<0.10	<0.2	<0.2	<0.1	<0.20	<0.35	<0.22
4-Methyl-2-Pentanone	560	NL	µg/L	<2.0	<2.0	<2.0	<1.6	<1.3	<1.1	<2.0	<2.0	<2.0	<1.6	<1.3	<1.0
Acetone	700/63000	NL	µg/L	9	<2.0	<2.0	<3.8	<1.4	<1.5	<2.0	<2.0	<2.0	<3.8	<1.4	<1.1
Benzene	1/1	5	µg/L	4.5	4.0	5.1	7.8	<0.29	2.6	0.5 i	0.6 i	0.4 i	0.52 I	<0.29	<0.27
Bromobenzene	NL	NL	µg/L	<0.1	<0.1	<0.1	<0.40	<0.20	<0.13	<0.1	<0.1	<0.1	<0.40	<0.20	<0.26
Bromochloromethane	91/91	NL	µg/L	<0.3	<0.3	<0.3	<0.58	<0.67	<0.11	<0.3	<0.3	<0.3	<0.58	<0.67	<0.28
Bromodichloromethane	0.6/0.6	100	µg/L	<0.2	<0.2	<0.2	<0.29	<0.12	<0.10	<0.2	<0.2	<0.2	<0.29	<0.12	<0.20
Bromoform	4.4/4.4	NL	µg/L	<0.2	<0.2	<0.2	<0.35	<0.25	<0.20	<0.2	<0.2	<0.2	<0.35	<0.25	<0.33
Bromomethane	9.8/9.8	NL	µg/L	<0.6	<0.6	<0.6	<0.45	<0.48	<0.28	<0.6	<0.6	<0.6	<0.45	<0.48	<0.64
Carbon Disulfide	700/700	NL	µg/L	<0.9	<0.9	<0.9	<1.5	<1.3	<0.54	<0.9	<0.9	<0.9	<1.5	<1.3	<0.24
Carbon Tetrachloride	3/3	5	µg/L	<0.3	<0.3	<0.3	<0.53	<0.45	<0.082	<0.3	<0.3	<0.3	<0.53	<0.45	<0.20
Chlorobenzene	100/100	100	µg/L	74	73	85.1	89	41	40	<0.2	<0.2	0.2 I	<0.21	<0.24	<0.24
Chloroethane	NL	NL	µg/L	<0.4	<0.4	<0.3	<0.85	<0.36	<0.18	<0.4	<0.4	<0.3	<0.85	<0.36	<0.31
Chloroform	5.7/70	100	µg/L	<0.2	<0.2	<0.2	<0.34	<0.43	<0.083	<0.2	<0.2	<0.2	<0.34	<0.43	<0.21
Chloromethane	2.7/2.7	NL	µg/L	<0.3	<0.3	<0.3	<0.36	<0.39	<0.050	<0.3	<0.3	<0.3	<0.36	<0.39	<0.31
cis-1,2-DCE	70/70	70	µg/L	2.6	3.0	1.8	0.76 I	1.6	1.3	39	66	74	37	22	39
c-1,3-Dichloropropene	0.2	NL	µg/L	<0.1	<0.1	<0.1	<0.27	<0.23	<0.073	<0.1	<0.1	<0.1	<0.27	<0.23	<0.35
Dibromochloromethane	0.4/0.4	NL	µg/L	<0.2	<0.2	<0.2	<0.31	<0.28	<0.067	<0.2	<0.2	<0.2	<0.31	<0.28	<0.27
Dibromomethane	NL	5	µg/L	<0.3	<0.3	<0.3	<0.41	<0.29	<0.13	<0.3	<0.3	<0.3	<0.41	<0.29	<0.27
Dichlorodifluoromethane	1400/1400	NL	µg/L	<0.3	<0.3	<0.3	<0.31	<0.14	<0.091	<0.3	<0.3	<0.3	<0.31	<0.14	<0.29
Ethylbenzene	30/30	700	µg/L	<0.3	<0.3	<0.3	<0.34	<0.29	<0.10	<0.3	<0.3	<0.3	<0.34	<0.29	<0.26
Hexachlorobutadiene	0.5	NL	µg/L	<0.6	<0.6	<0.4	<0.37	<0.12	<0.15	<0.6	<0.6	<0.4	<0.37	<0.12	<0.35
Isopropylbenzene	NL	NL	µg/L	<0.1	0.1 i	<0.1	0.35 I	<0.23	<0.13	<0.1	<0.1	<0.1	<0.25	<0.23	<0.20
Methylene Chloride	5/5	NL	µg/L	<0.1	<0.1	<2.0	<0.65	<0.25	<0.070	<0.1	<0.1	<2.0	<0.65	<0.25	<0.62
MTBE	50/20	NL	µg/L	<0.2	<0.2	<0.2	<0.21	<0.21	<0.12	<0.2	<0.2	<0.2	<0.21	<0.21	<0.24
n-Butylbenzene	NL	NL	µg/L	0.4 i	<0.3	<0.3	<0.30	<0.29	<0.074	<0.3	<0.3	<0.3	<0.30	<0.29	<0.28
n-Propylbenzene	NL	NL	µg/L	<0.2	<0.2	<0.3	<0.27	<0.20	<0.073	<0.2	<0.2	<0.3	<0.27	<0.20	<0.20
Naphthalene	20/14	NL	µg/L	<0.3	<0.3	1.7	<0.35	<0.58	<0.086	<0.3	<0.3	<0.3	<0.35	<0.58	4.6 V
s-butylbenzene	NL	NL	µg/L	0.8 i	0.3 i	1.4	0.78 I	<0.20	<0.053	<0.1	<0.1	<0.2	<0.20	<0.20	<0.20
Styrene	100/100	100	µg/L	<0.1	<0.1	<0.1	<0.19	<0.21	<0.082	<0.1	<0.1	<0.1	<0.19	<0.21	<0.32
tert-Butylbenzene	NL	NL	µg/L	0.7 i	0.5 i	1.5	1.2	<0.29	<0.094	<0.1	<0.1	<0.3	<0.41	<0.29	<0.21
Tetrachloroethene	3/3	NL	µg/L	<0.3	<0.3	<0.3	<0.35	<0.32	<0.099	0.5 i	<0.3	<0.3	0.55 I	<0.32	<0.21
Toluene	40/40	1000	µg/L	0.6 i	0.5 i	0.6 i	0.91 I	<0.35	<0.053	<0.2	<0.2	<0.2	<0.28	<0.35	<0.30
Trans-1,2-DCE	100/100	100	µg/L	<0.2	0.2 i	<0.2	<0.41	<0.49	<0.11	6	12	8	6	2.4	5.5
t-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.2	<0.2	<0.40	<0.27	<0.080	<0.2	<0.2	<0.2	<0.40	<0.27	<0.33
TCE	3/3	5	µg/L	1	1.0	<0.3	<0.26	<0.50	<0.13	42	60	46.5	46.0	27.0	43
Trichloroflouromethane	2100/2100	NL	µg/L	<0.3	0.3	<0.3	<0.46	<0.45	<0.15	<0.3	<0.3	<0.3	<0.46	<0.45	<0.20
Vinyl Chloride	1/1	2	µg/L	2.4	2.0	1.6	<0.52	<0.61	0.80 I	9.7	15	20.5	11.0	6.2	10
Xylenes (Total)	20/20	10000	µg/L	<0.5	<0.5	<0.5	0.50 I	<0.29	<0.22	<0.5	<0.5	<0.5	<0.38	<0.29	<0.50
p-Isopropyltoluene	NL	NL	µg/L	0.2 i	<0.2	<0.2	NA	NA	NA	<0.2	<0.2	<0.5	NA	NA	NA
EETCE			µg/L	<9.498	<9.23	<6.134	<2.591	4.104	3.5382	<113.67	<178.02	<188.16	117.85	68.916	115.038

Parameter	FDEP GCTLs old/current	USEPA MCLs	Units	OU1-MW-12 11/10/2004	OU1-MW-12 11/18/2005	OU1-MW-12 11/21/2006	OU1-MW-12 11/15/2007	OU1-MW-12 12/3/2008	**OU1-MW-12 2/11/2010**	OU1-MW-18 11/10/2004	OU1-MW-18 11/17/2005	OU1-MW-18 11/21/2006	OU1-MW-18 11/15/2007	OU1-MW-18 12/3/2008	**OU1-MW-18 2/10/2010**
Total Metals															
Iron	300/300	NL	µg/L	97000	81600	100000	85400	71000	41400	140	50	180	245	167 V	169
Dissolved Metals															
Iron	300/300	NL	µg/L	NA	NA	NA	NA	NA	41300	NA	NA	NA	NA	NA	158
Dissolved Gases															
Methane	NL	NL	µg/L	3010	600 V D1	2000 D	6.84	1020	826	210	60	44	0.106	36	36
Ethene	NL	NL	µg/L	3.7	<0.3	<0.3	<0.0003	<1.0	1 I	<0.3	3000	0.7 I	<0.0003	<1.0	0.7 I
Ethane	NL	NL	µg/L	36	10	10	0.027	6	4	20	4	3	0.01	<3.0	3
Miscellaneous Parameters															
Chloride	250/250	NL	mg/L	56	25.9	26	29 v	15	14	100	99.2	69	85	84	71
Sulfate	250/250	NL	mg/L	18	22.6	11	6.5	15	20	34	22	37	49	68	76
Sulfide	NL	NL	mg/L	<1.0	<1.0	<0.49	0.45 I	1.2	<0.45	<1.0	<1.0	<0.49	0.61 I	<0.45	<0.45
Total Organic Carbon	NL	NL	mg/L	29	19.4	11	24	9.9	6.9	8	8.7	0.81 I	8.8	5.9	7.6

J - estimated concentration

D1- Analyte value was determined from a 1:5 dilution

i - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)

V- indicated that the analyte was detected in both the sample and associated method blank

D3- Analyte value was determined from a 1:200 dilution

D2- Analyte value was determined from a 1:10 dilution

TABLE 4: GROUNDWATER ANALYTICAL RESULTS SUMMARY

SITE NAME: OU1, NAVAL AIR STATION JACKSONVILLE

Parameter	FDEP GCTLs old/current	USEPA MCLs	Sample ID / Date Collected / Units	OU1-MW-19 11/11/2004	OU1-MW-19 11/18/2005	OU1-MW-19 11/21/2006	OU1-MW-19 11/16/2007	OU1-MW-19 12/4/2008	**OU1-MW-19 2/10/2010**	OU1-MW-22 11/10/2004	OU1-MW-22 11/17/2005	OU1-MW-22 11/21/2006	OU1-MW-22 11/15/2007	OU1-MW-22 12/3/2008	**OU1-MW-22 2/10/2010**
VOCs															
1,1,1-Trichloroethane	200/200	200	µg/L	<1.0	<0.3	1.5 - U,D	<1.7	<0.37	<0.20	<0.3	<0.3	<0.3	<0.34	<0.37	<0.20
1,1,2-Trichloroethane	5/5	5	µg/L	<1.0	2.0	1.5 - U,D	<1.8	2.4	10	<0.3	<0.3	<0.3	<0.35	<0.40	<0.40
1,1,1,2-Tetrachloroethane	1.3/1.3	NL	µg/L	<1.0	<0.1	0.5 - U,D	<1.1	<0.33	<0.20	<0.1	<0.1	<0.1	<0.22	<0.33	<0.20
1,1,2,2-Tetrachloroethane	0.2/0.2	NL	µg/L	0.60	2.0	1.0 - U,D	<0.70	3.7	9.7	<0.2	<0.2	<0.2	<0.14	<0.21	<0.32
1,1-DCE	7	7	µg/L	2.1	3.0 v	4.4 - U,D	2.4 I	2.3	2.2	<0.3	<0.3	0.9 I	0.81 I	0.78 I	<0.21
1,1 Dichloroethane	70/70	NL	µg/L	<1.0	0.3 i	1.0 - U,D	<2.2	<0.37	<0.30	<0.2	<0.2	0.3 I	<0.45	<0.37	<0.30
1,2-Dichlorobenzene	600	NL	µg/L	<1.0	0.3 i	1.0 - U,D	<1.5	0.36 I	<0.24	<0.2	<0.2	<0.2	<0.30	<0.06	<0.24
1,1-Dichloropropene	NL	NL	µg/L	<1.0	<0.2	1.0 - U,D	<2.8	<0.29	<0.21	<0.2	<0.2	<0.2	<0.56	<0.29	<0.21
1,2-Dibromoethane	0.02	NL	µg/L	<1.0	<0.1	0.5 - U,D	<1.7	<0.10	<0.27	<0.1	<0.1	<0.1	<0.34	<0.10	<0.27
1,2-Dichloroethane	3	5	µg/L	<1.0	<0.2	0.5 - U,D	<0.95	<0.43	<0.28	<0.2	<0.2	<0.1	<0.19	<0.43	<0.28
1,2-Dichloropropane	5	5	µg/L	<1.0	<0.4	2.0 - U,D	<2.2	<0.52	<0.30	<0.4	<0.4	<0.4	<0.44	<0.52	<0.30
1,2-Dibromo-3-chloropropane	0.2	0.2	µg/L	<1.0	<0.2	1.5 - U,D	<2.8	<0.18	<0.60	<0.2	<0.2	<0.3	<0.56	<0.18	<0.60
1,2,3-Trichloropropane	0.2/0.02	NL	µg/L	0.60	<0.3	1.5 - U,D	<1.2	<0.20	<0.30	<0.3	<0.3	<0.3	<0.25	<0.20	<0.30
1,2,3-Trichlorobenzene	70/70	NL	µg/L	<1.0	2.0	2.2 - I,D	2.6 iv	1.8	3.1	<0.6	<0.4	<0.2	<0.35	<0.14	<0.50
1,2,4-Trichlorobenzene	70	NL	µg/L	8.4	13	11.2 - D	19 v	19	24	<0.4	<0.4	<0.1	<0.17	<0.67	1.3
1,2,4-Trimethylbenzene	10/10	NL	µg/L	<1.0	<0.2	1.0 - U,D	<1.9	<0.26	<0.28	<0.2	<0.2	<0.2	<0.38	<0.26	<0.28
1,3-Dichlorobenzene	10/210	NL	µg/L	<1.0	1.0	1.9 - D,I	1.8 I	1.5	1.1	<0.1	<0.1	<0.2	<0.25	<0.23	<0.27
1,3-Dichloropropane	NL	NL	µg/L	<1.0	<0.3	1.5 - U,D	<0.70	<0.18	<0.25	<0.3	<0.3	<0.3	<0.14	<0.18	<0.25
1,3,5-Trimethylbenzene	10/10	NL	µg/L	<1.0	<0.2	1.0 - U,D	<1.1	<0.21	<0.28	<0.2	<0.2	<0.2	<0.22	<0.21	0.30 I
1,4-Dichlorobenzene	75	NL	µg/L	<1.0	1.0 i	1.4 - D,I	<0.90	1.2	<0.23	<0.2	<0.2	<0.1	<0.18	<0.20	<0.23
2-Butanone	4,200	NL	µg/L	<20	<2.0	10.0 - U,D	<12	<0.78	<0.38	<2.0	<2.0	<2.0	<2.4	<0.78	<0.38
2-Chloroethyl vinyl ether	175	NL	µg/L	<6.0	<0.8	4.0 - U,D	<10	<1.5	<1.5	<0.8	<0.8	<0.8	<2.1	<1.5	<1.5
2-Chlorotoluene	NL	NL	µg/L	<1.0	<0.1	0.5 - U,D	<1.8	<0.27	<0.33	<0.1	<0.1	<0.1	<0.37	<0.27	<0.33
2-Hexanone	280/280	NL	µg/L	<20	<0.6	3.0 - U,D	<4.8	<1.1	<0.50	<0.6	<0.6	<0.6	<0.95	<1.1	<0.50
2,2 Dichloropropane	NL	NL	µg/L	<1.0	<0.3	1.0 - U,D	<3.6	<0.28	<0.40	<0.3	<0.3	<0.2	<0.71	<0.28	<0.40
4-Chlorotoluene	NL	NL	µg/L	<1.0	<0.2	0.5 - U,D	<1.0	<0.35	<0.22	<0.2	<0.2	<0.1	<0.20	<0.35	<0.22
4-Methyl-2-Pentanone	560	NL	µg/L	<20	<2.0	10.0 - U,D	<8.0	<1.3	<1.0	<2.0	<2.0	<2.0	<1.6	<1.3	<1.0
Acetone	700/63000	NL	µg/L	<50	<2.0	10.0 - U,D	<19	<1.4	<1.1	<2.0	<2.0	<2.0	<3.8	<1.4	<1.1
Benzene	1/1	5	µg/L	<1.0	0.3 i	1.0 - U,D	<1.2	0.34 I	<0.27	0.2 i	<0.2	0.3 I	<0.23	<0.29	<0.27
Bromobenzene	NL	NL	µg/L	<1.0	<0.1	0.5 - U,D	<2.0	<0.20	<0.28	<0.1	<0.1	<0.1	<0.40	<0.20	<0.28
Bromochloromethane	91/91	NL	µg/L	<1.0	<0.3	1.5 - U,D	<2.9	<0.67	<0.28	<0.3	<0.3	<0.3	<0.58	<0.67	<0.28
Bromodichloromethane	0.6/0.6	100	µg/L	<0.60	<0.2	1.0 - U,D	<1.4	<0.12	<0.20	<0.2	<0.2	<0.2	<0.29	<0.12	<0.20
Bromoform	4.4/4.4	NL	µg/L	<1.0	<0.2	1.0 - U,D	<1.8	<0.25	<0.33	<0.2	<0.2	<0.2	<0.35	<0.25	<0.33
Bromomethane	9.8/9.8	NL	µg/L	<2.0	<0.6	3.0 - U,D	<2.2	<0.48	<0.64	<0.6	<0.6	<0.6	<0.45	<0.48	<0.64
Carbon Disulfide	700/700	NL	µg/L	<50	<0.9	4.5 - U,D	<7.5	<1.3	<0.24	<0.9	<0.9	<0.9	<1.5	<1.3	<0.24
Carbon Tetrachloride	3	5	µg/L	<1.0	<0.3	1.5 - U,D	<2.6	<0.45	<0.20	<0.3	<0.3	<0.3	<0.53	<0.45	<0.20
Chlorobenzene	100	100	µg/L	<1.0	0.8 i	1.0 - U,D	<1.0	<0.24	<0.24	<0.2	<0.2	<0.2	<0.21	<0.24	<0.24
Chloroethane	NL	NL	µg/L	<2.0	<0.4	1.5 - U,D	<4.2	<0.38	<0.31	<0.4	<0.4	<0.3	<0.85	<0.38	<0.31
Chloroform	5.7/70	100	µg/L	<1.0	<0.2	1.0 - U,D	<1.7	<0.43	<0.21	<0.2	<0.2	<0.2	<0.34	<0.43	<0.21
Chloromethane	2.7	NL	µg/L	<1.0	<0.3	1.5 - U,D	<1.8	<0.39	<0.31	<0.3	<0.3	<0.3	<0.36	<0.39	<0.31
cis-1,2-DCE	70	70	µg/L	150	170	420 - D	140	150	260	26	30	27.4	18	14	11
c-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.1	0.5 - U,D	<1.4	<0.23	<0.35	<0.1	<0.1	<0.1	<0.27	<0.23	<0.35
Dibromochloromethane	0.4/0.4	NL	µg/L	<0.4	<0.2	1.0 - U,D	<1.6	<0.28	<0.27	<0.2	<0.2	<0.2	<0.31	<0.28	<0.27
Dibromomethane	NL	5	µg/L	<1.0	<0.3	1.5 - U,D	<2.0	<0.29	<0.27	<0.3	<0.3	<0.3	<0.41	<0.29	<0.27
Dichlorodifluoromethane	1400/1400	NL	µg/L	<2.0	<0.3	1.5 - U,D	<1.6	2.2	<0.29	4.5	17	16.1	21	17	23
Ethylbenzene	30/30	700	µg/L	<1.0	<0.3	1.5 - U,D	<1.7	<0.29	<0.26	<0.3	<0.3	<0.3	<0.34	<0.29	<0.26
Hexachlorobutadiene	0.5	NL	µg/L	<1.0	<0.6	2.0 - U,D	<1.8	<0.12	<0.35	<0.6	<0.6	<0.4	<0.37	<0.12	<0.35
Isopropylbenzene	NL	NL	µg/L	<1.0	<0.1	0.5 - U,D	<1.2	<0.23	<0.20	<0.1	<0.1	<0.1	<0.25	<0.23	0.25 I
Methylene Chloride	5	NL	µg/L	<5.0	<0.1	10.0 - U,D	<3.2	<0.25	<0.62	<0.1	<0.1	<2.0	<0.65	<0.25	<0.62
MTBE	50/20	NL	µg/L	<1.0	<0.2	1.0 - U,D	<1.0	<0.21	<0.24	<0.2	<0.2	<0.2	<0.21	<0.21	<0.24
n-Butylbenzene	NL	NL	µg/L	<1.0	<0.3	1.5 - U,D	<1.5	<0.29	<0.28	<0.3	<0.3	<0.3	<0.30	<0.29	2.5
n-Propylbenzene	NL	NL	µg/L	<1.0	<0.2	1.5 - U,D	<1.4	<0.20	<0.20	<0.2	<0.2	<0.3	<0.27	<0.20	0.28 I
Naphthalene	20/14	NL	µg/L	<2.0	<0.3	1.5 - U,D	<1.8	<0.58	2.8 V	<0.3	<0.3	<0.3	0.77 I	<0.58	6.9 V
s-butylbenzene	NL	NL	µg/L	<1.0	<0.1	1.0 - U,D	<1.0	<0.20	<0.20	<0.1	<0.1	<0.2	<0.20	<0.20	0.43 I
Styrene	100	100	µg/L	<1.0	<0.1	0.5 - U,D	<0.95	<0.21	<0.32	<0.1	<0.1	<0.1	<0.19	<0.21	<0.32
tert-Butylbenzene	NL	NL	µg/L	<1.0	<0.1	1.5 - U,D	<2.0	<0.29	<0.21	<0.1	<0.1	<0.3	<0.41	<0.29	<0.21
Tetrachloroethene	3	NL	µg/L	2	<0.3	1.5 - U,D	<1.8	0.90 - I	1.7	<0.3	<0.3	<0.3	<0.35	<0.32	<0.21
Toluene	40/40	1000	µg/L	<1.0	<0.2	1.0 - U,D	<1.4	<0.35	<0.30	<0.2	<0.2	<0.2	<0.28	<0.35	<0.30
Trans-1,2-DCE	100	100	µg/L	21	36	134 - D	18	41	61	8.3	10	7.2	4.2	2.8	1.6
t-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.2	1.0 - U,D	<2.0	<0.27	<0.33	<0.2	<0.2	<0.2	<0.40	<0.27	<0.33
TCE	3	5	µg/L	140	180	238 - D	95	110	170	22	31	26.5	29	14	9.9
Trichlorofluoromethane	2100/2100	NL	µg/L	<1.0	<0.3	1.5 - U,D	<2.3	<0.45	<0.20	<0.3	<0.3	<0.3	<0.46	<0.45	<0.20
Vinyl Chloride	1	2	µg/L	11	11	22.0 - D	7.6	11	12	1.9	3	2.2	1.7	1.3	1.9
Xylenes (Total)	20/20	10000	µg/L	<3.0	<0.5	2.5 - U,D	<1.9	<0.29	<0.50	<0.5	<0.5	<0.5	<0.38	<0.29	<0.50
p-Isopropyltoluene	NL	NL	µg/L	<1.0	<0.2	NA	NA	NA	NA	<0.2	<0.2	NA	NA	NA	NA
SETCE				363.1	<428.34	461.42	297.84	332.22	541.16	<60.62	<77.14	<67.582	<56.62	35.476	28.498
Total Metals															
Iron	300	NL	µg/L	2700	5200	4690	43400	2780	47900	1900	1900	3180	3260	3100	2620
Dissolved Metals															
Iron	300	NL	µg/L	NA	NA	NA	NA	NA	3670	NA	NA		NA	NA	1020
Dissolved Gases															
Methane	NL	NL	µg/L	200	80 V	9.66	159	1	1	356	400	171	667	161	180
Ethene	NL	NL	µg/L	3.1	<0.3	0.0003	<0.3	<1.0	<0.4	<0.3	<0.3	<0.3	<0.3	<0.1	<0.4
Ethane	NL	NL	µg/L	3.9	1.0	0.0002	3	<0.9	<0.4	<0.2	<0.2	<0.2	1.1	<0.9	<0.4
Miscellaneous Parameters															
Chloride	250	NL	mg/L	62	55.2	35	49 v	55	34	25	21.5	15	23 v	26	21
Sulfate	250	NL	mg/L	26	21.7	14	29	21	25	6.9	7.4	9	8.7	12	10
Sulfide	NL	NL	mg/L	<1.0	<1.0	0.49 - U	<0.45	<0.45	<0.45	<1.0	<1.0	<0.49	0.94	<0.45	<0.45
Total Organic Carbon	NL	NL	mg/L	3.0	7.8	0.3 - U	6.0	3.5	9.0	6	7.4	1.6	5.8	4.4	4.4

J - estimated concentration

D1- Analyte value was determined from a 1:5 dilution

i - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)

V- indicated that the analyte was detected in both the sample and associated method blank

D3- Analyte value was determined from a 1:200 dilution

D2- Analyte value was determined from a 1:10 dilution

TABLE 4: GROUNDWATER ANALYTICAL RESULTS SUMMARY

SITE NAME: OU1, NAVAL AIR STATION JACKSONVILLE

Parameter	FDEP GCTLs old/current	USEPA MCLs	Units	OU1-MW-67 11/11/2004	OU1-MW-67 11/17/2005	OU1-MW-67 11/22/2006	OU1-MW-67 11/15/2007	OU1-MW-67 12/3/2008	**OU1-MW-67 2/10/2010**	OU1-MW-84 11/11/2004	OU1-MW-84 11/15/2005	OU1-MW-84 11/21/2006	OU1-MW-84 11/15/2007	OU1-MW-84 12/9/2008	**OU1-MW-84 2/11/2010**
VOCs															
1,1,1-Trichloroethane	200/200	200	µg/L	<1.0	<0.3	<0.3	<0.34	<0.37	**<0.20**	<1.0	<0.3	<0.3	<0.34	<0.37	**<0.15**
1,1,2-Trichloroethane	5/5	5	µg/L	<1.0	<0.3	<0.3	<0.35	<0.40	**<0.40**	<1.0	<0.3	<0.3	<0.35	<0.40	**<0.068**
1,1,1,2-Tetrachloroethane	1.3/1.3	NL	µg/L	<1.0	<0.1	<0.1	<0.22	<0.33	**<0.20**	<1.0	<0.1	<0.1	<0.22	<0.33	**<0.091**
1,1,2,2-Tetrachloroethane	0.2/0.2	NL	µg/L	<0.2	<0.2	<0.2	<0.14	<0.21	**<0.32**	<0.2	<0.2	<0.2	<0.14	<0.21	**<0.085**
1,1-DCE	7	7	µg/L	<1.0	<0.3	<0.2	<0.36	<0.34	**<0.21**	<1.0	<0.3	<0.2	<0.36	<0.34	**<0.15**
1,1 Dichloroethane	70/70	NL	µg/L	<1.0	<0.2	<0.2	<0.45	<0.37	**<0.30**	<1.0	<0.2	<0.2	<0.45	<0.37	**<0.050**
1,2-Dichlorobenzene	600	NL	µg/L	<1.0	<0.2	<0.2	<0.30	<0.08	**<0.24**	<1.0	<0.2	<0.2	<0.30	<0.08	**<0.052**
1,1-Dichloropropene	NL	NL	µg/L	<1.0	<0.2	<0.2	<0.56	<0.29	**<0.21**	<1.0	<0.2	<0.2	<0.56	<0.29	**<0.083**
1,2-Dibromoethane	0.02	NL	µg/L	<1.0	<0.1	<0.1	<0.34	<0.10	**<0.27**	<1.0	<0.1	<0.1	<0.34	<0.10	**<0.42**
1,2-Dichloroethane	3	5	µg/L	<1.0	<0.2	<0.1	<0.19	<0.43	**<0.28**	<1.0	<0.2	<0.1	<0.19	<0.43	**<0.082**
1,2-Dichloropropane	5	5	µg/L	<1.0	<0.4	<0.4	<0.44	<0.52	**<0.30**	<1.0	<0.4	<0.4	<0.44	<0.52	**<0.098**
1,2-Dibromo-3-chloropropane	0.2	0.2	µg/L	<1.0	<0.2	<0.3	<0.56	<0.18	**<0.60**	<1.0	<0.2	<0.3	<0.56	<0.18	**<0.48**
1,2,3-Trichloropropane	0.2/0.02	NL	µg/L	<1.0	<0.3	<0.3	<0.25	<0.20	**<0.30**	<1.0	<0.3	<0.3	<0.25	<0.20	**<0.15**
1,2,3-Trichlorobenzene	70/70	NL	µg/L	<1.0	<0.4	<0.2	0.64 iv	<0.14	**<0.50**	<1.0	<0.4	<0.2	<0.35	<0.14	**<0.25**
1,2,4-Trichlorobenzene	70	NL	µg/L	<1.0	<0.4	<0.1	0.32 I	<0.67	**<0.41**	<1.0	4.0	<0.1	<0.17	<0.67	**<0.097**
1,2,4-Trimethylbenzene	10/10	NL	µg/L	<1.0	<0.2	<0.2	<0.38	<0.26	**<0.28**	<1.0	<0.2	<0.2	<0.38	<0.26	**<0.067**
1,3-Dichlorobenzene	10/210	NL	µg/L	<1.0	<0.1	<0.2	<0.25	<0.23	**<0.27**	<1.0	<0.1	<0.2	<0.25	<0.23	**<0.092**
1,3-Dichloropropane	NL	NL	µg/L	<1.0	<0.3	<0.3	<0.14	<0.18	**<0.25**	<1.0	<0.3	<0.4	<0.14	<0.18	**<0.15**
1,3,5-Trimethylbenzene	10/10	NL	µg/L	<1.0	<0.2	<0.2	<0.22	<0.21	**<0.26**	<1.0	<0.2	<0.2	<0.22	<0.21	**<0.10**
1,4-Dichlorobenzene	75	NL	µg/L	<1.0	<0.2	<0.1	<0.18	<0.20	**<0.23**	<1.0	<0.2	<0.1	<0.18	<0.20	**<0.10**
2-Butanone	4,200	NL	µg/L	<20	<2.0	<2.0	<2.4	<0.78	**<0.38**	<20	<2.0	<2.0	<2.4	<0.78	**<1.0**
2-Chloroethyl vinyl ether	175	NL	µg/L	<6.0	<0.8	<0.8	<2.1	<1.5	**<1.5**	<6.0	<0.8	<0.8	<2.1	<1.5	**<0.94**
2-Chlorotoluene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.37	<0.27	**<0.33**	<1.0	<0.1	<0.1	<0.37	<0.27	**<0.10**
2-Hexanone	280/280	NL	µg/L	<20	<0.6	<0.6	<0.95	<1.1	**<0.50**	<20	<0.6	<0.6	<0.95	<1.1	**<0.68**
2,2 Dichloropropane	NL	NL	µg/L	<1.0	<0.3	<0.2	<0.71	<0.26	**<0.40**	<1.0	<0.3	<0.2	<0.71	<0.26	**<0.12**
4-Chlorotoluene	NL	NL	µg/L	<1.0	<0.2	<0.1	<0.20	<0.35	**<0.22**	<1.0	<0.2	<0.1	<0.20	<0.35	**<0.10**
4-Methyl-2-Pentanone	560	NL	µg/L	<20	<2.0	<2.0	<1.6	<1.3	**<1.0**	<20	<2.0	<2.0	<1.6	<1.3	**<1.1**
Acetone	700/63000	NL	µg/L	<50	<2.0	<2.0	<3.8	<1.4	**<1.1**	<50	<2.0	<2.0	<3.8	<1.4	**<1.5**
Benzene	1/1	5	µg/L	<1.0	<0.2	<0.2	<0.23	<0.29	**<0.27**	<1.0	<0.2	<0.2	<0.23	<0.29	**<0.050**
Bromobenzene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.40	<0.20	**<0.26**	<1.0	<0.1	<0.1	<0.40	<0.20	**<0.13**
Bromochloromethane	91/91	NL	µg/L	<1.0	<0.3	<0.3	<0.58	<0.67	**<0.28**	<1.0	<0.3	<0.3	<0.58	<0.67	**<0.11**
Bromodichloromethane	0.6/0.6	100	µg/L	<0.60	<0.2	<0.2	<0.29	<0.12	**<0.20**	<0.60	<0.2	<0.2	<0.29	<0.12	**<0.10**
Bromoform	4.4/4.4	NL	µg/L	<1.0	<0.2	<0.2	<0.35	<0.25	**<0.33**	<1.0	<0.2	<0.2	<0.35	<0.25	**<0.20**
Bromomethane	9.8/9.8	NL	µg/L	<2.0	<0.6	<0.6	<0.45	<0.48	**<0.64**	<2.0	<0.6	<0.6	<0.45	<0.48	**<0.28**
Carbon Disulfide	700/700	NL	µg/L	<50	<0.9	<0.9	<1.5	<1.3	**<0.24**	<50	<0.9	<0.9	<1.5	<1.3	**<0.54**
Carbon Tetrachloride	3	5	µg/L	<1.0	<0.3	<0.3	<0.53	<0.45	**<0.20**	<1.0	<0.3	<0.3	<0.53	<0.45	**<0.082**
Chlorobenzene	100	100	µg/L	<1.0	<0.2	<0.2	<0.21	<0.24	**<0.24**	<1.0	<0.2	<0.2	<0.21	<0.24	**<0.069**
Chloroethane	NL	NL	µg/L	<2.0	<0.4	<0.3	<0.85	<0.36	**<0.31**	<2.0	<0.4	0.8 I	<0.85	<0.36	**<0.18**
Chloroform	5.7/70	100	µg/L	<1.0	<0.2	<0.2	<0.34	<0.43	**<0.21**	<1.0	<0.2	<0.2	<0.34	<0.43	**<0.083**
Chloromethane	2.7	NL	µg/L	<1.0	<0.3	<0.3	<0.36	<0.39	**<0.31**	<1.0	<0.3	<0.3	<0.36	<0.39	**<0.050**
cis-1,2-DCE	70	70	µg/L	80	58	83.2	57	25	**24**	1	0.4	0.6 I	<0.45	<0.32	**<0.075**
c-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.1	<0.1	<0.27	<0.23	**<0.35**	<0.2	<0.1	<0.1	<0.27	<0.23	**<0.073**
Dibromochloromethane	0.4/0.4	NL	µg/L	<0.4	<0.2	<0.2	<0.31	<0.28	**<0.27**	<0.4	<0.2	<0.2	<0.31	<0.28	**<0.067**
Dibromomethane	NL	5	µg/L	<1.0	<0.3	<0.3	<0.41	<0.29	**<0.27**	<1.0	<0.3	<0.3	<0.41	<0.29	**<0.13**
Dichlorodifluoromethane	1400/1400	NL	µg/L	<2.0	<0.3	<0.3	<0.31	<0.14	**<0.29**	<2.0	<0.3	<0.3	<0.31	<0.14	**<0.091**
Ethylbenzene	30/30	700	µg/L	<1.0	<0.3	<0.3	<0.34	<0.29	**<0.26**	<1.0	<0.3	<0.3	<0.34	<0.29	**<0.10**
Hexachlorobutadiene	0.5	NL	µg/L	<1.0	<0.6	<0.4	<0.37	<0.12	**<0.35**	<1.0	<0.6	<0.4	<0.37	<0.12	**<0.15**
Isopropylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.25	<0.23	**<0.20**	<1.0	<0.1	<0.1	<0.25	<0.23	**<0.13**
Methylene Chloride	5	NL	µg/L	<5.0	<0.1	<2.0	<0.65	<0.25	**<0.82**	<5.0	<0.1	<2.0	<0.65	<0.25	**0.94 I**
MTBE	50/20	NL	µg/L	<1.0	<0.2	<0.2	<0.21	<0.21	**<0.24**	<1.0	<0.2	<0.2	<0.21	<0.21	**<0.12**
n-Butylbenzene	NL	NL	µg/L	<1.0	<0.3	<0.3	<0.30	<0.29	**<0.28**	<1.0	<0.3	<0.3	<0.30	<0.29	**<0.074**
n-Propylbenzene	NL	NL	µg/L	<1.0	<0.2	<0.3	<0.27	<0.20	**<0.20**	<1.0	<0.2	<0.3	<0.27	<0.20	**<0.073**
Naphthalene	20/14	NL	µg/L	<2.0	<0.3	0.3 I	0.44 iv	<0.58	**5.0 V**	<2.0	<0.3	<0.3	<0.35	<0.58	**<0.086**
s-butylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.2	<0.20	<0.20	**0.35 I**	<1.0	<0.1	<0.2	<0.20	<0.20	**<0.053**
Styrene	100	100	µg/L	<1.0	<0.1	<0.1	<0.19	<0.21	**<0.32**	<1.0	<0.1	<0.1	<0.19	<0.21	**<0.082**
tert-Butylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.3	<0.41	<0.29	**<0.21**	<1.0	<0.1	<0.3	<0.41	<0.29	**<0.094**
Tetrachloroethene	3	NL	µg/L	<2.0	<0.3	<0.3	<0.35	<0.32	**<0.21**	<2.0	<0.3	<0.3	<0.35	<0.32	**<0.088**
Toluene	40/40	1000	µg/L	<1.0	<0.2	<0.2	<0.26	<0.35	**<0.30**	<1.0	<0.2	<0.2	<0.26	<0.35	**<0.053**
Trans-1,2-DCE	100	100	µg/L	7.7	5	7.9	1.9	1.3	**<0.30**	<1.0	0.2 i	<0.2	<0.41	<0.49	**<0.11**
t-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.2	<0.2	<0.40	<0.27	**<0.33**	<0.2	<0.2	<0.2	<0.40	<0.27	**<0.080**
TCE	3	5	µg/L	7	6	12.5	3.2	2.6	**<0.24**	<1.0	1.0	1.5	<0.26	<0.50	**<0.13**
Trichlorofluoromethane	2100/2100	NL	µg/L	<1.0	<0.3	<0.3	<0.46	<0.45	**<0.20**	<1.0	<0.3	<0.3	<0.46	<0.45	**<0.15**
Vinyl Chloride	1	2	µg/L	5.4	8	5	6.4	1.6	**2.1**	<1.0	<0.4	0.4 I	<0.52	<0.61	**<0.083**
Xylenes (Total)	20/20	10000	µg/L	<3.0	<0.5	<0.5	<0.38	<0.29	**<0.50**	<3.0	<0.5	<0.5	<0.38	<0.29	**<0.22**
p-Isopropyltoluene	NL	NL	µg/L	<1.0	<0.2	<0.2	NA	NA	**NA**	<1.0	<0.2	<0.5	NA	NA	**NA**
EETCE				<125.8	<39.38	<133.396	<92.09	39.306	**36.528**	<5.93	<2.572	<3.329	<2.179	<2.4016	**0.47495**
Total Metals															
Iron	300	NL	µg/L	5500	4200	3840	2980	17100	**5200**	1400	1100	1980	1890	2080	**2090**
Dissolved Metals															
Iron	300	NL	µg/L	NA	NA		NA	NA	**2060**	NA	NA	NA	NA	NA	**2040**
Dissolved Gases															
Methane	NL	NL	µg/L	260	200 D1	6.2	0.082	56	**40**	430	200 V D3	162	5	136	**238**
Ethene	NL	NL	µg/L	<1.0	<0.3	<0.3	<0.0003	<1.0	**<0.4**	<1.0	<0.3	<0.3	<0.3	<1.0	**<0.4**
Ethane	NL	NL	µg/L	<1.0	2	<0.2	0.0008 I	0.9 I	**1.0 I**	<1.0	<0.2	<0.2	<0.2	<0.9	**<0.4**
Miscellaneous Parameters															
Chloride	250	NL	mg/L	19	17	11	16 v	20	**20**	19	16.1	11	16 v	17	**17**
Sulfate	250	NL	mg/L	14	13.7	14	14	16	**19**	2.0	1.2 i	<0.03	1.7 i	0.66 - I	**1.60**
Sulfide	NL	NL	mg/L	<1.0	<1.0	<0.49	0.61 I	<0.45	**<0.45**	<1.0	<1.0	<0.49	0.77 I	<0.45	**<0.45**
Total Organic Carbon	NL	NL	mg/L	7.0	9.3	2.9	9.2	11	**10**	3.0	8.5	<0.3	5.8	4.2	**4.3**

J - estimated concentration

D1- Analyte value was determined from a 1:5 dilution

I - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)

V- indicated that the analyte was detected in both the sample and associated method blank

D3- Analyte value was determined from a 1:200 dilution

D2- Analyte value was determined from a 1:10 dilution

TABLE 4: GROUNDWATER ANALYTICAL RESULTS SUMMARY

SITE NAME: OU1, NAVAL AIR STATION JACKSONVILLE

Parameter	FDEP GCTLs old/current	USEPA MCLs	Units	Sample ID / Date Collected	OU1-MW-85 11/11/2004	OU1-MW-85 11/18/2005	OU1-MW-85 11/21/2006	OU1-MW-85 11/15/2007	OU1-MW-85 12/3/2008	OU1-MW-85 2/11/2010	OU1-MW-89 11/10/2004	OU1-MW-89 11/18/2005	OU1-MW-89 11/21/2006	OU1-MW-89 11/15/2007	OU1-MW-89 12/3/2008	OU1-MW-89 2/11/2010
VOCs																
1,1,1-Trichloroethane	200/200	200	µg/L		<1.0	<0.3	<0.3	<0.34	<0.37	<0.15	<3.0	<3.0 D2	<0.3	<0.34	<1.8	<0.30
1,1,2-Trichloroethane	5/5	5	µg/L		<1	<0.3	<0.3	<0.35	<0.40	<0.088	<3.0	<3.0 D2	<0.3	<0.35	<2.0	<0.14
1,1,1,2-Tetrachloroethane	1.3/1.3	NL	µg/L		<1.0	<0.1	<0.1	<0.22	<0.33	<0.091	<1.0	<1.0 D2	<0.1	<0.22	<1.6	<0.18
1,1,2,2-Tetrachloroethane	0.2/0.2	NL	µg/L		<0.2	<0.2	<0.2	<0.14	<0.21	<0.085	<1.0	<2.0 D2	<0.2	<0.14	<1.0	<0.17
1,1-DCE	7	7	µg/L		<1.0	<0.3	<0.2	<0.36	<0.34	<0.15	61	63 D2	131	99	64	22
1,1 Dichloroethane	70/70	NL	µg/L		<1.0	<0.2	<0.2	<0.45	<0.37	<0.050	3 i	2.0 i D2	4.8	3	<1.8	1.2 i
1,2-Dichlorobenzene	600	NL	µg/L		<1.0	<0.2	<0.2	<0.30	<0.08	<0.062	<3.0	<2.0 D2	<0.2	<0.30	<0.38	<0.10
1,1-Dichloropropene	NL	NL	µg/L		<1.0	<0.2	<0.2	<0.56	<0.29	<0.083	<2.0	<2.0 D2	<0.2	<0.56	<1.4	<0.13
1,2-Dibromoethane	0.02	NL	µg/L		<1.0	<0.1	<0.1	<0.34	<0.10	<0.42	<1.0	<1.0 D2	<0.1	<0.34	<0.46	<0.84
1,2-Dichloroethane	3	5	µg/L		<1.0	<0.2	<0.1	<0.19	<0.43	<0.082	6 i	6.0 i D2	10.2	9.2	<2.2	5.6
1,2-Dichloropropane	5	5	µg/L		<1.0	<0.4	<0.4	<0.44	<0.52	<0.096	<4.0	<4.0 D2	<0.4	<0.44	<2.6	<0.20
1,2-Dibromo-3-chloropropane	0.2	0.2	µg/L		<1.0	<0.2	<0.3	<0.56	<0.18	<0.48	<2.0	<2.0 D2	<0.3	<0.56	<0.90	<0.96
1,2,3-Trichloropropane	0.2/0.02	NL	µg/L		<1.0	<0.3	<0.3	<0.25	<0.20	<0.15	<3.0	<3.0 D2	<0.3	<0.25	<1.0	<0.30
1,2,3-Trichlorobenzene	70/70	NL	µg/L		<1.0	<0.4	<0.2	<0.35	<0.14	<0.25	<6.0	<4.0 D2	<0.2	<0.35	<0.70	<0.50
1,2,4-Trichlorobenzene	70	NL	µg/L		<1.0	<0.4	<0.1	<0.17	<0.67	<0.097	<4.0	<4.0 D2	<0.1	<0.17	<3.4	<0.19
1,2,4-Trimethylbenzene	10/10	NL	µg/L		<1.0	<0.2	<0.2	<0.38	<0.26	<0.067	2 i	4.0 i D2	<0.2	1.7	<1.3	<0.13
1,3-Dichlorobenzene	10/210	NL	µg/L		<1.0	<0.1	<0.2	<0.25	<0.23	<0.092	<1.0	<1.0 D2	<0.2	<0.25	<1.2	<0.18
1,3-Dichloropropane	NL	NL	µg/L		<1.0	<0.3	<0.3	<0.14	<0.16	<0.15	<3.0	<3.0 D2	<0.3	<0.14	<0.90	<0.30
1,3,5-Trimethylbenzene	10/10	NL	µg/L		<1.0	<0.2	<0.2	<0.22	<0.21	<0.10	<2.0	<2.0 D2	<0.2	0.841 i	<1.0	<0.20
1,4-Dichlorobenzene	75	NL	µg/L		<1.0	<0.2	<0.1	<0.18	<0.20	<0.10	<2.0	<2.0 D2	<0.1	<0.18	<1.0	<0.20
2-Butanone	4,200	NL	µg/L		<20	<2.0	<2.0	<2.4	<0.78	<1.0	<20	<20 D2	<2.0	<2.4	<3.9	<2.0
2-Chloroethyl vinyl ether	175	NL	µg/L		<6.0	<0.8	<0.8	<2.1	<1.5	<0.94	<8.0	<8.0 D2	<0.8	<2.1	<7.5	<1.9
2-Chlorotoluene	NL	NL	µg/L		<1.0	<0.1	<0.1	<0.37	<0.27	<0.10	<1.0	<1.0 D2	<0.1	<0.37	<1.4	<0.20
2-Hexanone	280/280	NL	µg/L		<20	<0.6	<0.6	<0.95	<1.1	<0.69	<6.0	<6.0 D2	<0.6	<0.95	<5.5	<1.4
2,2 Dichloropropane	NL	NL	µg/L		<1.0	<0.3	<0.2	<0.71	<0.26	<0.12	<3.0	<3.0 D2	<0.2	<0.71	<1.3	<0.24
4-Chlorotoluene	NL	NL	µg/L		<1.0	<0.2	<0.1	<0.20	<0.35	<0.10	<2.0	<2.0 D2	<0.1	<0.20	<1.8	<0.20
4-Methyl-2-Pentanone	560	NL	µg/L		<20	<2.0	<2.0	<1.6	<1.3	<1.1	<20	<20 D2	<2.0	<1.6	<6.5	<2.2
Acetone	700/63000	NL	µg/L		<50	<2.0	<2.0	<3.8	<1.4	<1.5	<20	<20 D2	<2.0	<3.8	<7.0	<3.0
Benzene	1/1	5	µg/L		<1.0	<0.2	<0.2	<0.23	<0.29	<0.050	55	42 D2	37	40	<1.4	32
Bromobenzene	NL	NL	µg/L		<1.0	<0.1	<0.1	<0.40	<0.20	<0.13	<1.0	<1.0 D2	<0.1	<0.40	<1.0	<0.26
Bromochloromethane	91/91	NL	µg/L		<1.0	<0.3	<0.3	<0.58	<0.67	<0.11	<3.0	<3.0 D2	<0.3	<0.58	<3.4	<0.22
Bromodichloromethane	0.6/0.6	100	µg/L		<0.60	<0.2	<0.2	<0.29	<0.12	<0.10	<2.0	<2.0 D2	<0.2	<0.29	<0.60	<0.20
Bromoform	4.4/4.4	NL	µg/L		<1.0	<0.2	<0.2	<0.35	<0.25	<0.20	<2.0	<2.0 D2	<0.2	<0.35	<1.2	<0.40
Bromomethane	9.8/9.8	NL	µg/L		<2.0	<0.6	<0.6	<0.45	<0.48	<0.28	<6.0	<6.0 D2	<0.6	<0.45	<2.4	<0.56
Carbon Disulfide	700/700	NL	µg/L		<50	<0.9	<0.9	<1.5	<1.3	<0.54	<9.0	<9.0 D2	<0.9	1.6 i	<6.5	<1.1
Carbon Tetrachloride	3	5	µg/L		<1.0	<0.3	<0.3	<0.53	<0.45	<0.082	<3.0	<3.0 D2	<0.3	<0.53	<2.2	<0.18
Chlorobenzene	100	100	µg/L		<1.0	<0.2	<0.2	<0.21	<0.24	<0.089	3 i	<2.0 D2	<0.2	<0.21	<1.2	<0.14
Chloroethane	NL	NL	µg/L		<2.0	<0.4	<0.3	<0.85	<0.36	<0.18	<4.0	<4.0 D2	<0.3	<0.85	<1.8	<0.36
Chloroform	5.7/70	100	µg/L		<1.0	<0.2	<0.2	<0.34	<0.43	<0.083	<2.0	<2.0 D2	0.6 i	0.57 i	<2.2	<0.17
Chloromethane	2.7	NL	µg/L		<1.0	<0.3	<0.3	<0.36	<0.39	<0.050	<3.0	<3.0 D2	<0.3	<0.36	<2.0	<0.10
cis-1,2-DCE	70	70	µg/L		1	0.2	0.2	<0.45	<0.32	<0.075	350	210	449 D	320	190	23
c-1,3-Dichloropropene	0.2	NL	µg/L		<0.2	<0.1	<0.1	<0.27	<0.23	<0.073	<1.0	<1.0 D2	<0.1	<0.27	<1.2	<0.15
Dibromochloromethane	0.4/0.4	NL	µg/L		<0.4	<0.2	<0.2	<0.31	<0.28	<0.067	<2.0	<2.0 D2	<0.2	<0.31	<1.4	<0.13
Dibromomethane	NL	5	µg/L		<1.0	<0.3	<0.3	<0.41	<0.29	<0.12	<3.0	<3.0 D2	<0.3	<0.41	<1.4	<0.26
Dichlorodifluromethane	1400/1400	NL	µg/L		<2.0	<0.3	<0.3	<0.31	<0.14	<0.091	<3.0	<3.0 D2	<0.3	<0.31	<0.70	<0.18
Ethylbenzene	30/30	700	µg/L		<1.0	<0.3	<0.3	<0.34	<0.29	<0.10	22	10 i D2	2.5	11	<1.4	<0.20
Hexachlorobutadiene	0.9	NL	µg/L		<1.0	<0.6	<0.4	<0.37	<0.12	<0.15	<6.0	<6.0 D2	<0.4	<0.37	<0.60	<0.30
Isopropylbenzene	NL	NL	µg/L		<1.0	<0.1	<0.1	<0.25	<0.23	<0.13	5 i	4.0 i D2	3.2	9.2	1.8 i	3.2
Methylene Chloride	5	NL	µg/L		<5.0	<0.1	<2.0	<0.65	<0.29	1.0	<1.0	<1.0 D2	<2.0	<0.65	<1.2	<0.14
MTBE	50/20	NL	µg/L		<1.0	<0.2	<0.2	<0.21	<0.21	<0.12	<2.0	<2.0 D2	<0.2	<0.21	<1.0	<0.24
n-Butylbenzene	NL	NL	µg/L		<1.0	<0.3	<0.3	<0.30	<0.29	<0.074	<3.0	<3.0 D2	<0.3	0.58 i	<1.4	<0.15
n-Propylbenzene	NL	NL	µg/L		<1.0	<0.2	<0.3	<0.27	<0.20	<0.073	<2.0	<2.0 D2	0.9 i	1.4	<1.0	<0.15
Naphthalene	20/14	NL	µg/L		<2.0	<0.3	<0.3	<0.35	<0.56	<0.088	<3.0	<3.0 D2	<0.3	<18	<2.9	<0.17
s-butylbenzene	NL	NL	µg/L		<1.0	<0.1	<0.2	<0.20	<0.20	<0.053	<1.0	<1.0 D2	0.6 i	1.1	<1.0	<0.11
Styrene	100	100	µg/L		<1.0	<0.1	<0.1	<0.19	<0.21	<0.082	<1.0	<1.0 D2	<0.1	<0.19	<1.0	<0.18
tert-Butylbenzene	NL	NL	µg/L		<1.0	<0.1	<0.3	<0.41	<0.28	<0.094	<1.0	<1.0 D2	0.4 i	0.72 i	<1.4	<0.19
Tetrachloroethene	3	NL	µg/L		<2.0	<0.3	<0.3	<0.35	<0.32	<0.098	<3.0	<3.0 D2	<0.3	<0.35	<1.6	<0.20
Toluene	40/40	1000	µg/L		<1.0	<0.2	<0.2	<0.28	<0.35	<0.053	2 i	4.0 i D2	1.2	2.1	<1.8	<0.11
Trans-1,2-DCE	100	100	µg/L		<1.0	<0.2	<0.2	<0.41	<0.49	<0.11	3 i	4.0 i D2	6.4	5.6	<2.4	2.1
t-1,3-Dichloropropene	0.2	NL	µg/L		<0.2	<0.2	<0.2	<0.40	<0.27	<0.080	<2.0	<2.0 D2	<0.2	<0.40	<1.4	<0.16
TCE	3	5	µg/L		<1.0	0.5 i	0.6 i	<0.26	<0.50	<0.13	1000	880 D2	1070 D	1500	870	340
Trichloroflouromethane	2100/2100	NL	µg/L		<1.0	<0.3	<0.3	<0.46	<0.45	<0.15	<3.0	<3.0 D2	<0.3	<0.46	<2.2	<0.30
Vinyl Chloride	1	2	µg/L		<1.0	<0.4	<0.4	<0.52	<0.61	<0.083	430	200 D2	459	490	230	99
Xylenes (Total)	20/20	10000	µg/L		<3.0	<0.5	<0.5	<0.38	<0.29	<0.22	<6 i	7.0 i D2	0.9 i	6.6	<1.4	<0.44
p-Isopropyltoluene	NL	NL	µg/L		<1.0	<0.2	<0.2	NA	NA	NA	<2.0	9.0 i D2	<0.5	NA	NA	NA
EETCE					<5.93	<1.806	<1.906	<2.179	<2.4016	0.47495	<2261.4	<1761.7	<2584.08	<2905.88	1583.98	64.185
Total Metals																
Iron	300/300	NL	µg/L		2000	1800	1690	1700	2190	9670	38000	34300	33600	31800	30900	59600
Dissolved Metals																
Iron	300/300	NL	µg/L		NA	NA	NA	NA	NA	9920	NA	NA	NA	NA	NA	39900
Dissolved Gases																
Methane	NL	NL	µg/L		440	3000 V D3	92	759	922	828	5700	2000 V D1	1870 D	4580	1050	1510
Ethene	NL	NL	µg/L		<1.0	<0.3	<0.3	<0.3	<1.0	<0.4	66	<0.3	29	58	22	6
Ethane	NL	NL	µg/L		<1.0	<0.2	<0.2	<0.2	<0.9	<0.4	73	40	13	44	13	8
Miscellaneous Parameters																
Chloride	250/250	NL	mg/L		17	14.2	9.5	14 v	21	50	18	15.6	10	13 v	15	13
Sulfate	250/250	NL	mg/L		2.6	2.0	4.7	2.3	4.6	32.0	2.9	2.2	28	2.6	2.4 - I	44
Sulfide	NL	NL	mg/L		<1.0	1.4	0.87 i	1.6	0.71	0.56 i	<1.0	<1.0	<0.49	0.45 i	<0.45	<0.45
Total Organic Carbon	NL	NL	mg/L		9.0	13.0	<0.3	10.0	9.3	16.0	16	25.6	8.4	26	19	18

J - estimated concentration

D1- Analyte value was determined from a 1:5 dilution

i - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)

V- indicated that the analyte was detected in both the sample and associated method blank

D3- Analyte value was determined from a 1:200 dilution

D2- Analyte value was determined from a 1:10 dilution

TABLE 4: GROUNDWATER ANALYTICAL RESULTS SUMMARY

SITE NAME: OU1, NAVAL AIR STATION JACKSONVILLE

Parameter	FDEP GCTLs old/current	USEPA MCLs	Units	OU1-MW-93	OU1-MW-93	OU1-MW-93	OU1-MW-93	OU1-MW-93	OU1-MW-93	OU1-MW-95	OU1-MW-95	OU1-MW-95	OU1-MW-95	OU1-MW-95	OU1-MW-95
			Date Collected	11/11/2004	11/17/2005	11/21/2006	11/15/2007	12/3/2008	2/11/2010	11/11/2004	11/18/2005	11/22/2006	11/15/2007	12/4/2008	2/10/2010
VOCs															
1,1,1-Trichloroethane	200/200	200	µg/L	<1.0	<0.3	<0.3	<0.34	<0.37	<0.15	<1.0	<0.3	<0.3	<0.34	<0.37	<0.20
1,1,2-Trichloroethane	5/5	5	µg/L	<1.0	<0.3	<0.3	<0.35	<0.40	<0.088	<1.0	<0.3	<0.3	<0.35	<0.40	<0.40
1,1,1,2-Tetrachloroethane	1.3/1.3	NL	µg/L	<1.0	<0.1	<0.1	<0.22	<0.33	<0.091	<1.0	<0.1	<0.1	<0.22	<0.33	<0.20
1,1,2,2-Tetrachloroethane	0.2/0.2	NL	µg/L	<0.2	<0.2	<0.2	<0.14	<0.21	<0.085	<0.2	<0.2	<0.2	<0.14	<0.21	<0.32
1,1-DCE	7	7	µg/L	<1.0	<0.3	<0.2	<0.36	<0.34	<0.15	<1.0	<0.3	<0.2	<0.36	<0.34	<0.21
1,1 Dichloroethane	70/70	NL	µg/L	<1.0	<0.2	<0.2	<0.45	<0.37	<0.050	<1.0	<0.2	<0.2	<0.45	<0.37	<0.30
1,2-Dichlorobenzene	600	NL	µg/L	<1.0	<0.2	<0.2	<0.30	<0.08	<0.052	<1.0	0.2 i	<0.2	<0.30	<0.08	<0.24
1,1-Dichloropropene	NL	NL	µg/L	<1.0	<0.2	<0.2	<0.56	<0.29	<0.093	<1.0	<0.2	<0.2	<0.56	<0.29	<0.21
1,2-Dibromoethane	0.02	NL	µg/L	<1.0	<0.1	<0.1	<0.34	<0.10	<0.42	<1.0	<0.1	<0.1	<0.34	<0.10	<0.27
1,2-Dichloroethane	3	5	µg/L	<1.0	<0.2	<0.1	<0.19	<0.43	<0.082	<1.0	<0.2	<0.1	<0.19	<0.43	<0.28
1,2-Dichloropropane	5	5	µg/L	<1.0	<0.4	<0.4	<0.44	<0.52	<0.098	<1.0	<0.4	<0.4	<0.44	<0.52	<0.30
1,2-Dibromo-3-chloropropane	0.2	0.2	µg/L	<1.0	<0.2	<0.3	<0.56	<0.18	<0.48	<1.0	<0.2	<0.3	<0.56	<0.18	<0.60
1,2,3-Trichloropropane	0.2/0.02	NL	µg/L	<1.0	<0.3	<0.3	<0.25	<0.20	<0.15	<1.0	<0.3	<0.3	<0.25	<0.20	<0.30
1,2,3-Trichlorobenzene	70/70	NL	µg/L	<1.0	<0.4	<0.2	<0.35	<0.14	<0.25	<1.0	<0.4	<0.2	<0.35	<0.14	<0.50
1,2,4-Trichlorobenzene	70	NL	µg/L	<1.0	<0.4	<0.1	<0.17	<0.67	<0.097	<1.0	<0.4	<0.1	<0.17	<0.67	<0.41
1,2,4-Trimethylbenzene	10/10	NL	µg/L	<1.0	<0.2	<0.2	<0.36	<0.26	<0.067	<1.0	<0.2	<0.2	<0.36	<0.26	<0.28
1,3-Dichlorobenzene	10/210	NL	µg/L	<1.0	<0.1	<0.2	<0.25	<0.23	<0.092	<1.0	<0.1	<0.2	<0.25	<0.23	<0.27
1,3-Dichloropropane	NL	NL	µg/L	<1.0	<0.3	<0.3	<0.14	<0.18	<0.15	<1.0	<0.3	<0.3	<0.14	<0.18	<0.25
1,3,5-Trimethylbenzene	10/10	NL	µg/L	<1.0	<0.2	<0.2	<0.22	<0.21	<0.10	<1.0	<0.2	<0.2	<0.22	<0.21	<0.26
1,4-Dichlorobenzene	75	NL	µg/L	<1.0	<0.2	<0.1	<0.18	<0.20	<0.10	<1.0	0.4 i	<0.1	<0.18	<0.20	<0.23
2-Butanone	4,200	NL	µg/L	<20	<2.0	<2.0	<2.4	<0.78	<1.0	<20	<2.0	<2.0	<2.4	<0.78	<0.38
2-Chloroethyl vinyl ether	175	NL	µg/L	<6.0	<0.8	<0.8	<2.1	<1.5	<0.84	<6.0	<0.8	<0.8	<2.1	<1.5	<1.5
2-Chlorotoluene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.37	<0.27	<0.10	<1.0	<0.1	<0.1	<0.37	<0.27	<0.33
2-Hexanone	250/250	NL	µg/L	<20	<0.6	<0.6	<0.95	<1.1	<0.89	<20	<0.6	<0.6	<0.95	<1.1	<0.50
2,2 Dichloropropane	NL	NL	µg/L	<1.0	<0.3	<0.2	<0.71	<0.26	<0.12	<1.0	<0.3	<0.2	<0.71	<0.26	<0.40
4-Chlorotoluene	NL	NL	µg/L	<1.0	<0.2	<0.1	<0.20	<0.35	<0.10	<1.0	<0.2	<0.1	<0.20	<0.35	<0.22
4-Methyl-2-Pentanone	550	NL	µg/L	<20	<2.0	<2.0	<1.6	<1.3	<1.1	<20	<2.0	<2.0	<1.6	<1.3	<1.0
Acetone	700/63000	NL	µg/L	<50	<2.0	<2.0	<3.8	<1.4	<1.5	<50	<2.0	<2.0	<3.8	<1.4	<1.1
Benzene	1/1	5	µg/L	<1.0	<0.2	<0.2	<0.23	<0.29	<0.050	<1.0	<0.2	<0.2	<0.23	<0.29	<0.27
Bromobenzene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.40	<0.20	<0.13	<1.0	<0.1	<0.1	<0.40	<0.20	<0.28
Bromochloromethane	91/91	NL	µg/L	<1.0	<0.3	<0.3	<0.58	<0.67	<0.11	<1.0	<0.3	<0.3	<0.58	<0.67	<0.28
Bromodichloromethane	0.6/0.6	100	µg/L	<0.60	<0.2	<0.2	<0.29	<0.12	<0.10	<0.60	<0.2	<0.2	<0.29	<0.12	<0.20
Bromoform	4.4/4.4	NL	µg/L	<1.0	<0.2	<0.2	<0.35	<0.25	<0.20	<1.0	<0.2	<0.2	<0.35	<0.25	<0.33
Bromomethane	9.8/9.8	NL	µg/L	<2.0	<0.6	<0.6	<0.45	<0.48	<0.28	<2.0	<0.6	<0.6	<0.45	0.48	<0.64
Carbon Disulfide	700/700	NL	µg/L	<50	<0.9	<0.9	<1.5	<1.3	<0.54	<50	<0.9	0.9 i	<1.5	<1.3	<0.24
Carbon Tetrachloride	3	5	µg/L	<1.0	<0.3	<0.3	<0.53	<0.45	<0.062	<1.0	<0.3	<0.3	<0.53	<0.45	<0.20
Chlorobenzene	100	100	µg/L	<1.0	<0.2	<0.2	<0.21	<0.24	<0.069	<1.0	<0.2	<0.2	<0.21	<0.24	<0.24
Chloroethane	NL	NL	µg/L	<2.0	<0.4	<0.3	<0.85	<0.36	<0.18	<2.0	<0.4	<0.3	<0.85	<0.36	<0.31
Chloroform	5.7/70	100	µg/L	<1.0	<0.2	<0.2	<0.34	<0.43	<0.083	<1.0	<0.2	<0.2	<0.34	<0.43	<0.21
Chloromethane	2.7	NL	µg/L	<1.0	<0.3	<0.3	<0.36	<0.39	<0.050	<1.0	<0.3	<0.3	<0.36	<0.39	<0.31
cis-1,2-DCE	70	70	µg/L	1	0.2	0.2	<0.45	<0.32	<0.075	<1.0	<0.2	0.2	<0.45	<0.32	<0.22
c-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.1	<0.1	<0.27	<0.23	<0.073	<0.2	<0.1	<0.1	<0.27	<0.23	<0.35
Dibromochloromethane	0.4/0.4	NL	µg/L	<0.4	<0.2	<0.2	<0.31	<0.28	<0.087	<0.4	<0.2	<0.2	<0.31	<0.28	<0.27
Dibromomethane	NL	5	µg/L	<1.0	<0.3	<0.3	<0.41	<0.29	<0.13	<1.0	<0.3	<0.3	<0.41	<0.29	<0.27
Dichlorodifluoromethane	1400/1400	NL	µg/L	<2.0	<0.3	<0.3	<0.31	<0.14	<0.091	<2.0	<0.3	<0.3	<0.31	<0.14	<0.29
Ethylbenzene	30/30	700	µg/L	<1.0	<0.3	<0.3	<0.34	<0.29	<0.10	<1.0	<0.3	<0.3	<0.34	<0.29	<0.26
Hexachlorobutadiene	0.5	NL	µg/L	<1.0	<0.6	<0.4	<0.37	<0.12	<0.15	<1.0	<0.6	<0.4	<0.37	<0.12	<0.35
Isopropylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.25	<0.23	<0.13	<1.0	<0.1	<0.1	<0.25	<0.23	<0.20
Methylene Chloride	5	NL	µg/L	<5.0	<0.1	2.0 U	<0.65	<0.25	1.4	<5.0	<0.1	<2.0	<0.65	<0.25	<0.82
MTBE	50/20	NL	µg/L	<1.0	<0.2	<0.2	<0.21	<0.21	<0.12	<1.0	<0.2	0.4 i	<0.21	<0.21	<0.24
n-Butylbenzene	NL	NL	µg/L	<1.0	<0.3	<0.3	<0.30	<0.29	<0.074	<1.0	<0.3	<0.3	<0.30	<0.29	<0.28
n-Propylbenzene	NL	NL	µg/L	<1.0	<0.2	<0.3	<0.27	<0.20	<0.073	<1.0	<0.2	<0.3	<0.27	<0.20	<0.20
Naphthalene	20/14	NL	µg/L	<2.0	<0.3	<0.3	<0.35	<0.58	<0.086	<2.0	<0.3	0.7 i	<0.35	<0.58	3.1 V
s-butylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.2	<0.20	<0.20	<0.053	<1.0	<0.1	<0.2	<0.20	<0.20	<0.20
Styrene	100	100	µg/L	<1.0	<0.1	<0.1	<0.19	<0.21	<0.062	<1.0	<0.1	<0.1	<0.19	<0.21	<0.32
tert-Butylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.3	<0.41	<0.29	<0.094	<1.0	<0.1	<0.3	<0.41	<0.29	<0.21
Tetrachloroethene	3	NL	µg/L	<2.0	<0.3	<0.3	<0.35	<0.32	<0.099	<2.0	<0.3	<0.3	<0.35	<0.32	<0.21
Toluene	40/40	1000	µg/L	<1.0	<0.2	<0.2	<0.28	<0.35	<0.053	<1.0	<0.2	<0.2	<0.28	<0.35	<0.30
Trans-1,2-DCE	100	100	µg/L	<1.0	<0.2	<0.2	<0.41	<0.49	<0.11	<1.0	<0.2	<0.2	<0.41	<0.49	<0.30
t-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.2	<0.2	<0.40	<0.27	<0.060	<0.2	<0.2	<0.2	<0.40	<0.27	<0.33
TCE	3	5	µg/L	<1.0	<0.3	0.4 i	<0.26	<0.56	<0.13	<1.0	<0.3	<0.3	<0.26	<0.50	<0.24
Trichlorofluoromethane	2100/2100	NL	µg/L	<1.0	<0.3	<0.3	<0.46	<0.45	<0.15	<1.0	<0.3	<0.3	<0.46	<0.45	<0.20
Vinyl Chloride	1	2	µg/L	<1.0	<0.4	<0.4	<0.52	<0.61	<0.083	<1.0	<0.4	<0.4	<0.52	<0.61	<0.33
Xylenes (Total)	20/20	10000	µg/L	<3.0	<0.5	<0.5	<0.38	<0.29	<0.22	<3.0	<0.5	<0.5	<0.38	<0.29	<0.50
p-Isopropyltoluene	NL	NL	µg/L	<1.0	<0.2	<0.2	NA	NA	NA	<1.0	<0.2	<0.2	NA	NA	NA
EETCE				<5.93	<1.606	<1.706	<2.179	<2.4016	0.47495	<5.93	<1.606	<1.606	<2.179	<2.4016	1.358
Total Metals															
Iron	300	NL	µg/L		1900	2350	2740	726	3410	3400	9700	5890	1240	7990	8500
Dissolved Metals															
Iron	300	NL	µg/L		NA	NA	NA	NA	1230	NA	NA	NA	NA	NA	1210
Dissolved Gases															
Methane	NL	NL	µg/L		2	3	1	1	29	29	3	6	7	3	1
Ethene	NL	NL	µg/L		<0.3	<0.3	<0.3	<1.0	<0.4	<1.0	<0.3	<0.3	<0.3	<1.0	<0.4
Ethane	NL	NL	µg/L		<0.2	<0.2	<0.2	<0.9	<0.4	<1.0	<0.2	<0.2	<0.2	<0.9	<0.4
Miscellaneous Parameters															
Chloride	250	NL	mg/L		3.1	2.2	3.7 v	4 - i	4.4 i	9.6	4.9	4	15 v	5.6	9.2
Sulfate	250	NL	mg/L		12.9	17	14	20	17	40	13.2	13	28	120	49
Sulfide	NL	NL	mg/L		<1.0	<0.49	0.77 i	<0.45	0.58 i	<1.0	<1.0	<0.49	0.77 i	<0.45	<0.45
Total Organic Carbon	NL	NL	mg/L		5.6	<0.3	5.3	5.1	2.8	13	23.1	3.3	20	5.6	19

J - estimated concentration

D1- Analyte value was determined from a 1:5 dilution

i - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)

V- indicated that the analyte was detected in both the sample and associated method blank

D3- Analyte value was determined from a 1:200 dilution

D2- Analyte value was determined from a 1:10 dilution

TABLE 4: GROUNDWATER ANALYTICAL RESULTS SUMMARY

SITE NAME: OU1, NAVAL AIR STATION JACKSONVILLE

Parameter	FDEP GCTLs old/current	USEPA MCLs	Units	Sample ID / Date Collected	OU1-MW-97 11/11/2004	OU1-MW-97 11/18/2005	OU1-MW-97 11/21/2006	OU1-MW-97 11/16/2007	OU1-MW-97 12/4/2008	OU1-MW-97 2/10/2010	OU1-MW-98 11/11/2004	OU1-MW-98 11/18/2005	OU1-MW-98 11/16/2007	OU1-MW-98 12/4/2008	OU1-MW-98 2/10/2010
VOCs															
1,1,1-Trichloroethane	200/200	200	µg/L		<1.0	<0.3	<0.3	<0.34	<0.37	<0.20	<1.0	<0.3	<0.34		<0.20
1,1,2-Trichloroethane	5/5	5	µg/L		<1.0	<0.3	<0.3	<0.35	<0.40	<0.40	<1.0	<0.3	<0.35		<0.40
1,1,1,2-Tetrachloroethane	1.3/1.3	NL	µg/L		<1.0	<0.1	<0.1	<0.22	<0.33	<0.20	<1.0	<0.1	<0.22		<0.20
1,1,2,2-Tetrachloroethane	0.2/0.2	NL	µg/L		<0.2	<0.2	<0.2	<0.14	<0.21	<0.32	<0.2	<0.2	<0.14		<0.32
1,1-DCE	7	7	µg/L		<1.0	<0.3	<0.2	<0.36	<0.34	<0.21	<1.0	<0.3	<0.36		<0.21
1,1 Dichloroethane	70/70	NL	µg/L		<1.0	<0.2	<0.2	<0.45	<0.37	<0.30	<1.0	<0.2	<0.45		<0.30
1,2-Dichlorobenzene	600	NL	µg/L		<1.0	<0.2	<0.2	<0.30	<0.08	<0.24	<1.0	<0.2	<0.30		<0.24
1,1-Dichloropropene	NL	NL	µg/L		<1.0	<0.2	<0.2	<0.56	<0.29	<0.21	<1.0	<0.2	<0.56		<0.21
1,2-Dibromoethane	0.02	NL	µg/L		<1.0	<0.1	<0.1	<0.34	<0.10	<0.27	<1.0	<0.1	<0.34		<0.27
1,2-Dichloroethane	3	5	µg/L		<1.0	<0.2	<0.1	<0.19	<0.43	<0.28	<1.0	<0.2	<0.19		<0.28
1,2-Dichloropropane	5	5	µg/L		<1.0	<0.4	<0.4	<0.44	<0.52	<0.30	<1.0	<0.4	<0.44		<0.30
1,2-Dibromo-3-chloropropane	0.2	0.2	µg/L		<1.0	<0.2	<0.3	<0.56	<0.18	<0.80	<1.0	<0.2	<0.56		<0.80
1,2,3-Trichloropropane	0.2/0.02	NL	µg/L		<1.0	<0.3	<0.3	<0.25	<0.20	<0.30	<1.0	<0.3	<0.25		<0.30
1,2,3-Trichlorobenzene	70/70	NL	µg/L		<1.0	<0.4	<0.2	<0.35	<0.14	<0.50	<1.0	<0.4	<0.35		<0.50
1,2,4-Trichlorobenzene	70	NL	µg/L		<1.0	<0.4	0.7 - I	<0.17	<0.67	<0.41	<1.0	<0.4	<0.17		<0.41
1,2,4-Trimethylbenzene	10/10	NL	µg/L		<1.0	<0.2	<0.2	<0.38	<0.26	<0.28	<1.0	<0.2	<0.38		<0.28
1,3-Dichlorobenzene	10/210	NL	µg/L		<1.0	<0.1	<0.2	<0.25	<0.23	<0.27	<1.0	<0.1	<0.25		<0.27
1,3-Dichloropropane	NL	NL	µg/L		<1.0	<0.3	<0.3	<0.14	<0.18	<0.25	<1.0	<0.3	<0.14		<0.25
1,3,5-Trimethylbenzene	10/10	NL	µg/L		<1.0	<0.2	<0.2	<0.22	<0.21	<0.26	<1.0	<0.2	<0.22		<0.26
1,4-Dichlorobenzene	75	NL	µg/L		<1.0	<0.2	<0.1	<0.18	<0.20	<0.23	<1.0	<0.2	<0.18		<0.23
2-Butanone	4,200	NL	µg/L		<20	<2.0	<2.0	<2.4	<0.78	<0.38	<20	<2.0	<2.4		<0.38
2-Chloroethyl vinyl ether	175	NL	µg/L		<6.0	<0.8	<0.8	<2.1	<1.5	<1.5	<6.0	<0.8	<2.1		<1.5
2-Chlorotoluene	NL	NL	µg/L		<1.0	<0.1	<0.1	<0.37	<0.27	<0.33	<1.0	<0.1	<0.37		<0.33
2-Hexanone	280/280	NL	µg/L		<20	<0.6	<0.6	<0.95	<1.1	<0.50	<20	<0.6	<0.95		<0.50
2,2 Dichloropropane	NL	NL	µg/L		<1.0	<0.3	<0.3	<0.71	<0.26	<0.40	<1.0	<0.3	<0.71		<0.40
4-Chlorotoluene	NL	NL	µg/L		<1.0	<0.2	<0.1	<0.29	<0.35	<0.22	<1.0	<0.2	<0.20		<0.22
4-Methyl-2-Pentanone	560	NL	µg/L		<20	<2.0	<2.0	<1.6	<1.3	<1.0	<20	<2.0	<1.6		<1.0
Acetone	700/63000	NL	µg/L		<50	<2.0	<2.0	<3.8	<1.4	<1.1	<50	<2.0	<3.8		<1.1
Benzene	1/1	5	µg/L		<1.0	<0.2	<0.2	<0.23	<0.29	<0.27	<1.0	<0.2	0.24 I		<0.27
Bromobenzene	NL	NL	µg/L		<1.0	<0.1	<0.1	<0.40	<0.20	<0.26	<1.0	<0.1	<0.40		<0.26
Bromochloromethane	91/91	NL	µg/L		<1.0	<0.3	<0.3	<0.58	<0.67	<0.28	<1.0	<0.3	<0.58		<0.28
Bromodichloromethane	0.6/0.6	100	µg/L		<0.60	<0.2	<0.2	<0.29	<0.12	<0.20	<0.60	<0.2	<0.29		<0.20
Bromoform	4.4/4.4	NL	µg/L		<1.0	<0.2	<0.2	<0.35	<0.25	<0.33	<1.0	<0.2	<0.35		<0.33
Bromomethane	9.8/9.8	NL	µg/L		<2.0	<0.6	<0.6	<0.45	<0.48	<0.64	<2.0	<0.6	<0.45		<0.64
Carbon Disulfide	700/700	NL	µg/L		<50	<0.9	<0.9	<1.5	<1.3	<0.24	<50	<0.9	<1.5		<0.24
Carbon Tetrachloride	3	5	µg/L		<1.0	<0.3	<0.3	<0.53	<0.45	<0.20	<1.0	<0.3	<0.53		<0.20
Chlorobenzene	100	100	µg/L		<1.0	<0.2	<0.2	<0.21	<0.24	<0.24	<1.0	<0.2	<0.21		<0.24
Chloroethane	NL	NL	µg/L		<2.0	<0.4	<0.3	<0.85	<0.36	<0.91	<2.0	<0.4	<0.85		<0.91
Chloroform	5.7/70	100	µg/L		<1.0	<0.2	<0.2	<0.34	<0.43	<0.21	<1.0	<0.2	<0.34		<0.21
Chloromethane	2.7	NL	µg/L		<1.0	<0.3	<0.3	<0.36	<0.39	<0.31	<1.0	<0.3	<0.36		<0.31
cis-1,2-DCE	70	70	µg/L		<1.0	<1.0	16.6	<0.45	1	<0.22	<1.0	0.6 I	2.7		<0.22
c-1,3-Dichloropropene	0.2	NL	µg/L		<0.2	<0.1	<0.1	<0.27	<0.23	<0.35	<0.2	<0.1	<0.27		<0.35
Dibromochloromethane	0.4/0.4	NL	µg/L		<0.4	<0.2	<0.2	<0.31	<0.28	<0.27	<0.4	<0.2	<0.31		<0.27
Dibromomethane	NL	5	µg/L		<1.0	<0.3	<0.3	<0.41	<0.29	<0.27	<1.0	<0.3	<0.41		<0.27
Dichlorodifluoromethane	1400/1400	NL	µg/L		<2.0	<0.3	<0.3	<0.31	<0.14	<0.29	<2.0	<0.3	<0.31		<0.29
Ethylbenzene	30/30	700	µg/L		<1.0	<0.3	<0.3	<0.34	<0.29	<0.26	<1.0	<0.3	<0.34		<0.26
Hexachlorobutadiene	0.5	NL	µg/L		<1.0	<0.6	<0.6	<0.37	<0.12	<0.35	<1.0	<0.6	<0.37		<0.35
Isopropylbenzene	NL	NL	µg/L		<1.0	<0.1	<0.1	<0.25	<0.23	<0.20	<1.0	<0.1	<0.25		<0.20
Methylene Chloride	5	NL	µg/L		<5.0	<0.1	<0.1	<0.65	<0.25	<0.62	<5.0	<0.1	<0.65		<0.62
MTBE	50/20	NL	µg/L		<1.0	<0.2	<0.2	<0.21	<0.21	<0.24	<1.0	<0.2	<0.21		<0.24
n-Butylbenzene	NL	NL	µg/L		<1.0	<0.3	<0.3	<0.30	<0.29	<0.28	<1.0	<0.3	<0.30		<0.28
n-Propylbenzene	NL	NL	µg/L		<1.0	<0.2	<0.2	<0.27	<0.20	<0.20	<1.0	<0.2	<0.27		<0.20
Naphthalene	20/14	NL	µg/L		<2.0	<0.3	<0.3	<0.35	<0.58	3.4 V	<2.0	<0.3	<0.35		2.8 V
s-butylbenzene	NL	NL	µg/L		<1.0	<0.1	<0.1	<0.20	<0.20	<0.20	<1.0	<0.1	<0.20		<0.20
Styrene	100	100	µg/L		<1.0	<0.1	<0.1	<0.19	<0.21	<0.32	<1.0	<0.1	<0.19		<0.32
tert-Butylbenzene	NL	NL	µg/L		<1.0	<0.1	<0.1	<0.41	<0.29	<0.21	<1.0	<0.1	<0.41		<0.21
Tetrachloroethene	3	NL	µg/L		<2.0	<0.3	<0.3	<0.35	<0.32	<0.21	<2.0	<0.3	<0.35		<0.21
Toluene	40/40	1000	µg/L		<1.0	<0.2	<0.2	<0.28	<0.35	<0.30	<1.0	<0.2	0.46 I		<0.30
Trans-1,2-DCE	100	100	µg/L		<1.0	0.3 I	3.5	<0.41	<0.49	<0.30	<1.0	<0.2	<0.41		<0.30
t-1,3-Dichloropropene	0.2	NL	µg/L		<0.2	<0.2	<0.2	<0.40	<0.27	<0.33	<0.2	<0.2	<0.40		<0.33
TCE	3	5	µg/L		<1.0	0.7 I	2.9	<0.26	<0.50	<0.24	<1.0	0.4 I	0.91 I		<0.24
Trichlorofluoromethane	2100/2100	NL	µg/L		<1.0	<0.3	<0.3	<0.46	<0.45	<0.20	<1.0	<0.3	<0.46		<0.20
Vinyl Chloride	1	2	µg/L		<1.0	<0.4	0.4 - I	<0.52	<0.61	<0.33	<1.0	<0.4	<0.52		<0.33
Xylenes (Total)	20/20	10000	µg/L		<3.0	<0.5	<0.5	<0.35	<0.29	<0.50	<3.0	<0.5	<0.38		<0.50
p-Isopropyltoluene	NL	NL	µg/L		<1.0	<0.2	<0.2	NA	NA	NA	<1.0	<0.2	NA		NA
EETCE					<5.93	<3.07	<3.07	<2.179	3.306	1.358	<5.93	<2.238	<5.821		1.358
Total Metals															
Iron	300	NL	µg/L		9400	10000		9810	9960	2340	12000	18000	34700		1980
Dissolved Metals															
Iron	300	NL	µg/L		NA	NA			NA	1970	NA	NA	NA		784
Dissolved Gases															
Methane	NL	NL	µg/L		4.7	2 V		5	1	3	47	10 V	36		7
Ethene	NL	NL	µg/L		<1.0	<0.3		<0.3	<1.9	<0.4	<1.0	<0.3	<0.3		<0.4
Ethane	NL	NL	µg/L		<1.0	<0.2		<0.2	<0.9	<0.4	<1.0	<0.2	<0.2		<0.4
Miscellaneous Parameters															
Chloride	250	NL	mg/L		20	17.4		15 v	16	18	37	19.1	13 v		23
Sulfate	250	NL	mg/L		57	59		54	62	60	42	38.1	37		46
Sulfide	NL	NL	mg/L		<1.0	<1.0		<0.45	<0.45	<0.45	<1.0	<1.0	<0.45		<0.45
Total Organic Carbon	NL	NL	mg/L		3.0	8.1		4.8	2.8	3	2.0	8.9	10.0		6.1

J - estimated concentration

D1- Analyte value was determined from a 1:5 dilution

I - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)

V- indicated that the analyte was detected in both the sample and associated method blank

D3- Analyte value was determined from a 1:200 dilution

D2- Analyte value was determined from a 1:10 dilution

TABLE 4: GROUNDWATER ANALYTICAL RESULTS SUMMARY

SITE NAME: OU1, NAVAL AIR STATION JACKSONVILLE

Parameter	FDEP GCTLs old/current	USEPA MCLs	Sample ID / Date Collected / Units	OU1-MW-100 11/11/2004	OU1-MW-100 11/17/2005	OU1-MW-100 I 11/22/2006	OU1-MW-100 11/15/2007	OU1-MW-100 12/3/2008	OU1-MW-100 2/10/2010	OU1-MW-101 11/10/2004	OU1-MW-101 11/17/2005	OU1-MW-101 11/22/2006	OU1-MW-101 11/15/2007	OU1-MW-101 12/4/2008	OU1-MW-101 2/10/2010
VOCs															
1,1,1-Trichloroethane	200/200	200	µg/L	<1.0	<0.3	<0.3	<0.34	<0.37	<0.20	<0.3	<0.3	<0.3	<0.34	<0.37	<0.20
1,1,2-Trichloroethane	5/5	5	µg/L	<1.0	<0.3	<0.3	<0.35	<0.40	<0.40	<0.3	<0.3	<0.3	<0.35	<0.40	<0.40
1,1,1,2-Tetrachloroethane	1.3/1.3	NL	µg/L	<1.0	<0.1	<0.1	<0.22	<0.33	<0.20	<0.1	<0.1	<0.1	<0.22	<0.33	<0.20
1,1,2,2-Tetrachloroethane	0.2/0.2	NL	µg/L	<0.2	<0.2	<0.2	<0.14	<0.21	<0.32	<0.1	<0.2	<0.2	<0.14	<0.21	<0.32
1,1-DCE	7	7	µg/L	<1.0	<0.3	<0.2	<0.56	<0.34	<0.21	<2.0	<0.3	<0.2	<0.36	<0.34	<0.21
1,1 Dichloroethane	70/70	NL	µg/L	<1.0	0.2 i	<0.2	<0.45	<0.37	<0.30	< 02	<0.2	<0.2	<0.45	<0.37	<0.30
1,2-Dichlorobenzene	600	NL	µg/L	<1.0	<0.2	<0.2	<0.30	<0.08	<0.24	<0.3	<0.2	<0.2	<0.30	<0.08	<0.24
1,1-Dichloropropene	NL	NL	µg/L	<1.0	<0.2	<0.2	<0.56	<0.29	<0.21	<0.2	<0.2	<0.2	<0.56	<0.29	<0.21
1,2-Dibromoethane	0.02	NL	µg/L	<1.0	<0.1	<0.1	<0.34	<0.10	<0.27	<0.1	<0.1	<0.1	<0.34	<0.10	<0.27
1,2-Dichloroethane	3	5	µg/L	<1.0	<0.2	<0.1	<0.19	<0.43	<0.28	<0.2	<0.2	<0.1	<0.19	<0.43	<0.28
1,2-Dichloropropane	5	5	µg/L	<1.0	<0.4	<0.4	<0.44	<0.52	<0.30	<0.4	<0.4	<0.4	<0.44	<0.52	<0.30
1,2-Dibromo-3-chloropropane	0.2	0.2	µg/L	<1.0	<0.2	<0.3	<0.56	<0.18	<0.60	<0.2	<0.2	<0.3	<0.56	<0.18	<0.60
1,2,3-Trichloropropane	0.2/0.02	NL	µg/L	<1.0	<0.3	<0.3	<0.25	<0.20	<0.30	<0.3	<0.3	<0.3	<0.25	<0.20	<0.30
1,2,3-Trichlorobenzene	70/70	NL	µg/L	<1.0	<0.4	<0.2	<0.35	<0.14	<0.50	<0.6	<0.4	<0.2	<0.35	<0.14	<0.50
1,2,4-Trichlorobenzene	70	NL	µg/L	<1.0	<0.4	<0.1	<0.17	<0.67	<0.41	<0.4	<0.4	<0.1	<0.17	<0.67	<0.41
1,2,4-Trimethylbenzene	10/10	NL	µg/L	<1.0	<0.2	<0.2	<0.38	<0.26	<0.28	<0.2	<0.2	<0.2	<0.38	<0.26	<0.28
1,3-Dichlorobenzene	10/210	NL	µg/L	<1.0	<0.1	<0.2	<0.25	<0.23	<0.27	<0.1	<0.1	<0.2	<0.25	<0.23	<0.27
1,3-Dichloropropane	NL	NL	µg/L	<1.0	<0.3	<0.3	<0.14	<0.18	<0.25	<0.3	<0.3	<0.3	<0.14	<0.18	<0.25
1,3,5-Trimethylbenzene	10/10	NL	µg/L	<1.0	<0.2	<0.2	<0.22	<0.21	<0.26	<0.2	<0.2	<0.2	<0.22	<0.21	<0.26
1,4-Dichlorobenzene	75	NL	µg/L	<1.0	<0.2	<0.1	<0.18	<0.20	<0.23	<0.2	<0.2	<0.1	<0.18	<0.20	<0.23
2-Butanone	4,200	NL	µg/L	<20	<2.0	<2.0	<2.4	<0.78	<0.38	<2.0	<2.0	<2.0	<2.4	<0.78	<0.38
2-Chloroethyl vinyl ether	175	NL	µg/L	<6.0	<0.8	<0.8	<2.1	<1.5	<1.5	<0.8	<0.8	<0.8	<2.1	<1.5	<1.5
2-Chlorotoluene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.37	<0.27	<0.33	<0.1	<0.1	<0.1	<0.37	<0.27	<0.33
2-Hexanone	280/280	NL	µg/L	<20	<0.6	<0.6	<0.95	<1.1	<0.50	<0.6	<0.6	<0.6	<0.95	<1.1	<0.50
2,2 Dichloropropane	NL	NL	µg/L	<1.0	<0.3	<0.2	<0.71	<0.26	<0.40	<0.3	<0.3	<0.2	<0.71	<0.26	<0.40
4-Chlorotoluene	NL	NL	µg/L	<1.0	<0.2	<0.1	<0.20	<0.35	<0.22	<0.2	<0.2	<0.1	<0.20	<0.35	<0.22
4-Methyl-2-Pentanone	560	NL	µg/L	<20	<2.0	<2.0	<1.6	<1.3	<1.0	<2.0	<2.0	<2.0	<1.6	<1.3	<1.0
Acetone	700/63000	NL	µg/L	<50	<2.0	<2.0	<3.8	<1.4	<1.1	34	<2.0	<2.0	<3.8	<1.4	13
Benzene	1/1	5	µg/L	<1.0	<0.2	<0.2	<0.23	<0.29	<0.27	<0.2	<0.2	<0.2	<0.23	<0.29	<0.27
Bromobenzene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.40	<0.02	<0.26	<0.1	<0.1	<0.1	<0.40	<0.20	<0.26
Bromochloromethane	91/91	NL	µg/L	<1.0	<0.3	<0.3	<0.58	<0.67	<0.28	<0.3	<0.3	<0.3	<0.58	<0.67	<0.28
Bromodichloromethane	0.6/0.6	100	µg/L	<0.60	<0.2	<0.2	<0.29	<0.12	<0.20	<0.2	<0.2	<0.2	<0.29	<0.12	<0.20
Bromoform	4.4/4.4	NL	µg/L	<1.0	<0.2	<0.2	<0.35	<0.25	<0.33	<0.2	<0.2	<0.2	<0.35	<0.25	<0.33
Bromomethane	9.8/9.8	NL	µg/L	<2.0	<0.6	<0.6	<0.45	<0.48	<0.64	<0.6	<0.6	<0.6	<0.45	<0.48	<0.64
Carbon Disulfide	700/700	NL	µg/L	<50	<0.9	<0.9	<1.5	<1.3	<0.24	<0.9	<0.9	<0.9	<1.5	<1.3	<0.24
Carbon Tetrachloride	3	5	µg/L	<1.0	<0.3	<0.3	<0.53	<0.45	<0.20	<0.3	<0.3	<0.3	<0.53	<0.45	<0.20
Chlorobenzene	100	100	µg/L	<1.0	<0.2	<0.2	<0.21	<0.24	<0.24	<0.2	<0.2	<0.2	<0.21	<0.24	<0.24
Chloroethane	NL	NL	µg/L	<2.0	<0.4	<0.3	<0.85	<0.36	<0.31	<0.4	<0.4	<0.3	<0.85	<0.36	<0.31
Chloroform	5.7/70	100	µg/L	<1.0	<0.2	<0.2	<0.34	<0.43	<0.21	<0.2	<0.2	<0.2	<0.34	<0.43	<0.21
Chloromethane	2.7	NL	µg/L	<1.0	<0.3	<0.3	<0.36	<0.39	<0.31	<0.3	<0.3	<0.3	<0.36	<0.39	<0.31
cis-1,2-DCE	70	70	µg/L	53	97	80	31	35	80	0.1	0.2	0.2	8	39	<0.22
c-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.1	<0.1	<0.27	<0.23	<0.35	<0.1	<0.1	<0.1	<0.27	<0.23	<0.35
Dibromochloromethane	0.4/0.4	NL	µg/L	<0.4	<0.2	<0.2	<0.31	<0.28	<0.27	<0.2	<0.2	<0.2	<0.31	<0.28	<0.27
Dibromomethane	NL	5	µg/L	<1.0	<0.3	<0.3	<0.41	<0.29	<0.27	<0.3	<0.3	<0.3	<0.41	<0.28	<0.27
Dichlorodifluoromethane	1400/1400	NL	µg/L	<2.0	<0.3	<0.3	<0.31	<0.14	<0.29	<0.3	<0.3	<0.3	<0.31	<0.14	<0.29
Ethylbenzene	30/30	700	µg/L	<1.0	<0.3	<0.3	<0.34	<0.29	<0.26	<0.3	<0.3	<0.3	<0.34	<0.29	<0.26
Hexachlorobutadiene	0.5	NL	µg/L	<1.0	<0.6	<0.4	<0.37	<0.12	<0.35	<0.6	<0.6	<0.4	<0.37	<0.12	<0.35
Isopropylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.1	<0.25	<0.23	<0.20	<0.1	<0.1	<0.1	<0.25	<0.23	<0.20
Methylene Chloride	5	NL	µg/L	<5.0	<0.1	<2.0	<0.65	<0.25	<0.62	<0.1	<0.1	<2.0	<0.65	<0.25	<0.62
MTBE	50/20	NL	µg/L	<1.0	<0.2	<0.2	<0.21	<0.21	<0.24	<0.2	<0.2	<0.2	<0.21	<0.21	<0.24
n-Butylbenzene	NL	NL	µg/L	<1.0	<0.3	<0.3	<0.30	<0.29	<0.28	<0.3	<0.3	<0.3	<0.30	<0.29	<0.28
n-Propylbenzene	NL	NL	µg/L	<1.0	<0.2	<0.3	<0.27	<0.20	<0.20	<0.2	<0.2	<0.3	<0.27	<0.20	<0.20
Naphthalene	20/14	NL	µg/L	<2.0	<0.3	0.3 I	<0.35	<0.58	3.5 V	<0.3	<0.3	<0.3	<0.35	<0.58	3.9 V
s-butylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.2	<0.20	<0.20	<0.20	<0.1	<0.1	<0.2	<0.20	<0.20	<0.20
Styrene	100	100	µg/L	<1.0	<0.1	<0.1	<0.19	<0.21	<0.32	<0.1	<0.1	<0.1	<0.19	<0.21	<0.32
tert-Butylbenzene	NL	NL	µg/L	<1.0	<0.1	<0.3	<0.41	<0.29	<0.21	<0.1	<0.1	<0.3	<0.41	<0.29	<0.21
Tetrachloroethene	3	NL	µg/L	<2.0	<0.3	<0.3	<0.35	<0.32	<0.21	<0.3	<0.3	<0.3	<0.35	<0.32	<0.21
Toluene	40/40	1000	µg/L	<1.0	<0.2	<0.2	<0.28	<0.35	<0.30	<0.2	<0.2	<0.2	<0.28	<0.35	<0.30
Trans-1,2-DCE	100	100	µg/L	5.7	8.0	5.6	1.8	2.4	4.6	<0.2	<0.2	<0.2	<0.41	<0.49	<0.30
t-1,3-Dichloropropene	0.2	NL	µg/L	<0.2	<0.2	<0.2	<0.40	<0.27	<0.33	<0.2	<0.2	<0.2	<0.40	<0.27	<0.33
TCE	3	5	µg/L	2.6	2.0	1.8	1.4	0.99 - I	<0.24	<0.3	0.4 i	<0.3	<0.26	<0.50	<0.24
Trichloroflouromethane	2100/2100	NL	µg/L	<1.0	<0.3	<0.3	<0.46	<0.45	<0.20	<0.3	<0.3	<0.3	<0.46	<0.45	<0.20
Vinyl Chloride	1	2	µg/L	1.9	9.0	2.9	0.86 I	0.92	2.6	0.4 i	<0.4	0.4 i	19	51	<0.33
Xylenes (Total)	20/20	10000	µg/L	<3.0	<0.5	<0.5	<0.38	<0.59	<0.50	<0.5	<0.5	<0.5	<0.38	<0.29	<0.50
p-Isopropyltoluene	NL	NL	µg/L	<1.0	<0.2	<0.2	NA	NA	NA	<0.2	<0.2	<0.2	NA	NA	NA
EETCE				<76.49	<149.25	<114.24	<44.63	48.636	112.006	<1.473	<1.706	<1.606	<49.18	154.626	1.358
Total Metals															
Iron	300/300	NL	µg/L	3700	7700	38000	6790	25300	6740	3800	4000	4200	4790	8640	15600
Dissolved Metals															
Iron	300/300	NL	µg/L	NA	NA		NA	NA	1820	NA	NA		NA	NA	13700
Dissolved Gases															
Methane	NL	NL	µg/L	130	70	28	72	20	13	5270	12000 D3	704 D	4170	804	1670
Ethene	NL	NL	µg/L	<1.0	<0.3	<0.3	<0.3	<1.0	<0.4	<0.3	<0.3	<0.3	2 I	1 I	<0.4
Ethane	NL	NL	µg/L	<1.0	<0.2	<0.2	<0.2	<0.9	<0.4	<0.2	<0.2	<0.2	<0.2	<0.9	<0.4
Miscellaneous Parameters															
Chloride	250/250	NL	mg/L	21	22	12	16 v	17	21	11	8.9	6.9	12 v	22	11
Sulfate	250/250	NL	mg/L	17	16.7	18	19	26	23	3.9	<0.2	<0.03	3.1	11	14
Sulfide	NL	NL	mg/L	<1.0	<1.0	<0.49	0.61 I	<0.45	<0.45	<1.0	<1.0	<0.49	0.77 I	<0.45	<0.45
Total Organic Carbon	NL	NL	mg/L	3.0	7.1	<0.30	4.0	4.1	3.6	5	21.7	<0.3	6.3	7.6	14

J - estimated concentration

D1- Analyte value was determined from a 1:5 dilution

I - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)

V- indicated that the analyte was detected in both the sample and associated method blank

D3- Analyte value was determined from a 1:200 dilution

D2- Analyte value was determined from a 1:10 dilution

TABLE 4: GROUNDWATER ANALYTICAL RESULTS SUMMARY

SITE NAME: OU1, NAVAL AIR STATION JACKSONVILLE

Parameter	FDEP GCTLs old/current	USEPA MCLs	Units	Sample ID / Date Collected	OU1-MW-102 11/10/2004	OU1-MW-102 11/17/2005	OU1-MW-102 11/22/2006	OU1-MW-102 11/15/2007	OU1-MW-102 12/4/2008	OU1-MW-102 2/10/2010
VOCs										
1,1,1-Trichloroethane	200/200	200	µg/L		<0.3	<0.3	<0.3	<0.34	<0.37	<0.20
1,1,2-Trichloroethane	5/5	5	µg/L		<0.3	<0.3	<0.3	<0.35	<0.40	<0.40
1,1,1,2-Tetrachloroethane	1.3/1.3	NL	µg/L		<0.1	<0.1	<0.1	<0.22	<0.33	<0.20
1,1,2,2-Tetrachloroethane	0.2/0.2	NL	µg/L		<0.1	<0.2	<0.2	<0.14	<0.21	<0.32
1,1-DCE	7	7	µg/L		<2.0	<0.3	<0.2	<0.36	1.2	<0.21
1,1 Dichloroethane	70/70	NL	µg/L		<0.2	<0.2	<0.2	<0.45	<0.37	<0.30
1,2-Dichlorobenzene	600	NL	µg/L		<0.3	<0.2	<0.2	<0.30	<0.08	<0.24
1,1-Dichloropropene	NL	NL	µg/L		<0.2	<0.2	<0.2	<0.56	<0.29	<0.21
1,2-Dibromoethane	0.02	NL	µg/L		<0.1	<0.1	<0.1	<0.34	<0.10	<0.27
1,2-Dichloroethane	3	5	µg/L		<0.2	<0.2	<0.1	<0.19	<0.43	<0.28
1,2-Dichloropropane	5	5	µg/L		<0.4	<0.4	<0.4	<0.44	<0.52	<0.30
1,2-Dibromo-3-chloropropane	0.2	0.2	µg/L		<0.2	<0.2	<0.3	<0.56	<0.18	<0.60
1,2,3-Trichloropropane	0.2/0.02	NL	µg/L		<0.3	<0.3	<0.3	<0.25	<0.20	<0.30
1,2,3-Trichlorobenzene	70/70	NL	µg/L		<0.6	<0.4	<0.2	<0.35	<0.14	<0.50
1,2,4-Trichlorobenzene	70	NL	µg/L		<0.4	<0.4	<0.1	<0.17	<0.67	<0.41
1,2,4-Trimethylbenzene	10/10	NL	µg/L		<0.2	<0.2	<0.2	<0.38	<0.26	<0.28
1,3-Dichlorobenzene	10/210	NL	µg/L		<0.1	<0.1	<0.2	<0.25	<0.23	<0.27
1,3-Dichloropropane	NL	NL	µg/L		<0.3	<0.3	<0.3	<0.14	<0.18	<0.25
1,3,5-Trimethylbenzene	10/10	NL	µg/L		<0.2	<0.2	<0.2	<0.22	<0.21	<0.26
1,4-Dichlorobenzene	75	NL	µg/L		<0.2	<0.2	<0.1	<0.18	<0.20	<0.23
2-Butanone	4,200	NL	µg/L		<2.0	<2.0	<2.0	<2.4	<0.78	<0.38
2-Chloroethyl vinyl ether	175	NL	µg/L		<0.8	<0.8	<0.8	<2.1	<1.5	<1.5
2-Chlorotoluene	NL	NL	µg/L		<0.1	<0.1	<0.1	<0.37	<0.27	<0.33
2-Hexanone	280/280	NL	µg/L		<0.6	<0.6	<0.6	<0.95	<1.1	<0.50
2,2 Dichloropropane	NL	NL	µg/L		<0.3	<0.3	<0.2	<0.71	<0.26	<0.40
4-Chlorotoluene	NL	NL	µg/L		<0.2	<0.2	<0.1	<0.20	<0.35	<0.22
4-Methyl-2-Pentanone	560	NL	µg/L		<2.0	<2.0	<2.0	<1.6	<1.3	<1.0
Acetone	700/63000	NL	µg/L		<2.0	<2.0	<2.0	18	<1.4	<1.1
Benzene	1/1	5	µg/L		<0.2	<0.2	<0.2	<0.23	<0.29	<0.27
Bromobenzene	NL	NL	µg/L		<0.1	<0.1	<0.1	<0.40	<0.20	<0.26
Bromochloromethane	91/91	NL	µg/L		<0.3	<0.3	<0.3	<0.58	<0.67	<0.28
Bromodichloromethane	0.6/0.6	100	µg/L		<0.2	<0.2	<0.2	<0.29	<0.12	<0.20
Bromoform	4.4/4.4	NL	µg/L		<0.2	<0.2	<0.2	<0.35	<0.25	<0.33
Bromomethane	9.8/9.8	NL	µg/L		<0.6	<0.6	<0.6	<0.45	<0.48	<0.64
Carbon Disulfide	700/700	NL	µg/L		<0.9	<0.9	<0.9	<1.5	<1.3	<0.24
Carbon Tetrachloride	3	5	µg/L		<0.3	<0.3	<0.3	<0.53	<0.45	<0.20
Chlorobenzene	100	100	µg/L		<0.2	<0.2	<0.2	<0.21	<0.24	<0.24
Chloroethane	NL	NL	µg/L		<0.4	<0.4	<0.3	<0.85	<0.36	<0.31
Chloroform	5.7/70	100	µg/L		<0.2	<0.2	<0.2	<0.34	<0.43	<0.21
Chloromethane	2.7	NL	µg/L		<0.3	<0.3	<0.3	<0.36	<0.39	<0.31
cis-1,2-DCE	70	70	µg/L		16	24	1.3	14	86	0.85 I
c-1,3-Dichloropropene	0.2	NL	µg/L		<0.1	<0.1	<0.1	<0.27	<0.23	<0.35
Dibromochloromethane	0.4/0.4	NL	µg/L		<0.2	<0.2	<0.2	<0.31	<0.28	<0.27
Dibromomethane	NL	5	µg/L		<0.3	<0.3	<0.3	<0.41	<0.29	<0.27
Dichlorodifluoromethane	1400/1400	NL	µg/L		<0.3	<0.3	<0.3	<0.31	<0.14	<0.29
Ethylbenzene	30/30	700	µg/L		<0.3	<0.3	<0.3	<0.34	<0.29	<0.26
Hexachlorobutadiene	0.5	NL	µg/L		<0.6	<0.6	<0.4	<0.37	<0.12	<0.35
Isopropylbenzene	NL	NL	µg/L		<0.1	<0.1	<0.1	<0.25	<0.23	<0.20
Methylene Chloride	5	NL	µg/L		<0.1	<0.1	<2.0	<0.65	<0.25	<0.62
MTBE	50/20	NL	µg/L		<0.2	<0.2	<0.2	<0.21	<0.21	<0.24
n-Butylbenzene	NL	NL	µg/L		<0.3	<0.3	<0.3	<0.30	<0.29	<0.28
n-Propylbenzene	NL	NL	µg/L		<0.2	<0.2	<0.3	<0.27	<0.20	<0.20
Naphthalene	20/14	NL	µg/L		<0.3	<0.3	<0.3	<0.35	<0.58	3.2 V
s-butylbenzene	NL	NL	µg/L		<0.1	<0.1	<0.2	<0.20	<0.20	<0.20
Styrene	100	100	µg/L		<0.1	<0.1	<0.1	<0.19	<0.21	<0.32
tert-Butylbenzene	NL	NL	µg/L		<0.1	<0.1	<0.3	<0.41	<0.29	<0.21
Tetrachloroethene	3	NL	µg/L		<0.3	<0.3	<0.3	<0.35	<0.32	<0.21
Toluene	40/40	1000	µg/L		<0.2	<0.2	<0.2	<0.28	<0.35	<0.30
Trans-1,2-DCE	100	100	µg/L		<0.2	<0.2	<0.2	<0.41	0.53 - I	<0.30
t-1,3-Dichloropropene	0.2	NL	µg/L		<0.2	<0.2	<0.2	<0.40	<0.27	<0.33
TCE	3	5	µg/L		<0.3	<0.3	<0.3	<0.35	<0.50	<0.24
Trichlorofluoromethane	2100/2100	NL	µg/L		<0.3	<0.3	<0.3	<0.46	<0.45	<0.20
Vinyl Chloride	1	2	µg/L		41	140	1.2	2.1	67	2.8
Xylenes (Total)	20/20	10000	µg/L		<0.5	<0.5	<0.5	<0.38	<0.29	<0.50
p-Isopropyltoluene	NL	NL	µg/L		<0.2	<0.2	<0.2	NA	NA	NA
EETCE					<106.48	<312.46	<4.669	<23.45	347.806	7.786
Total Metals										
Iron	300	NL	µg/L		4100	14600	12600	6790	93900	6280
Dissolved Metals										
Iron	300	NL	µg/L		NA	NA	NA	NA	NA	1140
Dissolved Gases										
Methane	NL	NL	µg/L		130	0.1 D1	2	72	7	<0.2
Ethane	NL	NL	µg/L		<0.3	<0.3	<0.3	<0.3	<1.0	<0.4
Ethane	NL	NL	µg/L		<0.2	<0.2	<0.2	<0.2	<0.9	<0.4
Miscellaneous Parameters										
Chloride	250	NL	mg/L		16	13.3	10	16 v	27	13
Sulfate	250	NL	mg/L		11	12.6	15	19	26	24
Sulfide	NL	NL	mg/L		<1.0	<1.0	<0.49	0.61 I	<0.45	<0.45
Total Organic Carbon	NL	NL	mg/L		4	9.0	<0.3	4.0	7.6	5.1

J - estimated concentration

D1- Analyte value was determined from a 1:5 dilution

I - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)

V- indicated that the analyte was detected in both the sample and associated method blank

D3- Analyte value was determined from a 1:200 dilution

D2- Analyte value was determined from a 1:10 dilution

TABLE 1: SURFACE WATER AND GROUNDWATER FIELD PARAMETERS

SITE NAME: OU 1, NAVAL AIR STATION JACKSONVILLE

Sample Location	Date	pH	Specific Conductivity (uS)	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)
OU1-MW-12	11/18/2005	6.46	664.00	22.43	0.36	30.70	-110.80
OU1-MW-18	11/18/2005	5.39	557.00	21.45	0.48	2.24	93.20
OU1-MW-19	11/18/2005	6.12	418.00	20.68	0.38	15.70	-7.30
OU1-MW-22	11/18/2005	6.73	699.00	21.40	0.67	3.79	-66.90
OU1-MW-67	11/18/2005	5.81	333.00	22.92	0.18	3.21	-19.00
OU1-MW-84	11/18/2005	6.96	599.00	20.45	1.28	10.50	-53.50
OU1-MW-85	11/18/2005	5.38	109.00	20.82	0.17	5.38	49.50
OU1-MW-89	11/18/2005	6.11	262.00	21.59	0.24	17.30	-34.30
OU1-MW-93	11/18/2005	4.48	67.00	22.26	0.33	4.78	223.70
OU1-MW-95	11/18/2005	7.62	142.00	21.69	0.33	76.50	35.40
OU1-MW-97	11/18/2005	5.13	273.00	22.43	0.38	42.50	96.30
OU1-MW-98	11/18/2005	6.37	387.00	21.64	0.52	81.40	-102.50
OU1-MW-100	11/18/2005	6.89	587.00	22.24	0.61	364.00	-73.10
OU1-MW-101	11/17/2005	6.61	497.00	21.21	0.23	3.87	-42.70
OU1-MW-102	11/17/2005	6.80	483.00	22.08	0.95	987.00	-22.90
OU1-SW-20	11/18/2005	2.16	433.00	15.43	5.61	11.20	34.40
OU1-SW-55	11/18/2005	7.05	432.00	17.82	7.39	6.49	-73.70

uS - microSiemens
C - degrees Celsius
mg/L - milligrams per Liter
NTU - Nephelometric Turbidity Units
mV - milliVolts
Field Parameters measured with a calibrated YSI 556 Water Quality Multimeter

TABLE 1: SURFACE WATER AND GROUNDWATER FIELD PARAMETERS

SITE NAME: OU 1, NAVAL AIR STATION JACKSONVILLE

Sample Location	Date	pH	Specific Conductivity (uS)	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)
OU1-MW-12	11/21/2006	6.47	584.00	22.31	0.74	339.00	-91.00
OU1-MW-18	11/21/2006	5.41	604.00	19.90	0.44	1.47	49.50
OU1-MW-19	11/21/2006	6.00	500.00	19.50	0.37	70.40	27.60
OU1-MW-22	11/21/2006	7.01	616.00	20.45	0.49	8.62	-39.50
OU1-MW-67	11/21/2006	5.53	249.00	18.99	0.99	9.40	--
OU1-MW-84	11/21/2006	6.85	551.00	20.10	1.00	1.27	-49.80
OU1-MW-85	11/21/2006	4.73	98.00	20.43	0.33	3.77	69.10
OU1-MW-89	11/21/2006	5.77	275.00	21.13	0.90	6.95	-2.40
OU1-MW-93	11/21/2006	4.42	93.00	20.73	0.78	55.10	122.20
OU1-MW-95	11/22/2006	5.18	93.00	21.20	0.97	120.00	107.40
OU1-MW-97	11/21/2006	5.02	256.00	20.42	0.44	75.80	58.20
OU1-MW-100	11/22/2006	7.00	506.00	19.86	1.47	571.00	-17.40
OU1-MW-101	11/22/2006	6.31	435.00	21.76	1.67	6.10	3.60
OU1-MW-102	11/22/2006	6.80	412.00	18.23	1.78	327.00	50.20
OU1-SW-20	11/21/2006	7.74	781.00	12.93	1.76	2.17	-7.10
OU1-SW-55	11/21/2006	7.56	193.00	11.21	1.01	11.40	29.60

uS - microSiemens
C - degrees Celsius
mg/L - milligrams per Liter
NTU - Nephelometric Turbidity Units
mV - milliVolts
Field Parameters measured with a calibrated YSI 556 Water Quality Multimeter

TABLE 1: SURFACE WATER AND GROUNDWATER FIELD PARAMETERS

SITE NAME: OU 1, NAVAL AIR STATION JACKSONVILLE

Sample Location	Date	pH	Specific Conductivity (uS)	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)
OU1-MW-12	11/15/2007	7.65	541.50	23.51	0.03	7.59	-118.30
OU1-MW-18	11/15/2007	5.86	529.10	21.22	0.02	8.61	72.20
OU1-MW-19	11/16/2007	7.49	742.90	15.69	0.00	31.80	-36.60
OU1-MW-22	11/15/2007	7.76	622.50	19.91	0.00	8.61	-71.20
OU1-MW-67	11/15/2007	6.91	388.10	20.91	0.17	13.40	25.70
OU1-MW-84	11/15/2007	7.32	506.30	20.32	0.01	5.92	-57.20
OU1-MW-85	11/15/2007	5.72	101.50	21.27	3.03	4.49	52.90
OU1-MW-89	11/15/2007	6.78	213.20	20.20	1.40	17.60	-20.80
OU1-MW-93	11/15/2007	4.18	78.29	22.88	3.27	12.90	197.10
OU1-MW-95	11/15/2007	6.18	185.50	21.46	1.56	16.90	62.90
OU1-MW-97	11/16/2007	5.14	167.70	11.52	2.25	16.30	112.70
OU1-MW-98	11/16/2007	8.13	357.50	15.85	0.14	575.00	-105.20
OU1-MW-100	11/15/2007	7.99	494.50	21.38	0.03	849.00	-76.00
OU1-MW-101	11/15/2007	7.37	422.50	19.79	0.08	6.81	-38.20
OU1-MW-102	11/15/2007	8.03	492.00	20.21	0.05	41.90	-21.70
OU1-SW-20	11/15/2007	6.94	747.90	18.30	0.00	381.00	31.50
OU1-SW-55	11/15/2007	6.97	333.80	16.37	0.56	127.00	34.20

uS - microSiemens
C - degrees Celsius
mg/L - milligrams per Liter
NTU - Nephelometric Turbidity Units
mV - milliVolts
Field Parameters measured with a calibrated YSI 556 Water Quality Multimeter

TABLE 1: SURFACE WATER AND GROUNDWATER FIELD PARAMETERS

SITE NAME: OU 1, NAVAL AIR STATION JACKSONVILLE

Sample Location	Date	pH	Specific Conductivity (uS)	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)
OU1-MW-12	12/3/2008	6.14	404	20.68	2.18	10.9	-63.5
OU1-MW-18	12/3/2008	6.32	480	16.90	4.21	6.11	57.1
OU1-MW-19	12/3/2008	5.96	456	17.51	2.87	9.72	93.2
OU1-MW-22	12/3/2008	7.99	602	16.68	2.32	7.61	-45.4
OU1-MW-67	12/3/2008	6.21	291	18.83	1.36	15.3	44.3
OU1-MW-84	12/3/2008	6.44	466	18.43	1.87	9.03	-23.1
OU1-MW-85	12/3/2008	5.72	126	17.34	1.72	7.41	71.4
OU1-MW-89	12/3/2008	5.66	202	17.70	2.05	17.6	26.2
OU1-MW-93	12/3/2008	5.62	85	15.89	4.76	12.5	113.5
OU1-MW-95	12/4/2008	6.59	247	16.29	2.36	27.7	167.1
OU1-MW-97	12/4/2008	6.41	209	15.88	2.09	11.7	97.8
OU1-MW-98	12/3/2008	DESTROYED/MISSING					
OU1-MW-100	12/3/2008	6.65	457	19.13	2.89	83.3	-24.1
OU1-MW-101	12/4/2008	6.50	444	16.73	2.48	16.1	17.5
OU1-MW-102	12/4/2008	6.38	511	19.10	1.71	23.3	37.2
OU1-SW-20	12/3/2008	7.31	301	9.92	7.71	15.3	77.9
OU1-SW-55	12/3/2008	6.79	271	8.66	6.24	12.7	95.6

uS - microSiemens
C - degrees Celsius
mg/L - milligrams per Liter
NTU - Nephelometric Turbidity Units
mV - milliVolts
Field Parameters measured with a calibrated YSI 556 Water Quality Multimeter

TABLE 1: SURFACE WATER AND GROUNDWATER FIELD PARAMETERS

SITE NAME: OU 1, NAVAL AIR STATION JACKSONVILLE

Sample Location	Date	pH	Specific Conductivity (uS)	Temperature (°C)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)
OU1-MW-12	2/11/2010	6.30	753	16.60	1.62	2.14	7.9
OU1-MW-18	2/10/2010	5.59	1302	14.20	4.89	0.43	31.5
OU1-MW-19	2/10/2010	6.00	664	15.15	2.06	16.5	32.1
OU1-MW-22	2/10/2010	6.87	1480	14.03	2.16	1.32	5.2
OU1-MW-67	2/10/2010	5.91	547	12.44	2.11	11.8	52.2
OU1-MW-84	2/11/2010	6.99	1104	15.17	2.71	4.81	25.4
OU1-MW-85	2/11/2010	5.50	799	12.27	2.63	4.83	8.3
OU1-MW-89	2/11/2010	6.12	627	10.46	3.19	32.4	21.8
OU1-MW-93	2/11/2010	5.07	180	12.58	2.62	10.7	85.8
OU1-MW-95	2/10/2010	6.40	772	14.54	2.15	93.4	24.8
OU1-MW-97	2/10/2010	4.74	536	14.48	3.59	10.3	80.8
OU1-MW-98	2/10/2010	7.25	1173	17.67	1.76	13.7	-6.7
OU1-MW-100	2/10/2010	7.05	1187	14.79	1.18	76	22.7
OU1-MW-101	2/10/2010	7.08	1405	10.61	2.13	30.6	-3.1
OU1-MW-102	2/10/2010	7.05	1000	15.29	1.33	48.9	7.9
OU1-SW-20	2/11/2010	8.36	1022	7.26	5.95	28.6	13.3
OU1-SW-55	2/11/2010	7.61	660	5.35	5.36	13.3	23.9

uS - microSiemens
C - degrees Celsius
mg/L - milligrams per Liter
NTU - Nephelometric Turbidity Units
mV - milliVolts
Field Parameters measured with a calibrated YSI 556 Water Quality Multimeter

APPENDIX B

OU 2 HISTORICAL GROUNDWATER DATA TABLES

Table B-1
Summary of Groundwater Analytical Results for OU 2
February 2005
Domestic Sludge Drying Bed (DSDB), Industrial Sludge Drying Bed (ISDB) and Polishing Pond (PP)
Naval Air Station Jacksonville
Jacksonville, Florida

Compound	GWPS	PP (PSC 42)					BKG
		NAS 42-5R	NAS 42-6R	NAS 42-7R	NAS 42-8-2R	MW-017R	NAS 4-9
		Feb-2005	Feb-2005	Feb-2005	Feb-2005	Feb-2005	Feb-2005
Analytical Results - Parameters Specified in Specific Conditions 12 and 13 of Postclosure Permit 0072437-005-HF (µg/L)							
Total Recoverable Phenolics	50 pCi/L	-	-	86	-	-	-
Arsenic	50	18	22	-	-	-	-
Cadmium	5	-	-	-	-	-	-
Chromium, total	100	6.3 I	3.5 I	20	5.0 I	5.4 I	-
Iron	500	14000	15000	32000	4500	970	360
Lead	15	-	-	-	-	-	4.3 IV
Manganese	50	160	7.4 I	280	140	2.3 I	140
Sodium	160000	37000	8700	52000	15000	2300	2200
Vanadium	49	4.9 I	5.9 I	48	5.0 I	8.4 I	3.8 I
Zinc	5000	-	5.8 I	6.5 I	-	6.8 I	-
Gross alpha (pC/L)	15 pC/L	-	2.02 J	11.8	-	-	-
Gross beta (pC/L)	4 pCi/L	7.81	-	7.63	8.43	-	6.82
Radium 226	5 pCi/L	0.324 J	0.644 J	0.895 J	-	0.173 J	-
Radium 228	5 pCi/L	0.912 J	0.447 J	11.9	0.696 J	0.706 J	0.849 J
Analytical Results - Parameters Specified in Specific Condition 14 of Postclosure Permit 0072437-005-HF (µg/L)							
Barium	2,000	89	15	150	32	12	24
Beryllium	4	-	-	0.68 I	-	-	-
Cobalt	420	-	-	-	-	-	-
Copper	1,000	-	-	-	-	1.8 I	-
Mercury	2	-	-	-	-	-	-
Nickel	100	5.1 I	-	4.9 I	3.5 I	-	-
1,1-Dichloroethane	70	-	-	-	-	-	-
Chloroethane	12	-	-	-	-	-	-
Methyl chloride; Chloromethane	5	-	-	-	-	-	0.54 I
Bis(2-ethylhexyl)phthalate	6	-	-	-	-	-	-
Acenaphthene	20	-	0.027 I	0.029 I	-	-	-
Fluoranthene	280	-	-	-	-	-	-
Fluorene	280	-	0.026 I	-	-	-	-
Phenanthrene	210	-	-	-	-	-	-
Pyrene	210	-	-	-	-	-	-

Notes:
GWPS = Groundwater protection standard
I = Reported value between
J = estimated value
- = Not detected
V = Indicates the analyte was detected in both the sample and the associated method blank
pCi/L = Picocuries per liter
µg/L = micrograms per liter
Shaded cells denote concentrations that exceed their appropriate GWPS.
If no GWPS is listed in either Part III or Part VII of the Postclosure Permit, GWPSs for Specific Condition 14 parameters are the FDEP GCTLs from Rule 62-777 FAC.

Table B-2
Summary of Groundwater Analytical Results for OU 2
January 2006
Domestic Sludge Drying Bed (DSDB), Industrial Sludge Drying Bed (ISDB) and Polishing Pond (PP)
Naval Air Station Jacksonville
Jacksonville, Florida

		PP (PSC 42)			Background
Compound	**GCTL**	**NAS 42-5R**	**NAS 42-8-2R**	**NAS 42-8-2R DUP**	**NAS 4-9**
Detected Semivolatile Organic Compounds (SVOCs) µg/L					
1,4-Dioxane	3	-	-	-	-
2,4-Dinitrotoluene	0	0.082	-	0.085	-
Naphthalene	14	3.6	0.25 I	-	-
Detected Metals (µg/L)					
Arsenic	10	50	-	-	-
Barium	2,000	59	24	24	26
Beryllium	4	-	-	-	-
Chromium, total	100	10	6.8 I	7.0 I	1.1 I
Cobalt	140	-	-	-	-
Copper	1,000	-	-	-	-
Lead	15	-	-	-	-
Nickel	100	2.6 I	2 I	2.8 I	-
Tin	4,200	-	-	-	-
Vanadium	49	4.5 I	4.3 I	4.9 I	2.9 I
Zinc	5,000	-	5.3 I	14 I	4.0 I
Thallium	2	-	-	-	-

Notes:
Shaded cells denote concentrations that exceed the GCTL.
- = compound was not detected.
GCTL = Groundwater Cleanup Target level, from FAC 62-777 Table 1
I = Reported value between the method detection limit and the reporting limit is estimated.

Table B-3
Summary of Groundwater Analytical Results for OU 2
January 2007
Polishing Pond (PP)
Naval Air Station Jacksonville
Jacksonville, Florida

		PP (PSC 42)			Background
Compound	**GCTL**	**NAS 42-5R**	**NAS 42-8-2R**	**NAS 42-8-2R DUP**	**NAS 4-9**
Detected Metals (μg/L)					
Arsenic	10	15	-	-	-
Barium	2,000	170	27	27	-
Chromium, total	100	3.3 I	5.0 I	4.9 I	-
Vanadium	49	-	-	-	23

Notes:
Shaded cells denote concentrations that exceed the GCTL.
- = compound was not detected.
GCTL = Groundwater Cleanup Target level, from FAC 62-777 Table 1
I = Reported value between the method detection limit and the reporting limit is estimated.

Table B-4
Summary of Groundwater Analytical Results for OU 2
January 2008
Polishing Pond (PP)
Naval Air Station Jacksonville
Jacksonville, Florida

		PP (PSC 42)		Background
Compound	**GCTL**	**NAS 42-5R**	**NAS 42-8-2R**	**NAS 4-9**
Detected Metals (μg/L)				
Arsenic	10	10.8	-	-
Barium	2,000	69.1	21.6	21.2
Chromium, total	100	4.6 I	4.74 I	-

Notes:
Shaded cells denote concentrations that exceed the GCTL.
- = compound was not detected.
GCTL = Groundwater Cleanup Target level, from FAC 62-777 Table 1
I = Reported value between the method detection limit and the reporting limit is estimated.

Table B-5
Summary of Groundwater Analytical Results for OU 2
January 2009
Polishing Pond (PP)
Naval Air Station Jacksonville
Jacksonville, Florida

		PP (PSC 42)		Background
Compound	**GCTL**	**NAS 42-5R**	**NAS 42-8-2R**	**NAS 4-9**
Detected Metals (μg/L)				
Arsenic	10	24	-	-
Barium	2,000	109	20.5	25.9
Chromium, total	100	4.75 I	5.51 I	0.838 I
Lead	-	4.4 I	3.43 I	-
Selenium	50	-	-	11

Notes:
Shaded cells denote concentrations that exceed the GCTL.
- = compound was not detected.
GCTL = Groundwater Cleanup Target level, from FAC 62-777 Table 1
I = Reported value between the method detection limit and the reporting limit is estimated.

Table B-6
Summary of Groundwater Analytical Results for OU 2
January 2010
Polishing Pond (PP)
Naval Air Station Jacksonville
Jacksonville, Florida

		PP (PSC 42)		Background
Compound	**GCTL**	**NAS 42-5R**	**NAS 42-8-2R**	**NAS 4-9**
Detected Metals (µg/L)				
Arsenic	10	18.7 (16.8)	-	-
Barium	2,000	65	15.5	30
Chromium, total	100	5.57 I	5.86 I	-
Lead	-	-	-	-
Selenium	50	-	-	-

Notes:
Shaded cells denote concentrations that exceed the GCTL.
- = compound was not detected.
GCTL = Groundwater Cleanup Target level, from FAC 62-777 Table 1
I = Reported value between the method detection limit and the reporting limit is estimated.
Value in parentheses represents dissolved arsenic.

APPENDIX C

OU 3 RI/FS INFORMATION

Table 4-6
Summary of Detections in Surface Water

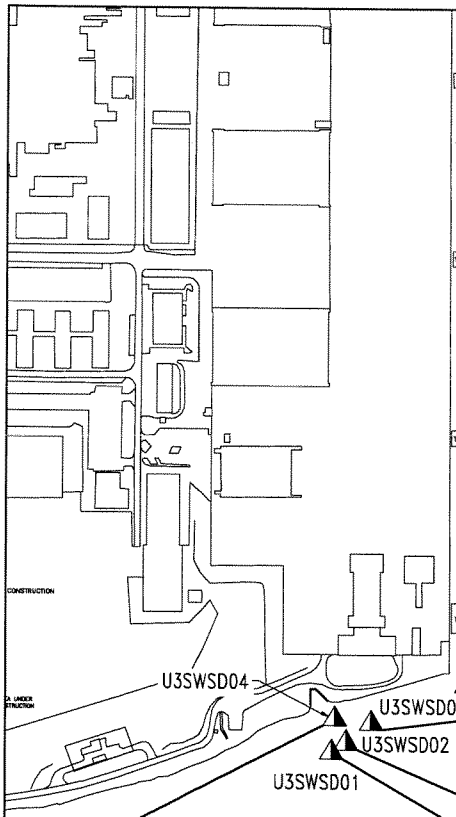
Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]
Volatile Organic Compounds (F g/ℓ)			
Chloromethane	1/10	2 to 2	2
Methylene Chloride	2/10	0.5 to 0.6	0.55
Inorganic Analytes (F g/ℓ)			
Aluminum	10/10	148 to 665	353
Barium	10/10	10.5 to 12.2	11.4
Calcium	10/10	23,900 to 25,300	24,775
Chromium	1/10	0.91 to 0.91	0.91
Cobalt	2/10	0.89 to 0.96	0.93
Copper	10/10	1.3 to 3.6	2.1
Iron	10/10	344 to 775	577
Magnesium	10/10	7,400 to 7,900	7,683
Manganese	7/10	11.9* to 25.1	16.9
Nickel	5/10	1 to 15.4	6.2
Potassium	10/10	2,580 to 2,840	2,671
Sodium	10/10	41,900 to 45,800	43,730
Thallium	2/10	9.6 to 10.9	10.3
Vanadium	10/10	1.7 to 2.7	2
Zinc	6/10	8 to 18.9	13.3
General Chemistry (mg/ℓ)			
Hardness, as $CaCO_3$	2/2	91 to 110	101

[1] Frequency of detection is the number of surface water samples in which the analyte was detected divided by the total number of samples analyzed.
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples in which the analyte was not detected.

Notes: Analytical results summarized include the following samples: U3W00101, U3W00201, U3W00301, U3W00401, U3W00501, U3W00601, U3W00701, U3W00801 (and field duplicate), U3W00901, and U3W01001.

F g/ℓ= micrograms per liter.
* = average of both sample and field duplicate.
mg/ℓ = milligrams per liter.
$CaCO_3$ = calcium carbonate.



U3W00601		
Inorganics	µg/l	
Aluminum	345	
Barium	11.5	J
Calcium	24,900	
Copper	2.7	J
Iron	667	
Magnesium	7710	
Manganese	16.2	
Nickel	1	J
Potassium	2680	J
Sodium	43,600	
Thallium	9.6	J
Vanadium	2	J
Zinc	13.8	J

U3W00501		
Inorganics	µg/l	
Aluminum	665	
Barium	11.7	J
Calcium	24,900	
Chromium	0.91	J
Cobalt	0.96	J
Copper	2.3	J
Iron	775	
Magnesium	7710	
Manganese	17.9	
Nickel	12	J
Potassium	2660	J
Sodium	43,100	
Thallium	10.9	
Vanadium	2.7	J
Zinc	13.3	J

U3W00301		
Inorganics	µg/l	
Aluminum	148	J
Barium	11.2	J
Calcium	24300	
Copper	1.9	J
Iron	344	
Magnesium	7490	
Potassium	2590	J
Sodium	43000	
Vanadium	1.8	J

U3W00401		
Inorganics	µg/l	
Aluminum	240	
Barium	11.1	J
Calcium	25,300	
Copper	1.3	J
Iron	432	
Magnesium	7800	
Manganese	15.8	
Potassium	2690	J
Sodium	44,200	
Vanadium	1.8	J

U3W00101		
Inorganics	µg/l	
Aluminum	231	
Barium	11.4	J
Calcium	25,100	
Copper	1.5	J
Iron	451	
Magnesium	7730	
Nickel	15.4	J
Potassium	2640	J
Sodium	44,400	
Vanadium	1.7	J
VOCs	µg/l	
Chloromethane	2	J

U3W00201		
Inorganics	µg/l	
Aluminum	225	
Barium	10.5	J
Calcium	24,200	
Copper	2	J
Iron	429	
Magnesium	7480	
Potassium	2590	J
Sodium	42,700	
Vanadium	1.9	J

0 300 600

SCALE: 1 INCH = 600 FEET

LEGEND

µg/l Micrograms per liter

U3SWSD04 Surface water and sediment sample location and designation

VOC Volatile organic compound

FIGURE 4-5A

ANALYTICAL DETECTIONS IN SURFACE WATER AT LOCATIONS SOUTHEAST OF OPERABLE UNIT 3

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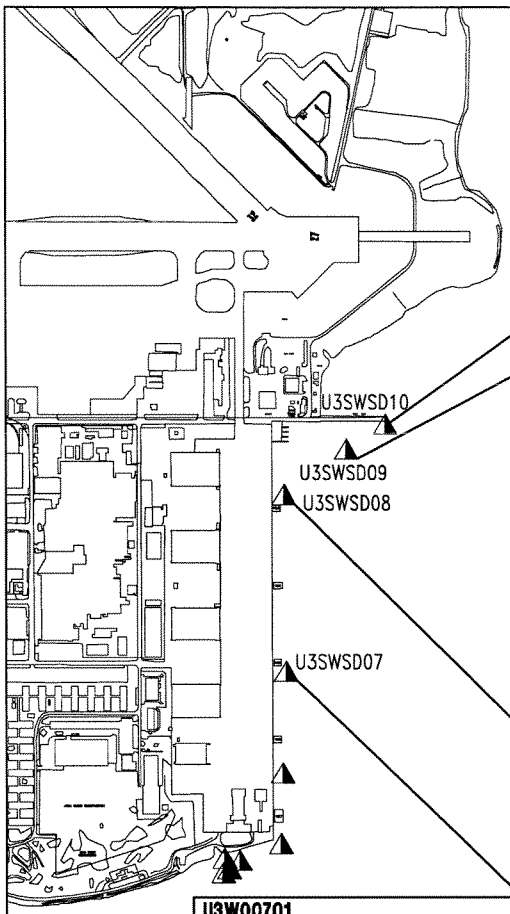
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE JACKSONVILLE, FLORIDA



U3W01001		
Inorganics	µg/l	
Aluminum	511	
Barium	11.9	J
Calcium	24,800	
Copper	2	J
Iron	745	
Magnesium	7,900	
Manganese	18	
Potassium	2,840	J
Sodium	45,800	
Vanadium	1.9	J
Zinc	17.1	J

U3W00901		
Inorganics	µg/l	
Aluminum	413	
Barium	12.2	J
Calcium	25,200	
Cobalt	0.89	J
Copper	3.6	J
Iron	745	
Magnesium	7,790	
Manganese	25.1	
Nickel	1.4	J
Potassium	2,730	J
Sodium	44,200	J
Vanadium	2.4	J
Zinc	18.9	J
VOCs	µg/l	
Methylene chloride	0.5	J

	U3W00801		U3W00801D	
Inorganics	µg/l		µg/l	
Aluminum	334		279	
Barium	11.7	J	10.7	J
Calcium	26,200		24,100	
Copper	2.3	J	1.7	J
Iron	502		482	
Magnesium	8,140		7,490	
Manganese	12	J	11.8	J
Potassium	2,800	J	2,620	J
Sodium	45,500		43,300	
Vanadium	2.1	J	1.7	J
Zinc	10.3	J	7.5	J
VOCs	µg/l		µg/l	
Methylene chloride	0.6	J		

U3W00701		
Inorganics	µg/l	
Aluminum	441	
Barium	11	J
Calcium	23,900	
Copper	2.1	J
Iron	694	
Magnesium	7,400	
Nickel	13.2	J
Potassium	1.4	J
Sodium	2,580	J
Vanadium	41,900	

LEGEND

▲ U3SWSD07	Surface water and sediment sample location and designation
U3W00701	Surface water sample identifier
VOC	Volatile organic compound
µg/l	Micrograms per liter
J	Estimated value
D	Duplicate

0 700 1400

SCALE: 1 INCH = 1400 FEET

FIGURE 4-5B

ANALYTICAL DETECTIONS IN SURFACE WATER AT LOCATIONS NORTHEAST OF OPERABLE UNIT 3

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REMEDIAL INVESTIGATION AND FEASIBILITY STUDY OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE JACKSONVILLE, FLORIDA

Table 4-7
Summary of Detections in Sediment

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]
Volatile Organic Compounds (F g/kg)			
2-Butanone	3/10	81 to 130	110
Acetone	6/10	41 to 625*	279
Carbon disulfide	1/10	14 to 14	14
Polyaromatic Hydrocarbons (F g/kg)			
2-Methylnaphthalene	1/3	617.5* to 617.5*	618
Benzo(a)anthracene	6/13	9.1 to 1,800	395
Benzo(a)pyrene	10/13	11 to 3,000	449
Benzo(b)fluoranthene	9/13	28 to 2,300	442
Benzo(g,h,i)perylene	4/13	35 to 1,300	457
Benzo(k)fluoranthene	4/13	15 to 1,500	457
Chrysene	2/13	615* to 1,200	908
Dibenzo(a,h)anthracene	9/13	19 to 740	193
Fluoranthene	11/13	14 to 2,100	416
Indeno(1,2,3-cd)pyrene	5/13	24 to 1,600	420
Naphthalene	1/13	572.5* to 572.5*	573
Phenanthrene	1/13	337.75* to 337.75*	338
Pyrene	11/13	14 to 3,000	561
Inorganic Analytes (mg/kg)			
Aluminum	13/13	407 to 14,100	4,543
Arsenic	4/13	9 to 12.85*	11
Barium	10/13	4.2 to 45.5	20.2
Beryllium	2/13	0.61 to 0.645*	0.63
Cadmium	14/16	0.46 to 4.2	1.5
Calcium	12/13	459 to 68,700	13,210
Chromium	13/13	5.3 to 101	27.8
Cobalt	8/13	0.25 to 4.1	2.1
Copper	13/13	2 to 57.2	15.4
Iron	13/13	771 to 23,950*	7,630
Lead	13/13	11.9 to 185	54.6
Magnesium	10/13	119 to 6,105*	2,489
Manganese	13/13	12.5 to 377	115
Mercury	10/16	0.08 to 0.62*	0.27
Nickel	13/13	1.3 to 21	11.2
Potassium	6/13	132 to 1,520*	962

See notes at end of table.

Table 4-7 (Continued)
Summary of Detections in Sediment

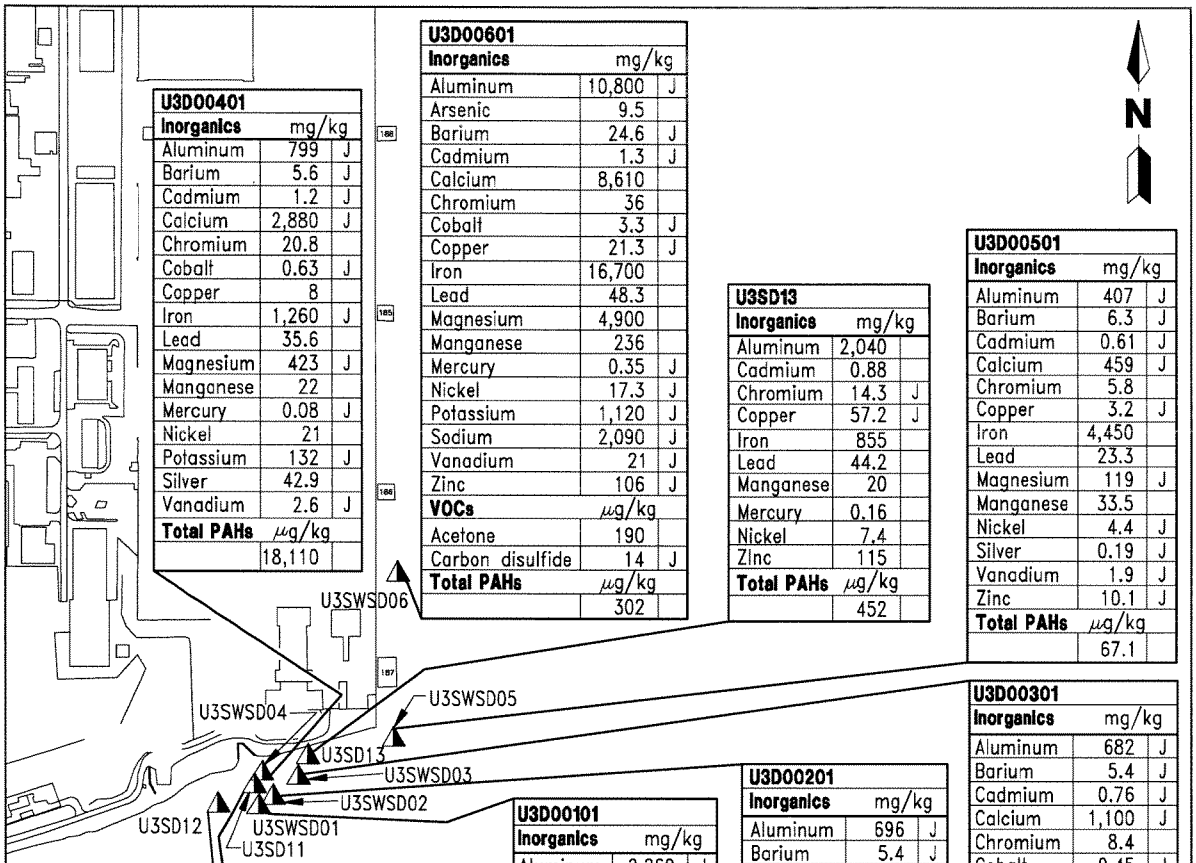
Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]
Inorganic Analytes (mg/kg) (Continued)			
Selenium	1/13	5.1 to 5.1	5.1
Silver	4/13	0.19 to 42.9	13
Sodium	4/13	2,090 to 3,250	2,789
Vanadium	10/13	1.8 to 31.9*	12.2
Zinc	9/13	10.1 to 655.35*	148
General Chemistry (mg/kg)			
Total Organic Carbon	16/16	2,000 to 160,000	58,844

[1] Frequency of detection is the number of sediment samples in which the analyte was detected divided by the total number of samples analyzed.
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples in which the analyte was not detected.

Notes: Analytical results summarized include the following samples: U3D00101, U3D00201, U3D00301, U3D00401, U3D00501, U3D00601, U3D00701, U3D00801 (and field duplicate), U3D00901, and U3D01001, U3SD11, U3SD12, U3SD13, U3SD14, U3SD15 and U3SD16.

Fg/kg = micrograms per kilogram.
* = average of both sample and field duplicate.
mg/kg = milligrams per kilogram.



U3D00401		
Inorganics	mg/kg	
Aluminum	799	J
Barium	5.6	J
Cadmium	1.2	J
Calcium	2,880	J
Chromium	20.8	
Cobalt	0.63	J
Copper	8	
Iron	1,260	J
Lead	35.6	
Magnesium	423	J
Manganese	22	
Mercury	0.08	J
Nickel	21	
Potassium	132	J
Silver	42.9	
Vanadium	2.6	J
Total PAHs	µg/kg	
	18,110	

U3D00601		
Inorganics	mg/kg	
Aluminum	10,800	J
Arsenic	9.5	
Barium	24.6	J
Cadmium	1.3	J
Calcium	8,610	
Chromium	36	
Cobalt	3.3	J
Copper	21.3	J
Iron	16,700	
Lead	48.3	
Magnesium	4,900	
Manganese	236	
Mercury	0.35	J
Nickel	17.3	J
Potassium	1,120	J
Sodium	2,090	J
Vanadium	21	J
Zinc	106	J
VOCs	µg/kg	
Acetone	190	
Carbon disulfide	14	J
Total PAHs	µg/kg	
	302	

U3SD13		
Inorganics	mg/kg	
Aluminum	2,040	
Cadmium	0.88	
Chromium	14.3	J
Copper	57.2	J
Iron	855	
Lead	44.2	
Manganese	20	
Mercury	0.16	
Nickel	7.4	
Zinc	115	
Total PAHs	µg/kg	
	452	

U3D00501		
Inorganics	mg/kg	
Aluminum	407	J
Barium	6.3	J
Cadmium	0.61	J
Calcium	459	J
Chromium	5.8	
Copper	3.2	J
Iron	4,450	
Lead	23.3	
Magnesium	119	J
Manganese	33.5	
Nickel	4.4	J
Silver	0.19	J
Vanadium	1.9	J
Zinc	10.1	J
Total PAHs	µg/kg	
	67.1	

U3D00301		
Inorganics	mg/kg	
Aluminum	682	J
Barium	5.4	J
Cadmium	0.76	J
Calcium	1,100	J
Chromium	8.4	
Cobalt	0.45	J
Copper	2.6	J
Iron	871	J
Lead	25.4	
Magnesium	240	J
Manganese	12.5	
Mercury	0.26	
Nickel	4.2	J
Silver	3.8	
Vanadium	2.2	J
VOCs	µg/kg	
Acetone	41	
Total PAHs	µg/kg	
	255	

U3D00201		
Inorganics	mg/kg	
Aluminum	696	J
Barium	5.4	J
Cadmium	0.78	J
Calcium	4,250	J
Chromium	15.6	
Cobalt	0.25	J
Copper	2.7	J
Iron	771	J
Lead	50.1	
Magnesium	213	J
Manganese	14.9	
Mercury	0.09	J
Nickel	13.6	
Vanadium	1.8	J
Total PAHs	µg/kg	
	890	

U3D00101		
Inorganics	mg/kg	
Aluminum	2,260	J
Barium	23.2	J
Cadmium	4.2	
Calcium	30,900	J
Chromium	101	
Cobalt	0.91	J
Copper	20.4	
Iron	2,350	J
Lead	185	
Magnesium	1,120	J
Manganese	100	
Mercury	0.18	
Nickel	16.3	
Potassium	331	J
Silver	5.2	
Vanadium	4.8	J
Zinc	52.7	
Total PAHs	µg/kg	
	3,210	

U3SD12		
Inorganics	mg/kg	
Aluminum	663	
Calcium	68,700	J
Chromium	7.5	J
Copper	5.7	J
Iron	879	
Lead	26.8	
Manganese	61.8	
Nickel	7.2	
Total PAHs	µg/kg	
	545	

	U3SD11		U3SD11D	
Inorganics	mg/kg		mg/kg	
Aluminum	898		734	
Cadmium	1.5	J	3	J
Calcium	4,350	J	2,900	J
Chromium	18.7	J	31.3	J
Copper	8.9	J	15.6	J
Iron	2,380	J	1,390	J
Lead	115		139	
Manganese	31.4		23.9	
Mercury			0.19	
Nickel	13.3		19.2	
Zinc	1,260	J	50.7	J
Total PAHs	µg/kg		µg/kg	
	8,660		4,310	

0 300 600

SCALE: 1 INCH = 600 FEET

LEGEND

PAH	Polynuclear aromatic hydrocarbons
VOC	Volatile organic compound
mg/kg	Milligrams per kilogram
µg/kg	Micrograms per kilograms
◮ U3SWSD04	Surface water and sediment sample location and designation

FIGURE 4-6A

ANALYTICAL DETECTIONS IN SEDIMENT SAMPLES AT LOCATIONS SOUTHEAST OF OPERABLE UNIT 3

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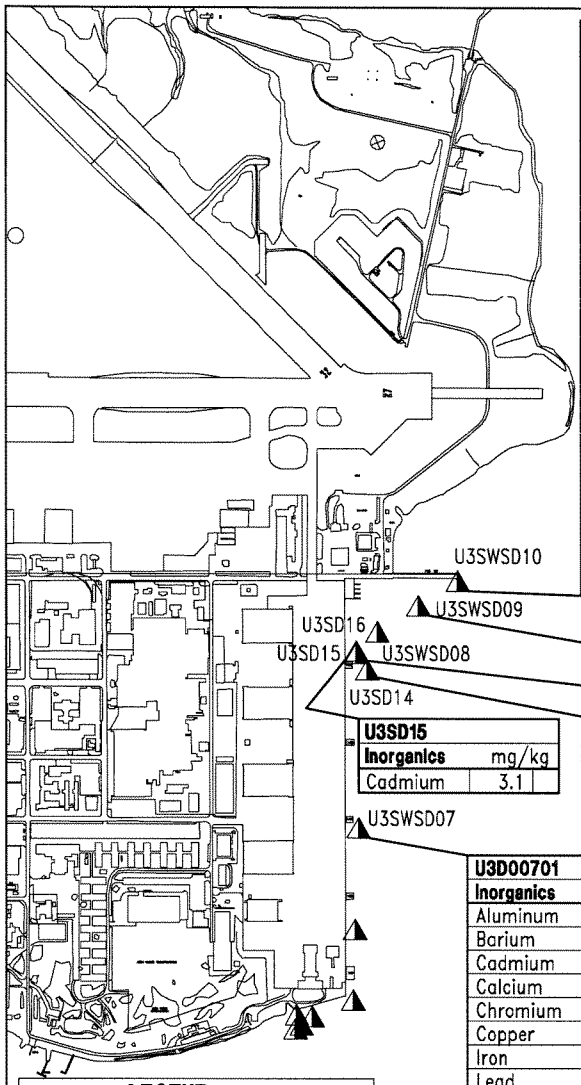
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE JACKSONVILLE, FLORIDA



U3D01001		
Inorganics	mg/kg	
Aluminum	14,100	J
Arsenic	12.6	J
Barium	45.5	J
Beryllium	0.61	J
Cadmium	1.1	J
Calcium	12,400	
Chromium	40.2	
Cobalt	4.1	J
Copper	21.7	J
Iron	23,600	
Lead	42.7	
Magnesium	5,900	J
Manganese	377	
Mercury	0.44	J
Nickel	12.2	J
Potassium	1,470	J
Sodium	3,250	J
Vanadium	31.3	J
Zinc	122	J
VOCs	μg/kg	
2-Butanone	130	
Acetone	390	

U3D00901		
Inorganics	mg/kg	
Aluminum	11,200	J
Arsenic	9	J
Barium	39	J
Cadmium	1	J
Calcium	11,500	
Chromium	34.2	
Cobalt	3.2	J
Copper	18.2	J
Iron	20,300	
Lead	33.8	
Magnesium	5,640	J
Manganese	276	
Mercury	0.39	J
Nickel	11.3	J
Potassium	1,200	J
Selenium	5.1	J
Sodium	3,130	J
Vanadium	22.6	J
Zinc	102	J
VOCs	μg/kg	
2-Butanone	81	
Acetone	320	
Total PAHs	μg/kg	
	183	

U3SD15		
Inorganics	mg/kg	
Cadmium	3.1	

U3SD14		
Inorganics	mg/kg	
Cadmium	1.6	

	U3D00801		U3D00801D	
Inorganics	mg/kg		mg/kg	
Aluminum	13,600	J	14,100	J
Arsenic	13.7	J	12	J
Barium	41.4	J	44.9	J
Beryllium	0.59	J	0.7	J
Cadmium	2	J	2.4	J
Calcium	11,700		12,100	
Chromium	44.2		49.2	
Cobalt	3.8	J	3.9	J
Copper	26.4	J	24.7	J
Iron	23,200		24,700	
Lead	52.6		58.3	
Magnesium	5,960	J	6,250	J
Manganese	290		305	
Mercury	0.6	J	0.64	J
Nickel	12.9	J	14	J
Potassium	1,450	J	1,590	J
Sodium	2,770	J	2,600	J
Vanadium	30.3	J	33.5	J
Zinc	131	J	142	J
VOCs	μg/kg		μg/kg	
2-Butanone	160		75	J
Acetone	640		610	

U3D00701		
Inorganics	mg/kg	
Aluminum	747	J
Barium	4.2	J
Cadmium	0.46	J
Calcium	2,200	
Chromium	5.3	
Copper	2	J
Iron	1,320	
Lead	11.9	
Magnesium	231	J
Manganese	12.8	
Nickel	1.3	J
Vanadium	2	J
Zinc	33.4	J
VOCs	μg/kg	
Acetone	110	
Total PAHs	μg/kg	
	152	

LEGEND

U3SWSD07	Surface water and sediment sample location and designation
U3D00701	Sediment sample identifier
mg/kg	Milligrams per kilogram
μg/kg	Micrograms per kilogram
VOC	Volatile organic compound
PAH	Polynuclear aromatic hydrocarbons
J	Estimated value
D	Duplicate

0 700 1400

SCALE: 1 INCH = 1400 FEET

FIGURE 4-6B

ANALYTICAL DETECTIONS IN SEDIMENT SAMPLES AT LOCATIONS NORTHEAST OF OPERABLE UNIT 3

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE JACKSONVILLE, FLORIDA

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Table 4-8
Summary of Detections in Groundwater

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]
Area A			
Volatile Organic Compounds (F g/ℓ)			
1,1,2-Trichloroethane	4/7	0.67 to 9.3	4.5
1,1-Dichloroethene	6/7	1.1 to 31	14.6
1,2-Dichloroethene (total)	7/7	140 to 6,200	2,526
Benzene	1/7	1.5 to 1.5	1.5
Carbon Disulfide	5/7	1 to 3.3	2.3
Chloroform	3/7	1 to 4.1	2.7
Tetrachloroethene	1/7	1.1 to 1.1	1.1
Toluene	3/7	17 to 21	18.3
Trichloroethene	7/7	2.9 to 31,000	13,173
Vinyl Chloride	7/7	110 to 1,600	580
Inorganic Analytes (F g/ℓ):			
Aluminum	1/1	197	197
Barium	1/1	104	104
Calcium	1/1	63,600	63,600
Cobalt	1/1	4.5	4.5
Copper	1/1	1.7	1.7
Iron	1/1	2,170	2,170
Magnesium	1/1	9,670	9,670
Manganese	1/1	82.8	82.8
Nickel	1/1	4.5	4.5
Potassium	1/1	1,860	1,860
Sodium	1/1	75,800	75,800
Zinc	1/1	52.3	52.3
Data set summarized above include hydrocone samples U3QA0101, U3QA0201, U3QA0301, U3QA0401, U3QA0501, U3QA0601 and monitoring well samples U3GA0701 (VOC) and U3GA0704 (metals).			
Area B			
Volatile Organic Compounds (F g/ℓ)			
1,1,2-Trichloroethane	1/7	2 to 2	2
1,1-Dichloroethene	1/7	3 to 3	3
1,2-Dichloroethene (total)	1/7	2 to 2	2
Acetone	1/7	26 to 26	26
Carbon Disulfide	2/7	1.9 to 97	49.5
Chloroform	2/7	0.88 to 3	1.9
Chloromethane	2/7	1.1 to 14	7.6
Tetrachloroethene	1/7	40 to 40	40
Trichloroethene	3/7	2.3 to 9,800	3,274
Data set summarized above include hydrocone samples U3QB0101, U3QB0201, U3QB0301, U3QB0401, U3QB0501, U3CW31A02, and monitoring well sample U3G01801.			
See notes at end of table.			

Table 4-8 (Continued)
Summary of Detections in Groundwater

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]
Area C			
Volatile Organic Compounds (F g/ℓ)			
1,2-Dichloroethene (total)	2/10	1.5 to 27	14.3
Acetone	2/10	26 to 310	168
Methylene Chloride	1/10	27 to 27	27
Trichloroethene	6/11	10 to 5,000	1,407
Data set summarized above include hydrocone samples U3QC0101, U3QC0201, U3QC0301, U3QC0401, U3QC0501, U3CW02A02 U3CW16A02 and monitoring well samples U3G00201, U3G00301, U3G01301, and U3G03101.			
Area D			
Volatile Organic Compounds (F g/ℓ)			
1,1,2-Trichloroethane	1/9	0.56 to 0.56	0.56
1,1-Dichloroethene	2/9	2 to 4.1	3.1
1,2-Dichloroethene (total)	8/9	0.63 to 190	42.9
2-Butanone	1/9	2.3 to 2.3	2.3
Acetone	1/9	98 to 98	98
Bromoform	1/9	8.8 to 8.8	8.8
Carbon Disulfide	1/9	1.5 to 1.5	1.5
Methylene Chloride	5/9	0.4 to 11.25	4.2
Tetrachloroethene	7/9	0.55 to 34	7.8
Trichloroethene	9/9	92 to 6,800	3,531
Inorganic Analytes (F g/ℓ)			
Aluminum	1/2	406 to 406	406
Arsenic	2/2	10.1 to 23	16.6
Barium	2/2	58.2 to 96.7	77.5
Calcium	2/2	17,300 to 35,800	26,550
Cobalt	1/2	1.6 to 1.6	1.6
Iron	2/2	14,800 to 32,300	23,550
Magnesium	2/2	2,360 to 8,330	5,345
Manganese	2/2	207 to 662	435
Nickel	1/2	1.3 to 1.3	1.3
Potassium	2/2	1,610 to 1,760	1,685
Sodium	2/2	46,500 to 104,000	75,250
Zinc	2/2	15.3 to 86.4	50.9
Data set summarized above include hydrocone samples U3QD0101, U3QD0201, U3QD0302, U3QD0401, U3QD0501 monitoring well samples U3GTP0902 (VOC), U3GTP0903 (metals), U3GTP1201, U3GTP1301, U3WD0601 (except VOC), U3WD0603 and U3WD0603D.			
See notes at end of table.			

Table 4-8 (Continued)
Summary of Detections in Groundwater

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]
Area E			
Volatile Organic Compounds (F g/ℓ)			
1,1,2-Trichloroethane	1/7	0.95 to 0.95	0.95
1,1-Dichloroethene	1/7	7.9 to 7.9	7.9
1,2-Dichloroethene (total)	3/7	7.5 to 610	369
Acetone	2/7	10 to 70	40
Carbon Disulfide	1/7	0.84 to 0.84	0.84
Chloroform	1/7	5.9 to 5.9	5.9
Tetrachloroethene	2/7	9,200 to 16,000	12,600
Trichloroethene	2/7	420 to 670	545
Vinyl Chloride	3/7	1.7 to 43	22.9
Data set summarized above include hydrocone samples U3QE0602, U3QE0101, U3QE0201, U3QE0301, U3QE0401, U3QE0501 and monitoring well sample U3G01601.			
Area F			
Volatile Organic Compounds (F g/ℓ)			
1,1,1-Trichloroethane	1/8	2.9 to 2.9	2.9
1,1,2-Trichloroethane	2/8	0.9 to 6.5	3.7
1,1-Dichloroethane	1/8	2.4 to 2.4	2.4
1,1-Dichloroethene	3/8	1 to 270	94.7
1,2-Dichloroethene (total)	5/8	1.7 to 61	21.7
Acetone	1/8	16 to 16	16
Carbon Disulfide	1/8	1.7 to 1.7	1.7
Chloroform	3/8	0.5 to 1.2	0.74
Methylene Chloride	1/8	0.3 to 0.3	0.3
Tetrachloroethene	3/8	1.4 to 7.3	3.7
Toluene	1/8	1.4 to 1.4	1.4
Trichloroethene	7/8	12 to 27,000	4,550
Vinyl Chloride	2/8	2.8 to 3.4	3.1
Inorganic Analytes (F g/ℓ)			
Aluminum	1/1	428	428
Barium	1/1	124	145
Beryllium	1/1	0.77	0.77
Calcium	1/1	11,500	11,500
Cobalt	1/1	2.1	2.1
Iron	1/1	32.6	32.6
Magnesium	1/1	10,700	10,700
Manganese	1/1	9.3	9.3

See notes at end of table.

Table 4-8 (Continued)
Summary of Detections in Groundwater

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]
Inorganic Analytes (F g/ℓ) (Continued)			
Nickel	1/1	2.3	2.3
Potassium	1/1	4,760	4,760
Sodium	1/1	23,900	23,900
Vanadium	1/1	0.82	0.82
Zinc	1/1	20.4	20.4
Data set summarized above include hydrocone samples U3QF0102, U3QF0201, U3QF0301, U3QF0401, U3QF0501, and monitoring well samples U3G00701, U3G00701D, U3G03201, U3GF0603 (VOC), and U3GF0604 (metals).			
Area G			
Volatile Organic Compounds (F g/ℓ)			
1,1,1-Trichloroethane	2/8	11 to 570	291
1,1,2-Trichloroethane	1/8	5.1 to 5.1	5.1
1,1-Dichloroethane	2/8	11 to 18	14.5
1,1-Dichloroethene	3/8	0.77 to 760	380
1,2-Dichloroethene (total)	3/8	25 to 1,600	605
Benzene	1/8	1.1 to 1.1	1.1
Carbon Disulfide	2/8	1 to 5.6	3.3
Chloroform	2/8	0.53 to 0.63	0.58
Methylene Chloride	2/8	0.9 to 2.4	1.7
Tetrachloroethene	2/8	0.71 to 0.94	0.83
Trichloroethene	7/8	1.5 to 3,800	1,123
Vinyl Chloride	3/8	1.6 to 66	26.9
Inorganic Analytes (F g/ℓ)			
Aluminum	1/1	800	800
Arsenic	1/1	4.9	4.9
Barium	1/1	46.8	46.8
Calcium	1/1	42,200	42,200
Iron	1/1	8,790	8,790
Magnesium	1/1	5,220	5,220
Manganese	1/1	45.6	45.6
Potassium	1/1	1,620	1,620
Sodium	1/1	3,350	3,350
Data set summarized above include hydrocone samples U3QG0102, U3QG0201, U3QG0302, U3QG0402, U3QG0501, and monitoring well samples U3G03301, U3G03401, U3NARFB103.			
See notes at end of table.			

Table 4-8 (Continued)
Summary of Detections in Groundwater

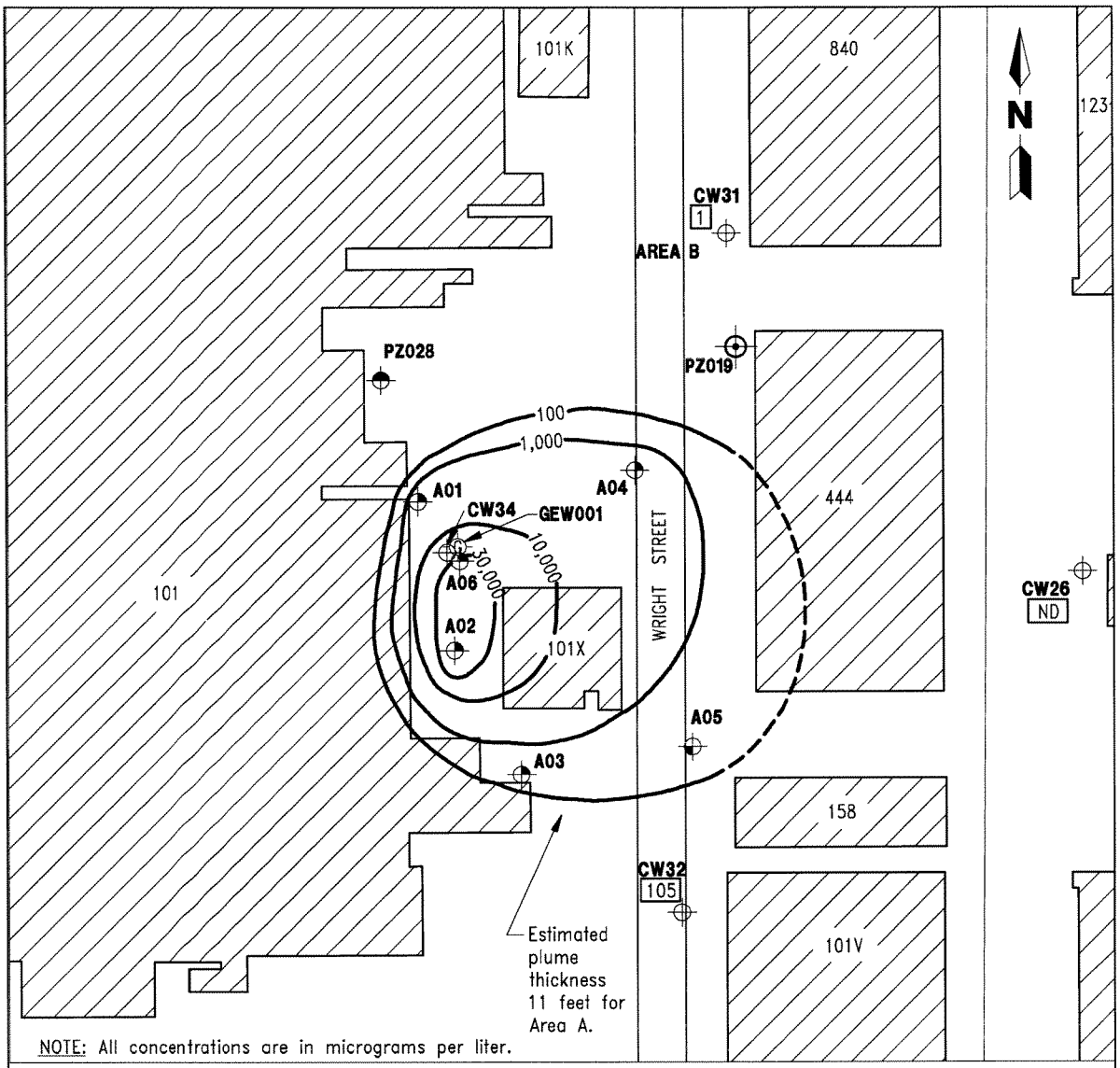
Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]
Areas Outside of Areas A to G			
Volatile Organic Compounds (F g/ℓ)			
1,1,1-Trichloroethane	1/76	1 to 1	1
1,1,2-Trichloroethane	1/76	1 to 1	1
1,1-Dichloroethane	3/76	1 to 3.8	2.2
1,2-Dichloroethane	1/76	1 to 1	1
Acetone	7/11	7 to 92	34.7
Benzene	3/76	1 to 64	24.8
Carbon Disulfide	5/11	5 to 260	96.6
Chloroform	2/76	1 to 1	1
Chloromethane	5/11	3 to 30	14
Methylene Chloride	6/11	1 to 35	7.7
Tetrachloroethene	4/76	1 to 10	3.3
Toluene	1/76	8.3 to 8.3	8.3
Trichloroethene	24/76	1 to 580	54.5
cis-1,2-Dichloroethene	15/65	1.6 to 1,300	99.1
trans-1,2-Dichloroethene	5/65	1.1 to 520	106
Semivolatile Organic Compounds (F g/ℓ)			
Di-n-butylphthalate	1/11	4 to 4	4
Diethylphthalate	2/11	3 to 7	5
Phenol	4/11	2 to 35	10.8
Pesticides (F g/ℓ)			
gamma-BHC (Lindane)	1/76	0.018 to 0.018	0.018

Data set summarized above include 1993 SSFP samples from three levels taken at hydrocone sampling locations CW01, CW03, CW04, CW10, CW14, CW17, CW19, CW21, CW22, CW25, CW29, CW30, CW35, CW37, CW38, CW47, CW48, CW49, CW50, CW52, CW53, CW55, CW57, CW62, and CW63.

[1] Frequency of detection is the number of groundwater samples in which the analyte was detected divided by the total number of samples analyzed.
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples in which the analyte was not detected.

Notes: Fg/ℓ = micrograms per liter.
BHC = hexachlorobenzene.



NOTE: All concentrations are in micrograms per liter.

LEGEND

- **CW32** — Cone penetrometer test sample location and designation (conducted during the SSFP in 1993)
- **PZ028** — Piezometer installed during the engineering studies in 1996 (not sampled)
- 100 — Total chlorinated solvent contour in groundwater (dashed where inferred)
- **A05** — Piezocone and hydrocone location and designation
- **A04** — Hydrocone sample location and designation
- **PZ018** — Piezometer location and designation (installed during the SSFP in 1993)
- **GEW001** — Groundwater extraction/air injection well location and designation
- 105 — Total chlorinated solvent concentration in shallow zone of the surficial aquifer
- Building
- SSFP — Scoping study field program
- ND — Not detected

0 50 100

SCALE: 1 INCH = 100 FEET

FIGURE 4-7

CONTAMINATION CONTOURS
AREA A - OLD ENGINE CLEANING AREA

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REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

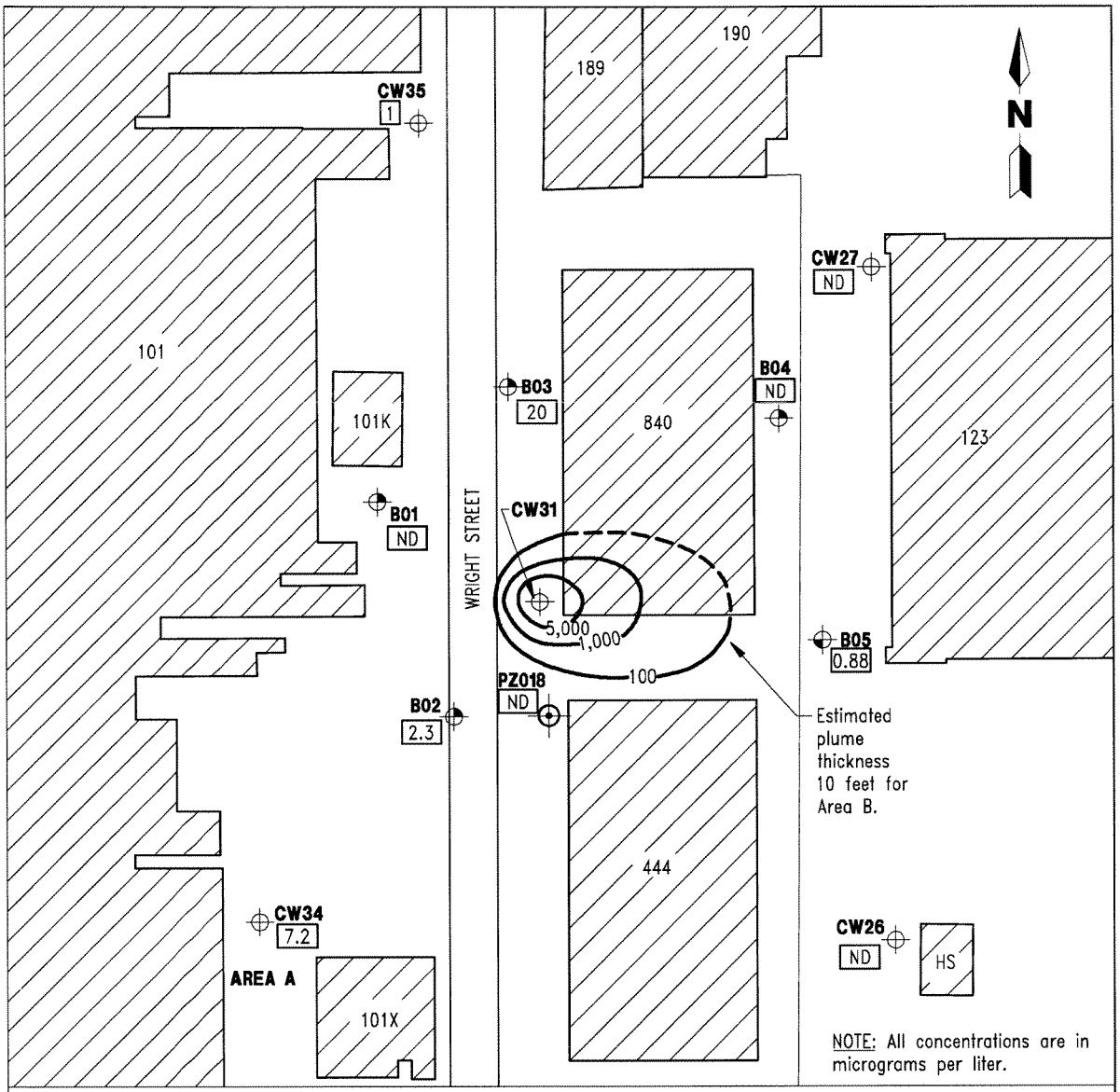
Table 4-9
Estimated Dimensions of Elevated Groundwater Contamination Areas

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station
Jacksonville, Florida

Area	Predominant VOC present	Estimated Total Area (ft^2)	Estimated Plume Thickness (feet)	Estimated Upper Boundary (ft bls)	Estimated Lower Boundary (ft bls)	Estimated Total Volume of Contaminated Groundwater (ft^3)	Estimated Total Contaminant Mass (kg)	Figure Reference
Area A	TCE	48,250	11	7	18	132,700	32.8	Figure 4-7
Area B	TCE	10,150	10	35	45	23,375	1.7	Figure 4-8
Area C (eastern plume)	TCE	8,950	10	30	40	51,125	1.9	Figure 4-9
(western plume)	TCE	20,450	10	30	40	19,875	1.6	
Area D	TCE	134,050	25	27	52	837,125	51.0	Figure 4-10
Area E	PCE	11,950	10	6	16	29,875	4.7	Figure 4-11
Area F	TCE	28,900	10	15	25	72,250	4.0	Figure 4-12
Area G	TCE	23,900	10	10 to 30*	20 to 40*	59,750	3.9	Figure 4-13

Notes: Total contaminant mass calculations based on the mass of the predominant chlorinated solvent compound in the plume (TCE except Area E which is based on PCE). All calculations, including assumptions used, can be found in Appendix C-8.

VOC = Volatile Organic Compound.
ft^2 = square feet.
ft bls = feet below land surface.
ft^3 = cubic feet.
kg = kilogram.
TCE = trichloroethene.
PCE= tetrachloroethene.
* = A range of depths is provided because the plume dips towards the east.



LEGEND

CW34	Cone penetrometer test sample location and designation (conducted during the SSFP in 1993)
B01	Hydrocone sample location and designation
100	Total chlorinated solvent contour in groundwater (dashed where inferred)
B05	Piezocone and hydrocone location and designation
PZ018	Piezometer location and designation (installed during the SSFP in 1993)
7.2	Total chlorinated solvent concentration in intermediate zone of the surficial aquifer
	Building
SSFP	Scoping study field program
ND	Not detected

0 50 100
SCALE: 1 INCH = 100 FEET

FIGURE 4-8

CONTAMINATION CONTOURS
AREA B - SOUTHWEST OF BUILDING 840

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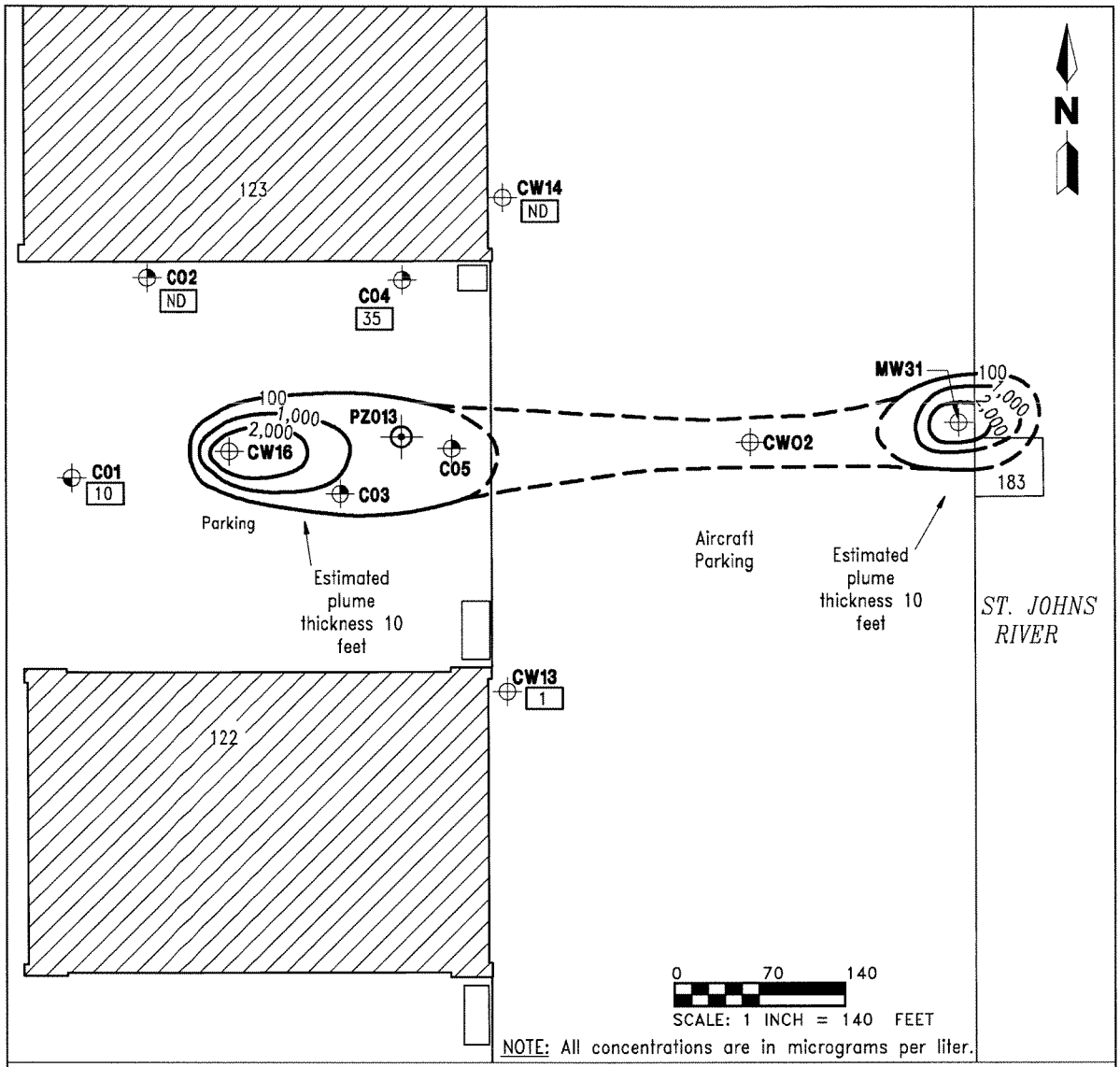
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA



LEGEND

CW16	Cone penetrometer test sample location and designation (conducted during the SSFP in 1993)
CO4	Hydrocone sample location and designation
SSFP	Scoping study field program
	Building
CO1	Piezocone and hydrocone location and designation
PZ013	Piezometer location and designation (installed during the SSFP in 1993)
100	Total chlorinated solvent contour in groundwater (dashed where inferred)
35	Total chlorinated solvent concentration in intermediate zone of the surficial aquifer
ND	Not detected

FIGURE 4-9

CONTAMINATION CONTOURS
AREA C - BETWEEN HANGARS 122 AND 123

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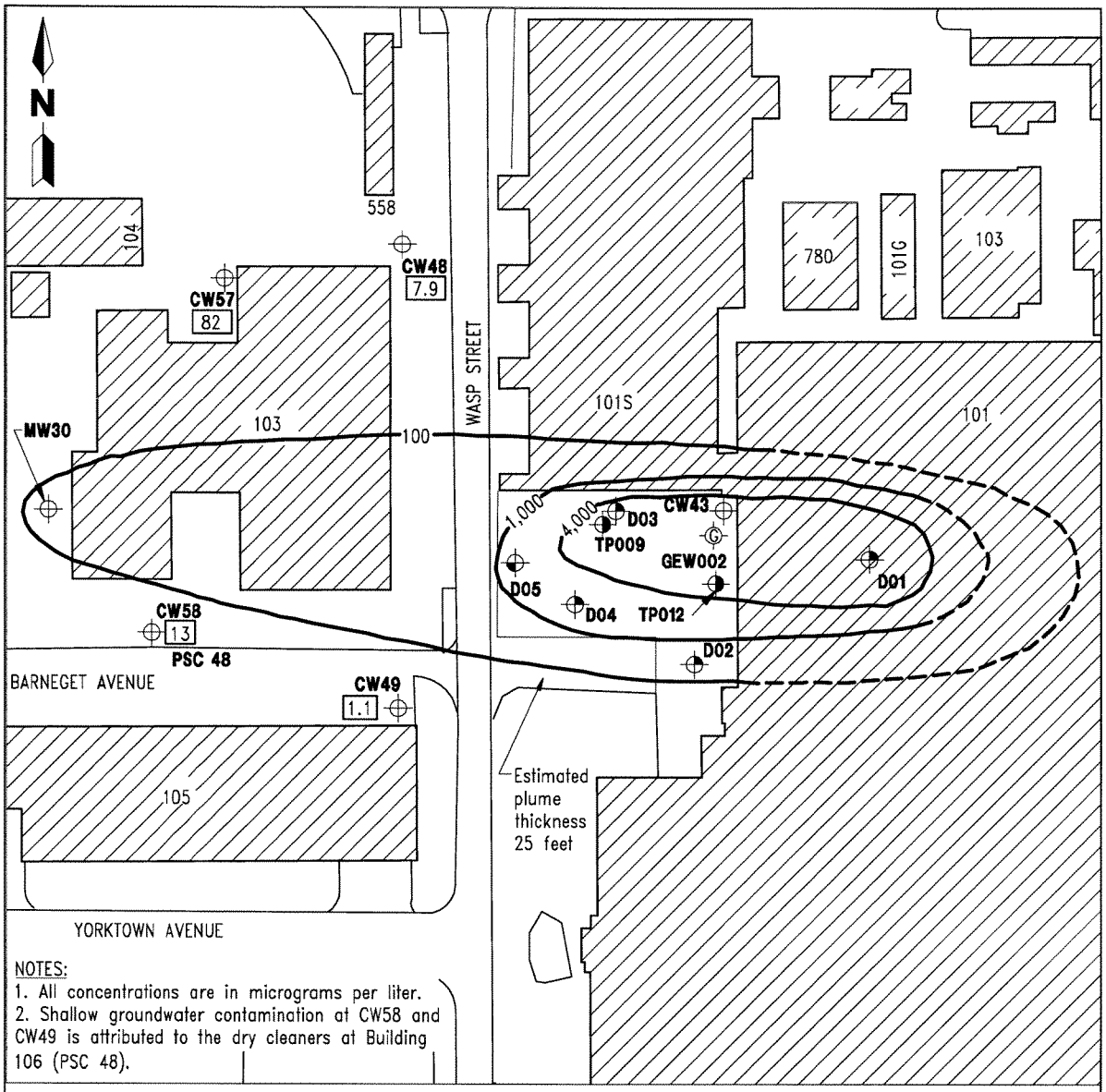
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA



NOTES:
1. All concentrations are in micrograms per liter.
2. Shallow groundwater contamination at CW58 and CW49 is attributed to the dry cleaners at Building 106 (PSC 48).

LEGEND

- CW58 — Cone penetrometer test sample location and designation (conducted during the SSFP in 1993)
- D02 — Hydrocone sample location and designation
- GEW002 — Groundwater extraction well location and designation
- D05 — Piezocone and hydrocone location and designation
- 100 — Total chlorinated solvent contour in groundwater (dashed where inferred)
- TP009 — Temporary piezometer installed for groundwater pumping test in 1996
- PSC — Potential source of contamination
- SSFP — Scoping study field program
- 13 — Total chlorinated solvent concentration in intermediate zone of the shallow aquifer
- Building

0 70 140
SCALE: 1 INCH = 140 FEET

FIGURE 4-10
CONTAMINATION CONTOURS
AREA D - WEST END OF JETLINE HANGAR

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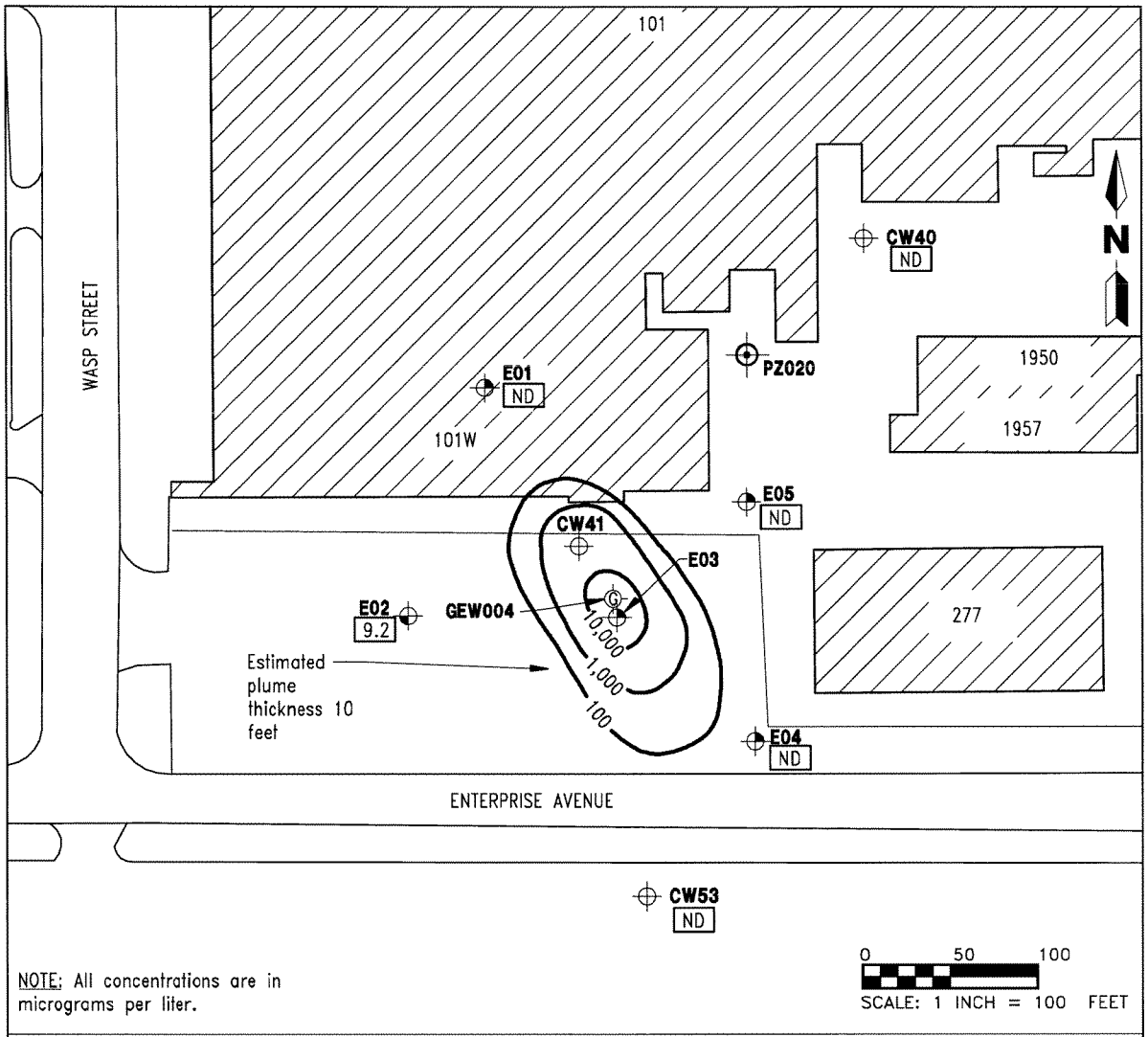
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA



NOTE: All concentrations are in micrograms per liter.

LEGEND

CW41	Cone penetrometer test sample location and designation (conducted during the SSFP in 1993)
E01	Hydrocone sample location and designation
E02	Piezocone and hydrocone location and designation
100	Total chlorinated solvent contour in groundwater
PZ020	Piezometer location and designation (installed during the SSFP in 1993)[not sampled]
GEW004	Groundwater extraction well location and designation
ND	Not detected
SSFP	Scoping study field program
9.2	Total chlorinated solvent concentration in shallow zone of the surficial aquifer
	Building

FIGURE 4-11

CONTAMINATION CONTOURS
AREA E - SOUTHERN END OF P3 HANGAR

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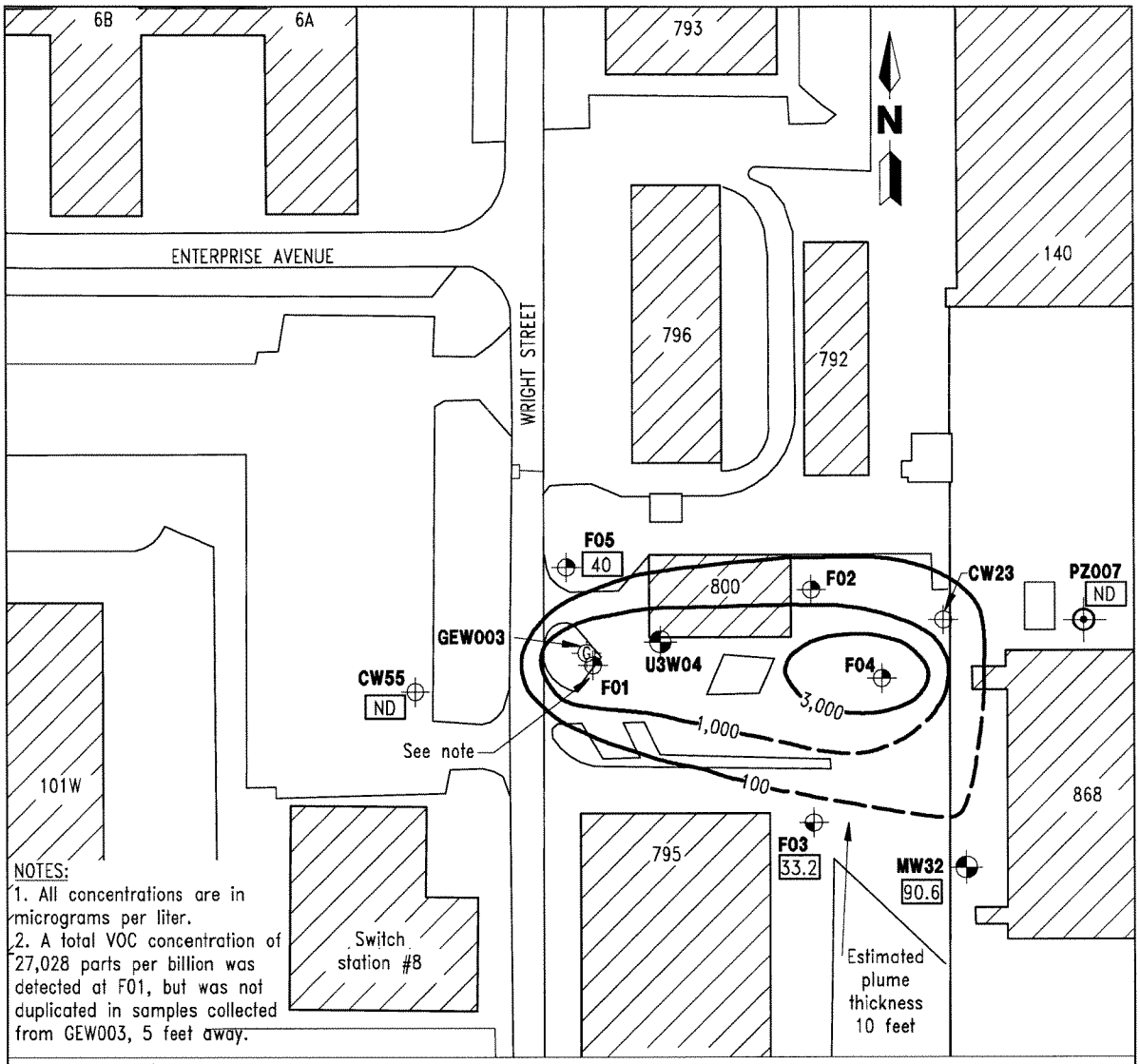
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA



NOTES:
1. All concentrations are in micrograms per liter.
2. A total VOC concentration of 27,028 parts per billion was detected at F01, but was not duplicated in samples collected from GEW003, 5 feet away.

LEGEND

- **PZ007** — Piezometer location and designation (installed during the SSFP in 1993)
- **CW23** — Cone penetrometer test sample location and designation (conducted during the SSFP in 1993)
- **F01** — Hydrocone sample location and designation
- **F03** — Piezocone and hydrocone location and designation
- **MW32** — Monitoring well location and designation
- **U3W04** — Temporary monitoring well location (ABB Environmental Services, Inc. 1992)
- **GEW003** — Groundwater extraction well location and designation
- 100 — Total chlorinated solvent contour in groundwater (dashed where inferred)
- Building
- 90.6 — Total chlorinated solvent concentration in shallow zone of the surficial aquifer
- ND — Not detected
- SSFP — Scoping study field program
- VOC — Volatile organic compound

0 50 100
SCALE: 1 INCH = 100 FEET

FIGURE 4-12
CONTAMINATION CONTOURS
AREA F - P-615 AREA

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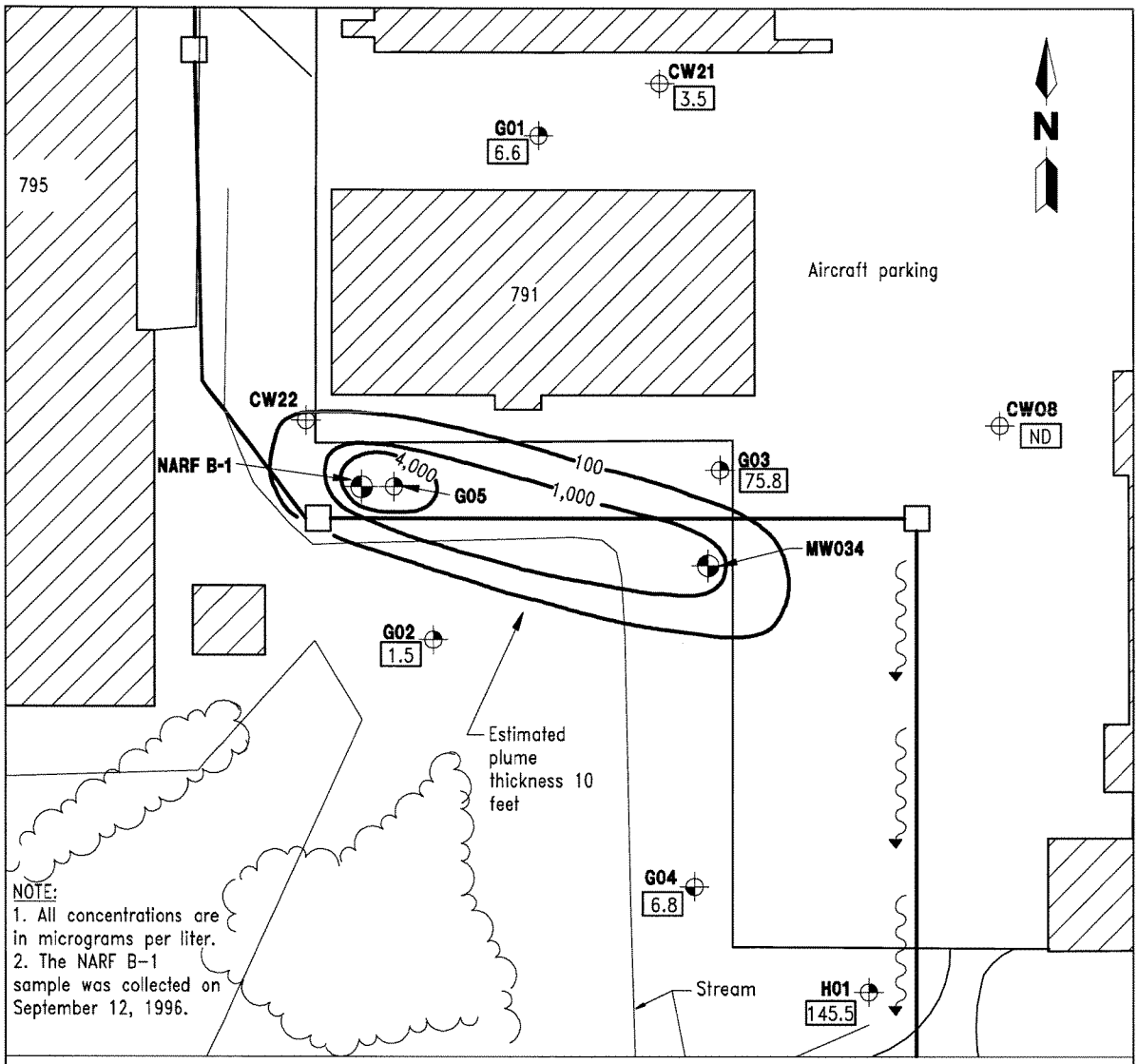
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA



LEGEND

CW22	Cone penetrometer test sample location and designation (conducted during the SSFP in 1993)
G03	Hydrocone sample location and designation
G04	Piezocone and hydrocone location and designation
NARF B-1	Monitoring well location and designation (installed by Geraghty & Miller)
MW034	Monitoring well location and designation
	Storm sewer line (consists of 2 60-inch diameter pipes)
	Potential groundwater pathway
100	Total chlorinated solvent contour in groundwater
SSFP	Scoping study field program
PSC	Potential source of contamination
NARF	Naval Air Rework Facility
ND	Not detected
6.8	Total chlorinated solvent concentration in shallow zone of the surficial aquifer
	Manhole
	Tree line
	Building

0 50 100
SCALE: 1 INCH = 100 FEET

FIGURE 4-13
CONTAMINATION CONTOURS
AREA G - PSC 15

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REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

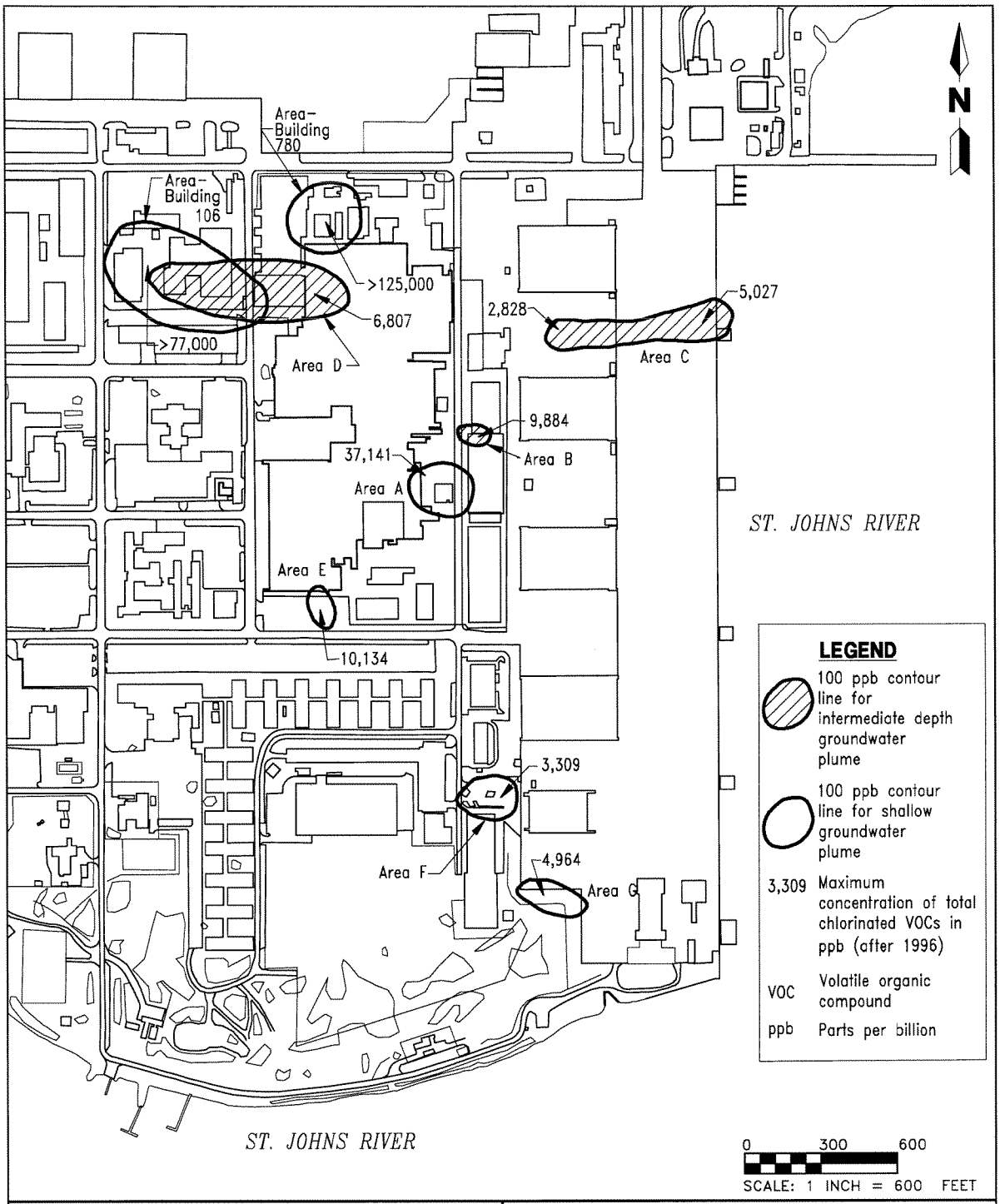

FIGURE 4-14
CHLORINATED VOC GROUNDWATER PLUME LOCATION AREAS

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REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

Table 4-10
Summary of Detections in Storm Sewer Water Samples
Target Compound List Volatile Organics

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Compound	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Maximum Detected Concentration
Volatile Organic Compounds (F g/ℓ)				
1,1,1-Trichloroethane	2/19	0.9 to 1	0.95	1
1,1-Dichloroethane	3/19	0.7 to 6.5	2.7	6.5
1,1-Dichloroethene	4/19	0.8 to 2	1.2	2
1,2-Dichlorobenzene	1/13	2.5 to 2.5	2.5	2.5
1,2-Dichloroethene (total)	13/19	1 to 98	13.3	98
Acetone	2/6	6 to 7	6.5	7
Bromodichloromethane	1/19	3 to 3	3	3
Chlorobenzene	1/19	1.2 to 1.2	1.2	1.2
Chloroform	5/19	1.3 to 8.5	3	8.5
Ethylbenzene	1/19	0.6 to 0.6	0.6	0.6
Methylene Chloride	7/19	0.7 to 8	3.1	8
Tetrachloroethene	3/19	0.7 to 3	1.6	3
Toluene	1/19	0.9* to 0.9*	0.9	0.9
Trichloroethene	8/19	1.5 to 170*	70.5	170
Vinyl chloride	7/19	0.9 to 13	3.4	13

[1] Frequency of detection is the number of storm sewer water samples in which the analyte was detected divided by the total number of samples analyzed. While Appendix C-1.2 lists 21 samples, two of these samples, U3ZMH202 and U3ZMH302, are resampling of U3ZMHZ01 and U3ZMH301, respectively. Only the newer data set was used for these two samples with the older data disregarded in the calculations. Acetone was reported only in the eight samples collected in January 1998. Because two of these samples were disregarded as noted above, the denominator for acetone is six.
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples in which the analyte was not detected.

Notes: F g/ℓ = micrograms per liter.
* = average of both sample and field duplicate.

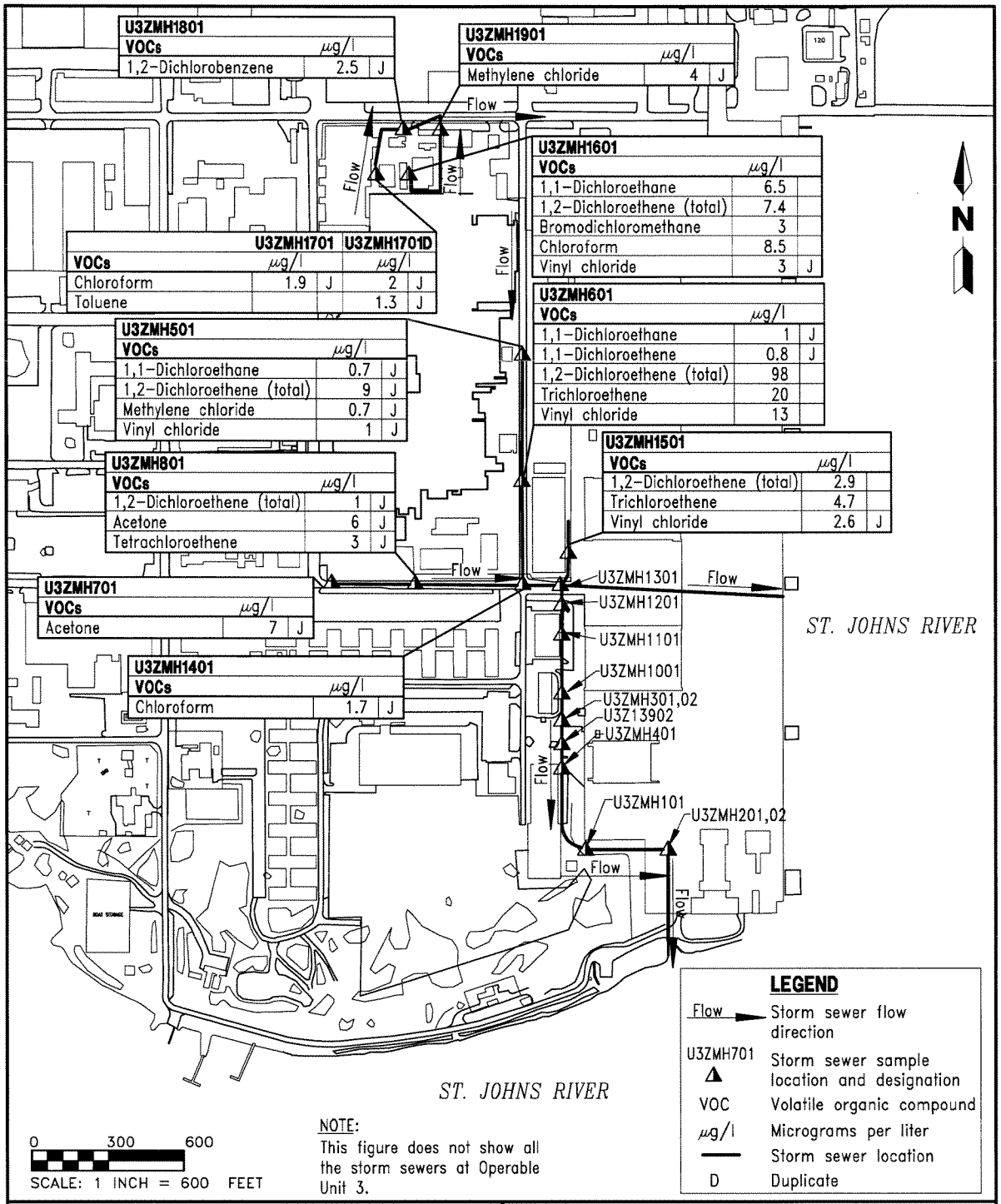

FIGURE 4-15A
ANALYTICAL DETECTIONS IN STORM SEWER SAMPLES

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

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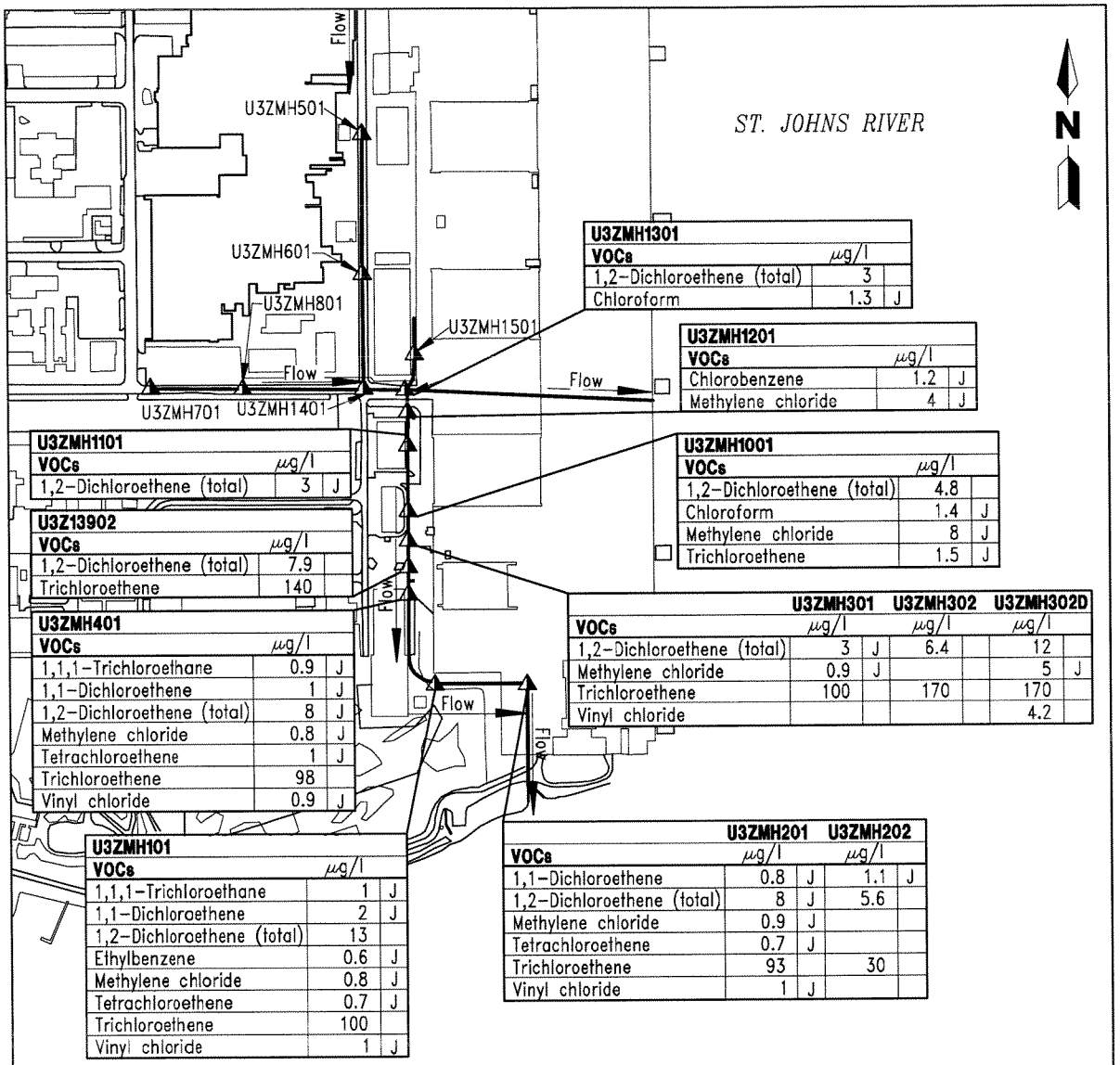

U3ZMH1301		
VOCs	µg/l	
1,2-Dichloroethene (total)	3	
Chloroform	1.3	J

U3ZMH1201		
VOCs	µg/l	
Chlorobenzene	1.2	J
Methylene chloride	4	J

U3ZMH1101		
VOCs	µg/l	
1,2-Dichloroethene (total)	3	J

U3ZMH1001		
VOCs	µg/l	
1,2-Dichloroethene (total)	4.8	
Chloroform	1.4	J
Methylene chloride	8	J
Trichloroethene	1.5	J

U3Z13902		
VOCs	µg/l	
1,2-Dichloroethene (total)	7.9	
Trichloroethene	140	

U3ZMH401		
VOCs	µg/l	
1,1,1-Trichloroethane	0.9	J
1,1-Dichloroethene	1	J
1,2-Dichloroethene (total)	8	J
Methylene chloride	0.8	J
Tetrachloroethene	1	J
Trichloroethene	98	
Vinyl chloride	0.9	J

	U3ZMH301		U3ZMH302		U3ZMH302D	
VOCs	µg/l		µg/l		µg/l	
1,2-Dichloroethene (total)	3	J	6.4		12	
Methylene chloride	0.9	J			5	J
Trichloroethene	100		170		170	
Vinyl chloride					4.2	

	U3ZMH201		U3ZMH202	
VOCs	µg/l		µg/l	
1,1-Dichloroethene	0.8	J	1.1	J
1,2-Dichloroethene (total)	8	J	5.6	
Methylene chloride	0.9	J		
Tetrachloroethene	0.7	J		
Trichloroethene	93		30	
Vinyl chloride	1	J		

U3ZMH101		
VOCs	µg/l	
1,1,1-Trichloroethane	1	J
1,1-Dichloroethene	2	J
1,2-Dichloroethene (total)	13	
Ethylbenzene	0.6	J
Methylene chloride	0.8	J
Tetrachloroethene	0.7	J
Trichloroethene	100	
Vinyl chloride	1	J

LEGEND

Flow →	Storm sewer flow direction
U3ZMH201 ▲	Storm sewer sampling location and designation
VOC	Volatile organic compound
µg/l	Micrograms per liter
—	Storm sewer location
D	Duplicate

0 300 600
SCALE: 1 INCH = 600 FEET

NOTE:
This figure does not show all the storm sewers at Operable Unit 3.

FIGURE 4-15B
ANALYTICAL DETECTIONS IN STORM SEWER SAMPLES

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

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Table 4-11
Summary of Sediment Sampling Results (Detections)
Obtained By Other Contractors

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Brown & Root Sampling Event (PSC 16) December, 1995 3 Samples[1]	Burns & McDonnell Sampling Event (Storm Sewers/PSC 16) May, 1996 2 Samples[2]	Bechtel Environmental Sampling Event (Storm Sewers/PSC 16) March, 1999 1 Sample[3]
Volatile Organic Compounds (µg/kg)			
Acetone	180, 220, 120		
2-Butanone	18		
n-Butylbenzene			1,100
s-Butylbenzene			580
Carbon disulfide	3		
Chloroethane	25		
1,4-Dichlorobenzene			1,200
1,2-Dichlorobenzene			320
1,3-Dichlorobenzene			900
1,2-Dichloroethene (total)	7	109, >10,000	
1,1-Dichloroethylene		27.8, >10,000	
Ethylbenzene	6	11.9, >10,000	
p-Isopropyltoluene			340
Methylene Chloride	3		
Tetrachloroethylene		56.1, >10,000	
Toluene	130, 7	108, >10,000	
1,1,1-Trichloroethane		1,050, >10,000	
Trichloroethylene		632, >10,000	
1,2,4-Trimethylbenzene			540
1,3,5-Trimethylbenzene			680
Vinyl chloride		70.2, >10,000	
Xylenes (total)	18		
Semivolatile Organic Compounds (F g/kg)			
alpha-Chlordane	24, 16, 2.1		
Benzo(a)anthracene	400		
Benzo(a)pyrene	300		
Benzo(b)fluoranthene	500		
Benzo(k)fluoranthene	200		

See notes at end of table.

Table 4-11 (Continued)
Summary of Sediment Sampling Results (Detections)
Obtained By Other Contractors

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Brown & Root Sampling Event (PSC 16) December, 1995 3 Samples[1]	Burns & McDonnell Sampling Event (Storm Sewers/PSC 16) May, 1996 2 Samples[2]	Bechtel Environmental Sampling Event (Storm Sewers/PSC 16) March, 1999 1 Sample[3]
Semivolatile Organic Compounds (F g/kg) (Continued)			
bis(2-Ethylhexyl)phthalate	800, 1,200, 400		
Butyl-benzyl-phthalate		37, 400	
Chrysene	400		
4,4'-DDE	10		
Di-n-butylphthalate	5,000		
Fluoranthene	900, 200		
gamma-Chlordane	5.3, 2.7		
Heptachlor epoxide	7.3		
Indeno(1,2,3-cd)pyrene	200		
Phenanthrene	700	1,110	
Pyrene	800, 190	1,380	
Diesel Range Organics (C10-C24) (mg/kg)			11,000
Inorganic Analytes (mg/kg)			
Aluminum	755, 1,660, 806		
Antimony	5.6, 1.9		
Arsenic	1		4.0
Barium	9.9, 10.3, 3.9		490
Beryllium	0.59, 0.6		
Cadmium	3.2	2.23, 2.11	69
Calcium	13,400, 14,200, 4,810		
Chromium	12.6, 29.2, 11.4	20.6, 40.8	410
Cobalt	2.4		
Copper	7.8, 11.2, 5.4	36.5, 21.4	
Iron	1,230, 2,020, 1,610		
Lead	38.2, 53.2, 20.5	238, 140	2,500
Magnesium	339, 960, 330		
Manganese	17.1, 53.5, 14.1		
Mercury	0.11, 0.16		2.8
Nickel	14.2	21.7, 16.6	
Potassium	69.4, 25.7		

See notes at end of table.

Table 4-11 (Continued)
Summary of Sediment Sampling Results (Detections)
Obtained By Other Contractors

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte/Compound	Brown & Root Sampling Event (PSC 16) December, 1995 3 Samples[1]	Burns & McDonnell Sampling Event (Storm Sewers/PSC 16) May, 1996 2 Samples[2]	Bechtel Environmental Sampling Event (Storm Sewers/PSC 16) March, 1999 1 Sample[3]
Inorganic Analytes (mg/kg)			
Selenium	0.33		
Silver			25
Vanadium	2.7, 5.9, 3.3		
Zinc	47.2, 54.7, 26.6	57.7, 88.2	

[1] Samples collected from the St. Johns River at distances of 10, 50 and 100 feet from the outfall at PSC 16.
[2] Samples taken from the sediment cleaned out of the 300-ft segment of storm sewer immediately upgradient from the outfall at PSC 16 prior to installation of the Cured-in-Place Pipe.
[3] Sample taken from sediment removed from segment of storm sewer from MH10 (just north of Area F) to MH1 (at Area G) prior to a video survey of the sewer.

Notes: PSC = potential source of contamination.
Fg/kg = micrograms per kilogram.
> = greater than.
DDE = dichlorodiphenyldichloroethene.
mg/kg = milligrams per kilogram.

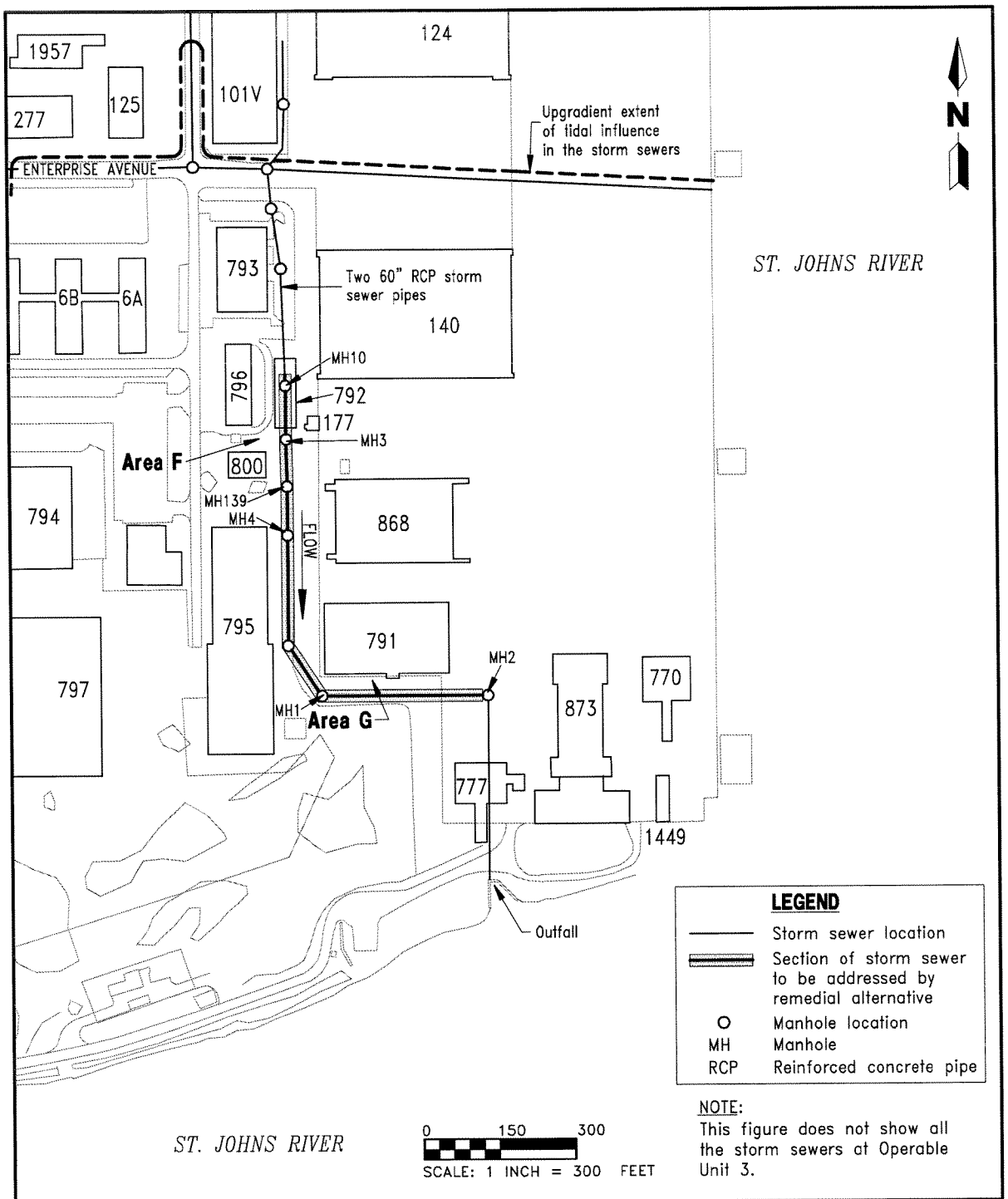

FIGURE 10-1
PORTION OF STORM SEWERS TO BE ADDRESSED BY REMEDIAL ALTERNATIVE

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REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
OPERABLE UNIT 3

NAVAL AIR STATION JACKSONVILLE
JACKSONVILLE, FLORIDA

receptor exposure to ECPCs in surface water at the site (refer to Paragraph 7.1.6.2).

No RAOs will be established for surface water at OU 3 because no risks were predicted for human or ecological receptors based on exposure to this medium.

9.2.3 RAOs for Storm Sewer Water Several water samples were collected from the storm sewers at OU 3 during two different sampling events conducted for the RI. These data were summarized and discussed in Chapters 4.0 and 5.0 of this report.

Chemical-specific ARARs for the storm sewer water were considered to be the same as those identified for surface water, which are the FSWSs for Class III fresh waters. This is because the storm sewers discharge to the St. Johns River, where surface water standards will need to be achieved. A comparison of the storm sewer data to the surface water standards was completed, and the concentration of one organic chemical, TCE, exceeded its respective standard (Table 9-3). TCE was detected in samples collected from the storm sewer in the vicinity of groundwater hot spot Areas F and G (see Figure 4-15B).

Table 9-3
Summary of Exceedances of ARARs/TBCs for Storm Sewer Water

Remedial Investigation and Feasibility Study
Operable Unit 3
Naval Air Station Jacksonville
Jacksonville, Florida

Analyte	Frequency of Detection[1]	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Maximum Detected Concentration	Florida Surface Water Standard[3]
Volatile Organic Compounds (µg/ℓ)					
Trichloroethene	8/19	1.5 to 170	70.5	170	80.7

[1] Frequency of detection is the number of confirmatory samples in which the analyte was detected versus the total number of confirmatory samples analyzed.
[2] The mean of detected concentrations is the arithmetic mean of all confirmatory samples in which the analyte was detected. It does not include those confirmatory samples in which the analyte was not detected.
[3] Values are for Class III Fresh water, at average annual flow conditions (Section 200, Chapter 62-302, Florida Administrative Code).

Notes: ARAR = applicable or relevant and appropriate requirement.
TBC = to be considered.
Fg/ℓ = micrograms per liter.

An HHRA was completed for human exposure to storm sewer water. The exposure scenario evaluated for this assessment included limited dermal contact for a utility worker (i.e., someone repairing or performing maintenance activities in the sewer line). The ELCR predicted for this exposure scenario was estimated to be $3x10^{-7}$, which is less than the USEPA target risk range of $1x10^{-4}$ to $1x10^{-6}$, and less than the FDEP target risk level of $1x10^{-6}$. The noncancer HI predicted for the same exposure scenario was less than 1, which is acceptable to the USEPA and FDEP.

An ERA was not conducted for ecological exposure to storm sewer water at OU 3. This is because a viable exposure pathway for ecological receptors was not identified, in that the storm sewers are located underground (beneath thick pavement and buildings) thereby severely limiting routes of exposure for ecological receptors to storm sewer water.

APPENDIX D

OU 5 HISTORICAL TABLES FROM AEROSTAR, 2009A

TABLE 4: SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Site Name: PSC 51, Naval Air Station Jacksonville

			Sample ID	PSC51-DPT-03						PSC51-DPT-04					
			Date Collected	10/28/04	4/29/05	4/28/06	5/1/07	5/5/08	**4/29/09**	10/28/04	4/29/05	4/28/06	5/1/07	5/6/08	**4/29/09**
Parameter	**FDEP GCTLs**	**USEPA MCLs**	**Units**												
Volatile Organic Compounds															
1,1,2,2-Tetrachloroethane	**1.3**	**NL**	µg/L	<0.2	<0.2	<0.2	<0.2	<0.14	<0.23	<0.2	<0.2	<0.2	<0.2	<0.14	<0.04
1,1-DCE	**7**	**7.0**	77.6	2.34	8.03	170.7	<0.2	<0.36	<0.5	<0.3	<1	<0.2	0.5 i	<0.36	0.55 i
1,2-Dichloroethane	**3**	**110**	µg/L	<0.2	<1	<0.2	<0.1	<0.19	<0.34	<0.2	<1	<0.2	<0.1	<0.19	<0.34
2-Butanone (MEK)	**4200**	**NL**	µg/L	<2.0	<20	NS	NS	NS	NS	<2.0	<20	NS	NS	NS	NS
Acetone	**6300**	**NL**	µg/L	<2.0	<50	NS	NS	NS	NS	<2.0	<50	NS	NS	NS	NS
Benzene	**1**	**5**	µg/L	<0.2	<1	<0.2	<0.2	<0.23	<0.35	0.7 i	<1	0.7 i	**66.3**	**1.3**	**42**
Bromodichloromethane	**91**	**100**	µg/L	<0.2	<0.6	<0.2	<0.2	<0.29	<0.31	<0.2	<0.6	<0.2	<0.2	<0.29	<0.31
Carbon Disulfide	**700**	**NL**	µg/L	<0.9	<50	NS	NS	NS	NS	<0.9	<50	NS	NS	NS	NS
Chloroform	**70**	**100**	µg/L	<0.2	<1	<0.2	<0.2	<0.34	<0.37	<0.2	<1	<0.2	<0.2	<0.34	<0.37
Chloromethane	**2.7**	**NL**	µg/L	<0.3	<1	<0.3	<0.3	<0.36	<0.53	<0.3	<1	<0.3	<0.3	<0.36	<0.53
cis-1,2-DCE	**70**	**70**	µg/L	<0.1	<1	<0.2	<0.2	<0.45	<0.41	2.2	2	3	18.3	3.8	20
Ethylbenzene	**30**	**700**	µg/L	<0.3	<1	<0.3	<0.3	<0.34	<0.43	<0.3	<1	<0.3	3.1	<0.34	1.7
Methylene Chloride	**5**	**NL**	µg/L	<0.1	<5	<2.0	<2.0	<0.65	<0.41	<0.1	<5	<2.0	<2.0	<0.65	<0.41
Toluene	**40**	**1000**	µg/L	<0.2	<1	<0.2	<0.2	<0.28	<0.43	<0.2	<1	<0.2	1.2	<0.28	0.53 i
trans-1,2-DCE	**100**	**100**	µg/L	<0.2	<1	<0.2	<0.2	<0.41	<0.47	<0.2	<1	<0.2	<0.2	<0.41	<0.47
Trichloroethene (TCE)	**3**	**5**	µg/L	<0.3	<1	<0.3	<0.3	<0.26	<0.39	<0.3	<1	<0.3	0.8 i	<0.26	<0.39
Vinyl Chloride	**1**	**2**	µg/L	<0.4	<1	<0.4	<0.4	<0.52	<0.48	<0.4	<1	0.4 i	**18.2**	0.84 i	**4.6**
Xylenes (Total)	**20**	**10,000**	µg/L	<0.5	<3	<0.5	<0.3	<0.38	<0.85	<0.5	<3	<0.5	4.9	<0.38	<0.85
1,3,5-Trimethylbenzene	**10**	**NL**	µg/L	<0.2	<1	NS	NS	NS	NS	<0.2	<1	NS	NS	NS	NS
1,2,4-Trimethylbenzene	**10**	**NL**	µg/L	<0.2	<1	NS	NS	NS	NS	<0.2	<1	NS	NS	NS	NS
Polynuclear Aromatic Hydrocarbons															
1-Methylnaphthalene	**28**	**NL**	µg/L	<0.05	<0.5	<0.02	<0.02	<0.02	<0.01	<0.05	<0.5	<0.02	0.28	<0.02	0.08 i
2-Methylnaphthalene	**28**	**NL**	µg/L	<0.05	<0.5	<0.02	<0.02	<0.03	<0.02	<0.05	<0.5	<0.02	0.41	<0.03	0.14
Acenaphthene	**20**	**NL**	µg/L	NS	NS	NS	<0.02	<0.02	<0.02	NS	NS	NS	0.08 i	<0.02	<0.02
Fluorene	**280**	**NL**	µg/L	NS	NS	NS	<0.02	<0.02	<0.01	NS	NS	NS	0.14	<0.02	<0.01
Naphthalene	**14**	**NL**	µg/L	<0.06	<0.5	<0.02	0.05 i	0.06 i	0.08 i	<0.06	<0.5	<0.02	1.38	0.04 i	0.68
Natural Attenuation Parameters															
Ammonia - N	**2.8**	**NL**	mg/L	<2.0	<0.020	0.02	<0.003	0.015 i	<0.01	<2.0	<0.020	<0.003	0.032	0.028	0.014 i
Chloride, Total	**250**	**NL**	mg/L	7.1	6.2	4.34	4.6	6.2	6.8	11	10.7	8.48	8.9	10	10
Nitrate- N	**10**	**10000**	mg/L	0.04	<0.10	0.03	0.094	0.36 i	<0.5 i	0.02	<0.10	0.06	0.36	<0.004	0.4 i
Nitrite- N	**1**	**1000**	mg/L	<1.0	<0.10	<0.05	<0.05	<0.002	<0.012	<1.0	<0.10	<0.05	<0.05	<0.002	<0.012
Nitrogen, Total	**NL**	**NL**	mg/L	0.1	0.27	NS	NS	NS	NS	0.22	0.27	NS	NS	NS	NS
Nitrate-Nitrite-N	**10**	**NL**	mg/L	0.04 i	<0.10	0.03	0.094	NS	NS	0.02 i	<0.10	0.06	0.36	NS	NS
Phosphorous, Total	**NL**	**NL**	mg/L	<2.0	<0.030	<0.02	<0.02	NS	NS	<2.0	<0.030	0.04	0.17	NS	NS
Sulfate, Total	**250**	**NL**	mg/L	<1.0	6.1	5.98	3.7	5.7	6.3	3 i	8.7	7.28	6.4	8.2	8.1
Total Kjeldahl-N	**NL**	**NL**	mg/L	0.06	0.18	NS	<0.04	NS	NS	0.2	0.20	NS	0.69	NS	NS
Total Organic Carbon	**NL**	**NL**	mg/L	2 V	6.8	4	1.4	2.1	0.5 i	5 V	17.8	5	12	1.9	5.8
Methane	**NL**	**NL**	mg/L	0.002	0.0011	0.001	0.002	0.0006 i	0.0006 i	0.08	0.069	0.05	2.12 d	0.176	0.058
Ethene	**NL**	**NL**	mg/L	<0.0003	<0.001	<0.0003	<0.0003	<0.001	<0.0004	<0.0003	<0.001	<0.0003	<0.0003	<0.001	<0.0004
Ethane	**NL**	**NL**	mg/L	<0.0002	<0.001	<0.0002	<0.0002	<0.0009	<0.0004	<0.0002	<0.001	<0.0002	<0.0002	<0.0009	<0.0004
Metals															
Iron	**0.3**	**NL**	mg/L	<0.02	<0.10	NS	NS	NS	NS	**1.8**	**1.4**	NS	NS	NS	NS
Manganese (Filtered)	**0.05**	**NL**	mg/L	NS	NS	NS	NS	0.0017 i	**1.45 i**	NS	NS	NS	NS	0.00802 i	**10.5**
Manganese	**0.050**	**NL**	mg/L	0.0011 i	<0.050	0.0014	0.0016 i	0.00219 i	**1.46 i**	0.0082	<0.050	0.0066 i	0.0178	0.00819 i	**12.1**

V - analyte detected in method blank
NL - not listed
NS - not sampled
ug/L - micrograms per liter
mg/L - milligrams per liter
MCL - maximum contaminant level

GCTL - Groundwater Cleanup Target Level
USEPA - United States Environmental Protection Agency
BOLD values exceed regulatory criteria
i - value between method detection limit and (MDL) and method quantitation level (MQL)
d - data derived from a dilution

TABLE 4: SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Site Name: PSC 51, Naval Air Station Jacksonville

			Sample ID	PSC51-MW-04						PSC51-MW-06					
			Date Collected	10/28/04	4/29/05	4/28/06	5/1/07	5/6/08	**4/29/09**	10/28/05	4/29/06	4/28/06	5/1/07	5/5/08	**4/29/09**
Parameter	**FDEP GCTLs**	**USEPA MCLs**	**Units**												
Volatile Organic Compounds															
1,1,2,2-Tetrachloroethane	**1.3**	**NL**	µg/L	<0.2	<0.2	<0.2	<0.2	<0.14	<0.23	<0.2	<0.2	<0.2	<0.2	<0.28	<0.23
1,1-DCE	**7**	**7.0**	µg/L	1.1	<1	0.9 i	0.9 i	0.55 i	0.52 i	0.7 i	<1	2.3	0.9 i	1 i	<0.5
1,2-Dichloroethane	**3**	**5**	µg/L	0.4 i	<1	0.5 i	<0.1	<0.19	<0.34	0.3 i	<1	1.0	<0.1	0.8 i	<0.34
2-Butanone (MEK)	**4200**	**NL**	µg/L	<2.0	<20	NS	NS	NS	NS	<2.0	<20	NS	NS	NS	NS
Acetone	**6300**	**NL**	µg/L	<2.0	<50	NS	NS	NS	NS	4 i	<50	NS	NS	NS	NS
Benzene	**1**	**5**	µg/L	**73**	**38**	**52.1**	**58.6**	**36**	**30**	**52**	**31**	**176**	**84.4**	**140**	**61**
Bromodichloromethane	**91**	**100**	µg/L	<0.2	<0.6	<0.2	<0.2	<0.29	<0.31	<0.2	<0.6	<0.2	<0.2	<0.58	<0.31
Carbon Disulfide	**700**	**NL**	µg/L	<0.9	<50	NS	NS	NS	NS	<0.9	<50	NS	NS	NS	NS
Chloroform	**70**	**100**	µg/L	0.2 i	<1	<0.2	<0.2	<0.34	<0.37	<0.2	<1	0.8 i	0.2 i	<0.68	<0.37
Chloromethane	**2.7**	**NL**	µg/L	<0.3	<1	<0.3	<0.3	<0.36	<0.53	<0.3	<1	<0.3	<0.3	<0.72	<0.53
cis-1,2-DCE	**70**	**70**	µg/L	34	13	25	23.6	15	17	24	11	**79.5**	31.7	53	26
Ethylbenzene	**30**	**700**	µg/L	4.2	2	2.9	1	0.48 i	0.53 i	7.5	4	21.8	6.4	14	6.3
Methylene Chloride	**5**	**NL**	µg/L	<0.1	<5	<2.0	<2.0	<0.65	<0.41	<0.1	<5	<0.2	<2.0	<1.3	<0.41
Toluene	**40**	**1000**	µg/L	0.4 i	<1	0.5 i	0.4 i	<0.28	<0.43	1.5	2	5.8	2.5	6.1	4.4
trans-1,2-DCE	**100**	**100**	µg/L	0.2 i	<1	0.2 i	<0.2	<0.41	<0.47	0.2 i	<1	0.5 i	<0.2	<0.82	<0.47
Trichloroethene (TCE)	**3**	**5**	µg/L	**18**	**16**	**23.6**	**22.6**	**20**	**14**	1.1	<1	**4.6**	1.4	2.9	2.3
Vinyl Chloride	**1**	**2**	µg/L	0.8 i	**2**	**2.8**	**4**	**2.2**	**2.2**	**3.6**	**2**	**9.2**	**6**	**6**	**2.6**
Xylenes (Total)	**20**	**10,000**	µg/L	3.6	<3	5.1	0.8 i	0.48 i	<0.85	**21.7**	9	**104.4**	**23.5**	**92**	**21**
1,3,5-Trimethylbenzene	**10**	**NL**	µg/L	0.4 i	<1	NS	NS	NS	NS	1.5	<1	NS	NS	NS	NS
1,2,4-Trimethylbenzene	**10**	**NL**	µg/L	1.4	<1	NS	NS	NS	NS	3.4	1	NS	NS	NS	NS
Polynuclear Aromatic Hydrocarbons															
1-Methylnaphthalene	**28**	**NL**	µg/L	0.51	<0.5	0.22	0.05 i	0.06 i	0.06 i	1.2	<0.5	2.72	0.72	2.2	0.12
2-Methylnaphthalene	**28**	**NL**	µg/L	1.3	<0.5	0.7	0.15	0.14	0.19	0.86	<0.5	2.19	0.69	0.61	0.09 i
Acenaphthene	**20**	**NL**	µg/L	NS	NS	NS	0.05	<0.02	<0.02	NS	NS	NS	0.05 i	0.06 i	<0.02
Fluorene	**280**	**NL**	µg/L	NS	NS	NS	0.15	0.05 i	0.04 i	NS	NS	NS	0.23	0.22	0.03 i
Naphthalene	**14**	**NL**	µg/L	2.9	0.8	2.01	0.54	0.39	0.69	3	1	8.46	3.1	4.6	0.45
Natural Attenuation Parameters															
Ammonia - N	**2.8**	**NL**	mg/L	<0.002	<0.020	0.02	0.006 i	0.044	<0.01	<0.002	<0.020	0.006 i	0.034	0.025	<0.01
Chloride, Total	**250**	**NL**	mg/L	14	15	10.2	10	12	12	20	16.8	20	19	21	13
Nitrate- N	**10**	**10000**	mg/L	0.02	<0.10	0.08	0.09	<0.004	<0.02	0.02	<0.10	0.02 i	0.088	<0.004	<0.02
Nitrite- N	**1**	**1000**	mg/L	<0.01	<0.10	<0.05	<0.05	<0.002	<0.012	<0.01	<0.10	<0.05	<0.05	<0.002	<0.012
Nitrogen, Total	**NL**	**NL**	mg/L	0.39	0.32	NS	NS	NS	NS	0.58	1.4	NS	NS	NS	NS
Nitrate-Nitrite-N	**10**	**NL**	mg/L	0.02 i	<0.10	0.08	0.09	NS	NS	0.02 i	<0.10	0.02 i	0.088	NS	NS
Phosphorous, Total	**NL**	**NL**	mg/L	0.02 i	<0.30	<0.02	<0.02	NS	NS	0.05	0.18	0.04	0.042	NS	NS
Sulfate, Total	**250**	**NL**	mg/L	8	12.7	7.12	8.1	9.5	9.9	9	11.2	6.88	12	11	9.4
Total Kjeldahl-N	**NL**	**NL**	mg/L	0.37	0.32	NS	0.18	NS	NS	0.56	1.4	NS	0.87	NS	NS
Total Organic Carbon	**NL**	**NL**	mg/L	9	14.6	17	7.6	7.6	5.9	15 V	21.3	44	14	17	10
Methane	**NL**	**NL**	mg/L	1.2 D1	0.86	0.8 d	1.36 d	1.03	0.228	1.3 D1	0.88	3.42 d	1.45 d	1.24	0.429
Ethene	**NL**	**NL**	mg/L	<0.0003	<0.01	<0.0003	<0.0003	<0.001	<0.0004	<0.0003	<0.001	0.001 i	<0.0003	<0.001	<0.0004
Ethane	**NL**	**NL**	mg/L	<0.002	<0.01	<0.0002	<0.0002	<0.0009	<0.0004	<0.0002	<0.001	0.002	<0.0002	0.001 i	<0.0004
Metals															
Iron	**0.3**	**NL**	mg/L	1.2	**0.33**	NS	NS	NS	NS	0.93	**0.84**	NS	NS	NS	NS
Manganese (Filtered)	**0.05**	**NL**	mg/L	NS	NS	NS	NS	0.0122	**9.97 i**	NS	NS	NS	NS	0.012	**6.92 i**
Manganese	**0.050**	**NL**	mg/L	0.034	<0.050	0.0085 i	0.0085 i	0.0121	**10**	0.022	<0.050	0.0206	0.0199	0.0148	**7.18 i**

V - analyte detected in method blank
NL - not listed
NS - not sampled
ug/L - micrograms per liter
mg/L - milligrams per liter
MCL - maximum contaminant level

GCTL - Groundwater Cleanup Target Level
USEPA - United States Environmental Protection Agency
BOLD values exceed regulatory criteria
i - value between method detection limit and (MDL) and method quantitation level (MQL)
d - data derived from a dilution

TABLE 4: SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Site Name: PSC 51, Naval Air Station Jacksonville

			Sample ID	PSC51-MW-08S						PSC51-MW-10D					
			Date Collected	10/28/04	4/28/05	4/28/06	5/1/07	5/6/08	**4/29/09**	10/28/04	4/28/05	4/28/06	5/1/07	5/6/08	**4/29/09**
Parameter	**FDEP GCTLs**	**USEPA MCLs**	**Units**												
Volatile Organic Compounds															
1,1,2,2-Tetrachloroethane	**1.3**	**NL**	µg/L	<0.2	<0.2	<0.2	<0.2	<0.14	<0.23	<0.2	<0.2	<0.2	<0.2	<0.14	<0.23
1,1-DCE	**7**	**7.0**	µg/L	0.5 i	<1	0.4 i	<0.2	<0.36	<0.5	<0.3	<1	<0.2	<0.2	<0.36	
1,2-Dichloroethane	**3**	**5**	µg/L	0.4 i	<1	<0.1	<0.1	<0.19	<0.34	<0.2	<1	<0.1	<0.1	<0.19	<0.34
2-Butanone (MEK)	**4200**	**NL**	µg/L	<2.0	<20	NS	NS	NS	NS	<2.0	<20	NS	NS	NS	NS
Acetone	**6300**	**NL**	µg/L	<2.0	<50	NS	NS	NS	NS	<2.0	<50	NS	NS	NS	NS
Benzene	**1**	**5**	µg/L	**9.6**	**7**	**4.4**	**1.4**	**2.3**	**2.8**	0.9 i	<1	<0.2	0.4 i	<0.23	<0.35
Bromodichloromethane	**91**	**100**	µg/L	<0.2	<0.6	<0.2	<0.2	<0.29	<0.31	<0.2	<0.6	<0.2	<0.2	<0.29	<0.31
Carbon Disulfide	**700**	**NL**	µg/L	<0.9	<50	NS	NS	NS	NS	<0.9	<50	NS	NS	NS	NS
Chloroform	**70**	**100**	µg/L	<0.2	<1	<0.2	<0.2	<0.34	<0.37	<0.2	<1	<0.2	<0.2	<0.34	<0.37
Chloromethane	**2.7**	**NL**	µg/L	<0.3	<1	<0.3	<0.3	<0.36	<0.53	<0.3	<1	<0.3	<0.3	<0.36	<0.53
cis-1,2-DCE	**70**	**70**	µg/L	6.6	5	5.3	3.2	3.7	5.8	0.2 i	<1	<0.2	<0.2	<0.45	<0.41
Ethylbenzene	**30**	**700**	µg/L	<0.3	<1	<0.3	<0.3	<0.34	<0.43	<0.3	<1	<0.3	<0.3	<0.34	<0.43
Methylene Chloride	**5**	**NL**	µg/L	<0.1	<5	<2.0	<2.0	<0.65	<0.41	<0.1	<5	<0.2	<2.0	<0.65	<0.41
Toluene	**40**	**1000**	µg/L	<0.2	<1	<0.2	0.5 i	<0.28	<0.43	<0.2	<1	<0.2	1 i	<0.28	<0.43
trans-1,2-DCE	**100**	**100**	µg/L	<0.2	<1	<0.2	<0.2	<0.41	<0.47	<0.2	<1	<0.2	<0.2	<0.41	<0.47
Trichloroethene (TCE)	**3**	**5**	µg/L	1.7	2	1.7	0.8 i	1	1.2	<0.3	<1	<0.3	<0.3	<0.26	<0.39
Vinyl Chloride	**1**	**2**	µg/L	**3.1**	**3**	**4.8**	**3.3**	**2.2**	**2.4**	<0.4	<1	<0.4	<0.4	0.52	<0.48
Xylenes (Total)	**20**	**10,000**	µg/L	<0.5	<3	<0.5	0.6 i	<0.38	<0.85	<0.5	<3	<0.5	0.7 i	<0.38	<0.85
1,3,5-Trimethylbenzene	**10**	**NL**	µg/L	<0.2	<1	NS	NS	NS	NS	<0.2	<1	NS	NS	NS	NS
1,2,4-Trimethylbenzene	**10**	**NL**	µg/L	<0.2	<1	NS	NS	NS	NS	<0.2	<1	NS	NS	NS	NS
Polynuclear Aromatic Hydrocarbons															
1-Methylnaphthalene	**28**	**NL**	µg/L	<0.05	<0.5	<0.2	<0.02	<0.02	<0.01	<0.05	<0.5	<0.2	<0.02	0.03 i	<0.01
2-Methylnaphthalene	**28**	**NL**	µg/L	<0.05	<0.5	<0.2	<0.02	<0.03	<0.02	<0.05	<0.5	<0.2	<0.02	0.06 i	<0.02
Acenaphthene	**20**	**NL**	µg/L	NS	NS	NS	<0.02	<0.02	<0.02	NS	NS	NS	<0.02	0.03 i	<0.02
Fluorene	**280**	**NL**	µg/L	NS	NS	NS	<0.02	<0.02	<0.01	NS	NS	NS	<0.02	<0.02	<0.01
Naphthalene	**14**	**NL**	µg/L	<0.06	<0.5	0.12	0.05 i	0.07 i	0.04 i	<0.06	<0.5	0.18	0.1	0.07 i	0.07 i
Natural Attenuation Parameters															
Ammonia - N	**2.8**	**NL**	mg/L	<0.02	<0.020	0.007 i	0.037	0.026	0.022	0.02	<0.020	<0.003	0.062	0.011 i	<0.01
Chloride, Total	**250**	**NL**	mg/L	12	10.4	8.83	6.9	9.2	9.3	21	20.1	15.4	14	17	16
Nitrate- N	**10**	**10000**	mg/L	0.02	<0.10	0.02 i	0.1	<0.004	0.4 i	0.05	0.22	0.1	0.12	0.21 i	0.45 i
Nitrite- N	**1**	**1000**	mg/L	<0.01	<0.10	<0.05	<0.05	<0.002	<0.012	0.09	<0.10	<0.05	<0.05	<0.002	<0.012
Nitrogen, Total	**NL**	**NL**	mg/L	0.18	<0.10	NS	NS	NS	NS	0.44	0.42	NS	NS	NS	NS
Nitrate-Nitrite-N	**10**	**NL**	mg/L	0.02 i	<0.10	0.02 i	0.1	NS	NS	0.14	0.22	0.1	0.12	NS	NS
Phosphorous, Total	**NL**	**NL**	mg/L	0.02 i	0.48	0.02 i	0.026 i	NS	NS	<0.02	<0.030	<0.02	0.063	NS	NS
Sulfate, Total	**250**	**NL**	mg/L	3 i	8.2	7.12	5.7	8.4	9.9	<1.0	2.9	2.24	0.82 i	1.8 i	3 i
Total Kjeldahl-N	**NL**	**NL**	mg/L	0.16	<0.050	NS	0.12	NS	NS	0.3	0.20	NS	0.15	NS	NS
Total Organic Carbon	**NL**	**NL**	mg/L	5 V	10.6	4	2.9	2.3	14	4 V	11.6	5	4.1	2.3	2.7
Methane	**NL**	**NL**	mg/L	0.16	0.074	0.054	0.063	0.119	0.027	0.03	0.0018	0.008	0.252	0.001	0.035
Ethene	**NL**	**NL**	mg/L	<0.0003	<0.001	<0.0003	<0.0003	<0.001	<0.0004	0.003	<0.001	<0.0003	<0.0003	<0.001	<0.0004
Ethane	**NL**	**NL**	mg/L	<0.0002	<0.001	<0.0002	<0.0002	<0.0009	<0.0004	<0.0002	<0.001	<0.0002	<0.0002	<0.0009	<0.0004
Metals															
Iron	**0.3**	**NL**	mg/L	**1.6**	**1.8**	NS	NS	NS	NS	0.02	<0.10	NS	NS	NS	NS
Manganese (Filtered)	**0.05**	**NL**	mg/L	NS	NS	NS	NS	0.00651 i	**7.2 i**	NS	NS	NS	NS	<0.00018	**<0.54**
Manganese	**0.050**	**NL**	mg/L	0.0063	<0.050	0.0078 i	0.0164	0.0069 i	**7.09 i**	0.0002	<0.050	0.0014	0.0126	<0.00018	**<0.54**

V - analyte detected in method blank
NL - not listed
NS - not sampled
ug/L - micrograms per liter
mg/L - milligrams per liter
MCL - maximum contaminant level

GCTL - Groundwater Cleanup Target Level
USEPA - United States Environmental Protection Agency
BOLD values exceed regulatory criteria
i - value between method detection limit and (MDL) and method quantitation level (MQL)
d - data derived from a dilution

TABLE 2: SUMMARY OF SURFACE WATER ANALYTICAL RESULTS

Site Name: PSC 51, Naval Air Station Jacksonville

Sample ID				PSC51-SW-01						PSC51-SW-02						PSC51-SW-03					
Date Collected				10/28/04	4/28/05	4/28/06	5/1/07	5/5/08	4/29/09	10/28/04	4/28/05	4/28/06	5/1/07	5/5/08	4/29/09	10/28/04	4/28/05	4/28/06	5/1/07	5/5/08	4/29/09
Parameter	FDEP Target Levels	USEPA MCLs	Units																		
Volatile Organic Compounds																					
1,1,2,2-Tetrachloroethane	NL	NL	µg/L	<0.2	<0.2	NS	NS	NS	<0.23	<0.2	<0.2	<0.2	NS	NS	<0.23	<0.2	<0.2	<0.2	NS	<0.14	<0.23
1,1-DCE	7	7.0	µg/L	<0.3	<1	NS	NS	NS	<0.5	<0.3	<1	<0.2	NS	NS	<0.5	<0.3	<1	<0.2	NS	<0.36	<0.5
1,2-Dichloroethane	69	77.6	2.34	8.03	170.7	NS	NS	NS	<0.34	<0.2	<1	<0.1	NS	NS	<0.34	<0.2	<1	<0.1	NS	<0.19	<0.34
2-Butanone (MEK)	110	NL	µg/L	<2.0	<20	NS	NS	NS	NS	<2.0	<20	NS	NS	NS	NS	<2.0	<20	NS	NS	NS	NS
Acetone	1700	NL	µg/L	<2.0	<50	NS	NS	NS	NS	<2.0	<50	NS	NS	NS	NS	<2.0	<50	NS	NS	NS	NS
Benzene	1	5	µg/L	<0.2	<1	NS	NS	NS	<0.35	<0.2	<1	<0.2	NS	NS	<0.35	<0.2	<1	<0.2	NS	<0.23	<0.35
Bromodichloromethane	NL	100	µg/L	<0.2	<0.6	NS	NS	NS	<0.31	<0.2	<0.6	<0.2	NS	NS	<0.31	<0.2	<0.6	<0.2	NS	<0.29	<0.31
Carbon Disulfide	110	NL	µg/L	<0.9	<50	NS	NS	NS	NS	<0.9	<50	NS	NS	NS	NS	<0.9	<50	NS	NS	NS	NS
Chloroform	NL	100	µg/L	<0.2	<1	NS	NS	NS	<0.37	<0.2	<1	<0.2	NS	NS	<0.37	<0.2	<1	<0.2	NS	<0.34	<0.37
cis-1,2-DCE	NL	70	µg/L	<0.1	<1	NS	NS	NS	<0.41	<0.1	<1	0.2 i	NS	NS	<0.41	<0.1	<1	<0.2	NS	<0.45	<0.41
Ethylbenzene	610	700	µg/L	<0.3	<1	NS	NS	NS	<0.43	<0.3	<1	<0.3	NS	NS	<0.43	<0.3	<1	<0.3	NS	<0.34	<0.43
Methylene Chloride	5	NL	µg/L	<0.1	<5	NS	NS	NS	<0.41	<0.1	<5	<0.2	NS	NS	<0.41	<0.1	<5	<0.2	NS	<0.65	<0.41
Toluene	480	1000	µg/L	<0.2	<1	NS	NS	NS	<0.43	<0.2	<1	<0.2	NS	NS	0.51 i	<0.2	<1	1.5	NS	<0.28	<0.43
Trans-1,2-DCE	11000	100	µg/L	<0.2	<1	NS	NS	NS	<0.47	<0.2	<1	<0.2	NS	NS	<0.47	<0.2	<1	<0.2	NS	<0.41	<0.47
Trichloroethene (TCE)	3	5	µg/L	<0.3	<1	NS	NS	NS	<0.39	<0.3	<1	<0.3	NS	NS	<0.39	<0.3	<1	<0.3	NS	<0.26	<0.39
Vinyl Chloride	2.4	2	µg/L	<0.4	<1	NS	NS	NS	<0.48	<0.4	<1	<0.4	NS	NS	<0.48	<0.4	<1	<0.4	NS	<0.52	<0.48
Xylenes (Total)	370	10,000	µg/L	<0.5	<3	NS	NS	NS	<0.85	<0.5	<3	<0.5	NS	NS	<0.85	<0.5	<3	<0.5	NS	<0.38	<0.85
Polynuclear Aromatic Hydrocarbons																					
1-Methylnaphthalene	95	NL	µg/L	<0.05	<0.5	NS	NS	NS	<0.01	<0.05	<0.5	<0.2	NS	NS	<0.01	<0.05	<0.5	<0.2	NS	<0.02	<0.01
2-Methylnaphthalene	30	NL	µg/L	<0.05	<0.5	NS	NS	NS	<0.02	<0.05	<0.5	<0.2	NS	NS	<0.02	<0.05	<0.5	<0.2	NS	<0.03	<0.02
Naphthalene	26	NL	µg/L	<0.06	<0.5	NS	NS	NS	0.03 i	<0.06	<0.5	0.23	NS	NS	0.04 i	<0.06	<0.5	0.07i	NS	0.06 - I	<0.02
Natural Attenuation Parameters																					
Chloride, Total	NL	NL	mg/L	26	32.1	NS	NS	NS	91	28	31.7	13.1	NS	NS	84	28	33.4	32.3	NS	50	33
Nitrate-N	NL	NL	mg/L	0.66	<0.10	NS	NS	NS	0.5 i	0.03	0.17	0.09	NS	NS	<0.02	0.03	<0.10	0.08	NS	0.16 - I	<0.02
Nitrogen, Total	NL	NL	mg/L	1.1	0.62	NS	NS	NS	NS	0.52	0.64	NS	NS	NS	NS	0.57	0.66	NS	NS	NS	NS
Nitrate-Nitrite-N	NL	NL	mg/L	0.66	<0.10	NS	NS	NS	<0.012	0.03 i	0.17	0.09	NS	NS	<0.012	0.03	<0.10	0.08	NS	<0.002	<0.012
Phosphorous, Total	NL	NL	mg/L	<0.020	<0.030	NS	NS	NS	NS	0.02 i	0.042	0.03	NS	NS	NS	0.04	0.042	0.8	NS	NS	NS
Sulfate, Total	NL	NL	mg/L	<10	35.3	NS	NS	NS	42	<10	34.0	19.3	NS	NS	28	29	30.1	7.46	NS	17	23
Total Kjeldahl-N	NL	NL	mg/L	0.46	0.55	NS	NS	NS	NS	0.49	0.47	NS	NS	NS	NS	0.54	0.60	NS	NS	NS	NS
Total Org. Carbon	NL	NL	mg/L	10 V	21.0	NS	NS	NS	3.8	12.0	20.2	4	NS	NS	7.8	12.0	19.3	25	NS	11	7.8
Methane	NL	NL	mg/L	0.017	0.0050	NS	NS	NS	0.009	0.017	0.0076	0.006	NS	NS	0.057	0.058	0.041	0.22	NS	0.056	0.013
Ethene	NL	NL	mg/L	< 0.0003	<0.001	NS	NS	NS	<0.0004	< 0.0003	<0.001	<0.0003	NS	NS	<0.0004	<0.0003	<0.001	<0.0003	NS	<0.001	<0.0004
Ethane	NL	NL	mg/L	< 0.0002	<0.001	NS	NS	NS	<0.0004	< 0.0002	<0.001	<0.0002	NS	NS	<0.0004	<0.0002	<0.001	<0.0002	NS	<0.0009	<0.0004
Metals																					
Iron	1000	NL	mg/L	1.9	2.0	NS	NS	NS	NS	1.2	1.4	NS	NS	NS	NS	1.0	0.82	NS	NS	NS	NS
Manganese	NL	NL	mg/L	0.0397	0.056	NS	NS	NS	80.6	0.046	<0.050	0.0265	NS	NS	168	0.033	<0.050	0.153	NS	0.053	30.1

BOLD values exceed regulatory criteria
I - analyte detected; value is between the Method Detection Level (MDL) and the Method Quantitation Level (MQL)
NL - not listed
FDEP Target Levels from Chapter 62-777, FAC, effective date 4/17/05
V - analyte detected in method blank above the laboratory minimum detection limit
NS - Not sampled
mg/L - milligrams per liter
USEPA - United States Environmental Protection Agency
MCL -

TABLE 4: SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

Site Name: PSC 51, Naval Air Station Jacksonville

			Sample ID	PSC51-MW-15S					
			Date Collected	10/28/04	4/28/05	4/28/06	5/1/07	5/6/08	4/29/09
Parameter	FDEP GCTLs	USEPA MCLs	Units						
Volatile Organic Compounds									
1,1,2,2-Tetrachloroethane	1.3	NL	µg/L	<0.2	<0.2	<0.2	<0.2	<0.14	<0.23
1,1-DCE	7	7.0	µg/L	<0.2	<1	<0.2	<0.2	<0.36	<0.5
1,2-Dichloroethane	3	5	µg/L	<0.2	<1	<0.1	<0.1	<0.19	<0.34
2-Butanone (MEK)	4200	NL	µg/L	<2.0	<20	NS	NS	NS	NS
Acetone	6300	NL	µg/L	2 i	<50	NS	NS	NS	NS
Benzene	1	5	µg/L	<0.2	<1	<0.2	0.6 i	<0.23	<0.35
Bromodichloromethane	91	100	µg/L	<0.2	<0.6	<0.2	<0.2	<0.29	<0.31
Carbon Disulfide	700	NL	µg/L	<0.9	<50	NS	NS	NS	NS
Chloroform	70	100	µg/L	<0.2	<1	<0.2	<0.2	<0.34	<0.37
Chloromethane	2.7	NL	µg/L	<0.3	<1	<0.3	<0.3	<0.36	<0.53
cis-1,2-DCE	70	70	µg/L	<0.1	<1	<0.2	<0.2	<0.45	<0.41
Ethylbenzene	30	700	µg/L	<0.3	<1	<0.3	<0.3	<0.34	<0.43
Methylene Chloride	5	NL	µg/L	<0.1	<5	<2.0	<2.0	<0.65	<0.41
Toluene	40	1000	µg/L	<0.2	<1	<0.2	1.4	<0.28	<0.43
trans-1,2-DCE	100	100	µg/L	<0.2	<1	<0.2	<0.2	<0.41	<0.47
Trichloroethene (TCE)	3	5	µg/L	<0.3	<1	<0.3	<0.3	<0.26	<0.39
Vinyl Chloride	1	2	µg/L	<0.4	<1	<0.4	<0.4	<0.52	<0.48
Xylenes (Total)	20	10,000	µg/L	<0.5	<3	<0.5	<0.3	<0.38	<0.85
1,3,5-Trimethylbenzene	10	NL	µg/L	<0.2	<1	NS	NS	NS	NS
1,2,4-Trimethylbenzene	10	NL	µg/L	<0.2	<1	NS	NS	NS	NS
Polynuclear Aromatic Hydrocarbons									
1-Methylnaphthalene	28	NL	µg/L	<0.05	<0.5	<0.2	<0.02	<0.02	<0.01
2-Methylnaphthalene	28	NL	µg/L	<0.05	<0.5	<0.2	<0.02	<0.03	<0.02
Acenaphthene	20	NL	µg/L	NS	NS	NS	<0.02	<0.02	<0.02
Fluorene	280	NL	µg/L	NS	NS	NS	<0.02	<0.02	<0.01
Naphthalene	14	NL	µg/L	<0.06	<0.5	<0.2	0.05 i	<0.02	0.06 i
Natural Attenuation Parameters									
Ammonia - N	2.8	NL	mg/L	<0.002	<0.020	0.03	<0.003	0.024	0.021
Chloride, Total	250	NL	mg/L	14	12.2	10.4	8.8	12	12
Nitrate- N	10	10000	mg/L	0.02	<0.10	0.07	0.085	<0.004	<0.02
Nitrite- N	1	1000	mg/L	0.01	<0.10	<0.05	<0.05	<0.002	<0.012
Nitrogen, Total	NL	NL	mg/L	0.18	<0.10	NS	NS	NS	NS
Nitrate-Nitrite-N	10	NL	mg/L	0.02 i	<0.10	0.07	0.085	NS	NS
Phosphorous, Total	NL	NL	mg/L	0.03	<0.030	<0.02	0.036	NS	NS
Sulfate, Total	250	NL	mg/L	2 i	7.4	6.69	5.6	8	8.3
Total Kjeldahl-N	NL	NL	mg/L	0.16	0.093	NS	0.08	NS	NS
Total Organic Carbon	NL	NL	mg/L	4 V	4.0	8.0	3.4	2.6	2.3
Methane	NL	NL	mg/L	0.005	0.0042	0.003	0.0006	0.005	0.021
Ethene	NL	NL	mg/L	<0.0003	<0.001	<0.0003	<0.0003	<0.001	<0.0004
Ethane	NL	NL	mg/L	<0.0002	<0.001	<0.0002	<0.0002	<0.0009	<0.0004
Metals									
Iron	0.3	NL	mg/L	0.33	0.26	NS	NS	NS	NS
Manganese (Filtered)	0.05	NL	mg/L	NS	NS	NS	NS	0.00146 i	**1.85 i**
Manganese	0.050	NL	mg/L	0.0037 i	<0.050	0.0014	0.0017 i	0.00159 i	**1.94 i**

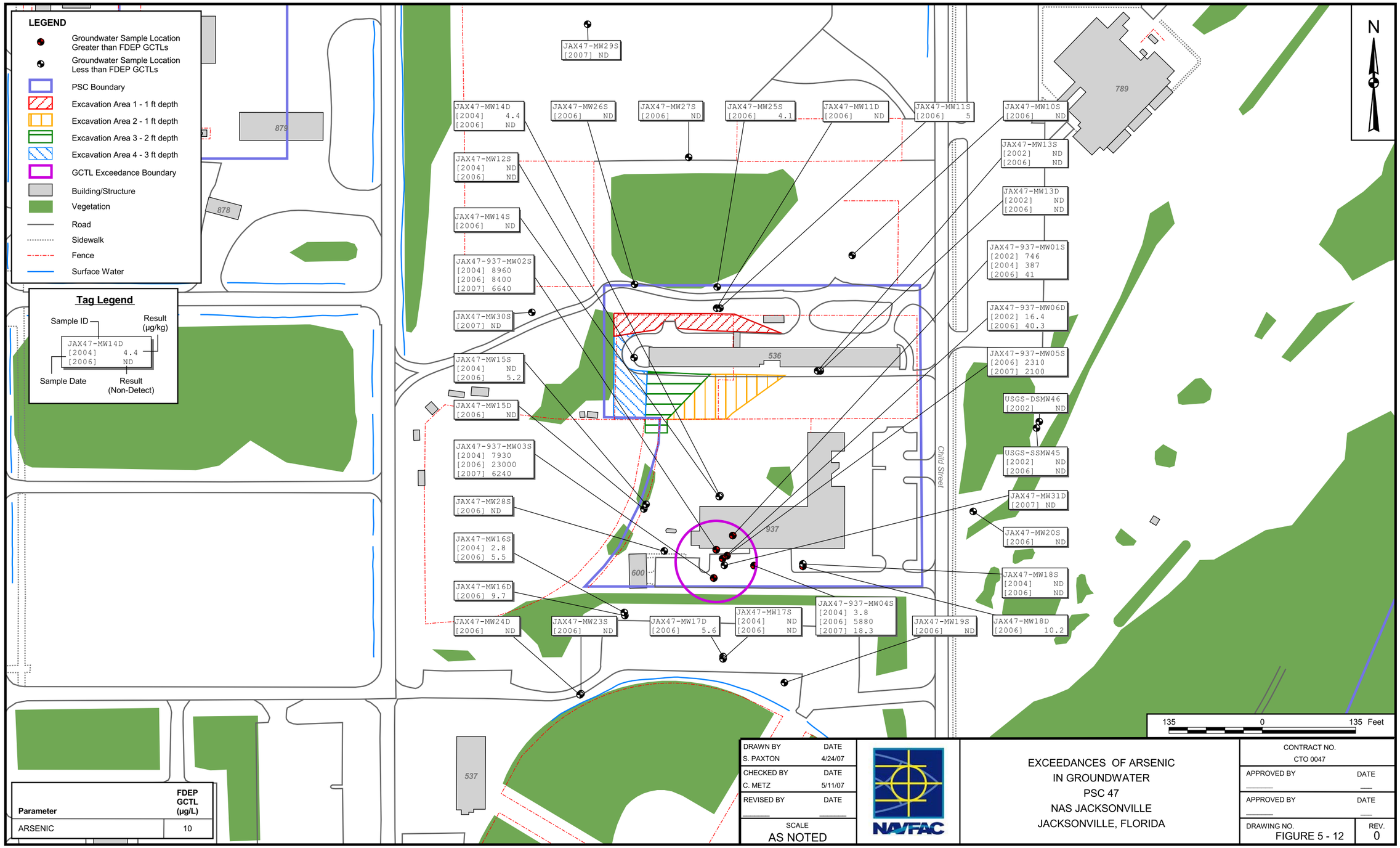
V - analyte detected in method blank
NL - not listed
NS - not sampled
ug/L - micrograms per liter
mg/L - milligrams per liter
MCL - maximum contaminant level

GCTL - Groundwater Cleanup Target Level
USEPA - United States Environmental Protection Agency
BOLD values exceed regulatory criteria
i - value between method detection limit and (MDL) and method quantitation level (MQL)
d - data derived from a dilution

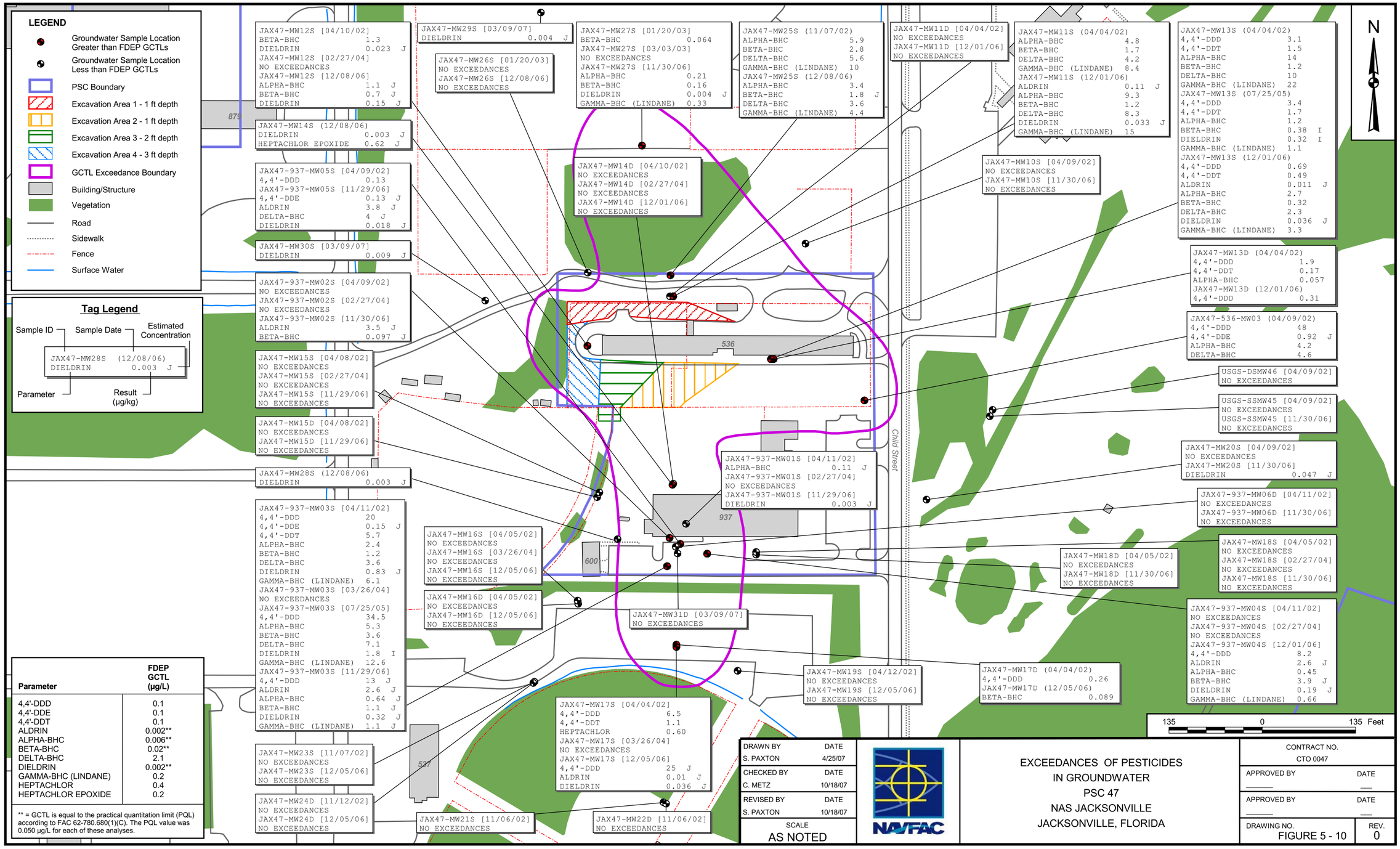
APPENDIX E

OU 8 HISTORICAL TRENDS, ARSENIC AND GROUNDWATER DATA FROM 2009 EVENT

P:\GIS\JACKSONVILLE_NAS\APR\PSC47.APR ARSENIC EXCEEDANCE IN GROUNDWATER TAG LAYOUT 5/11/07 SP



P:\GIS\JACKSONVILLE_NAS\APR\PSC47.APR TCL PESTICIDE EXCEEDANCE IN GROUNDWATER TAG LAYOUT 10/18/07 SP



Parameter	FDEP GCTL (µg/L)
4,4'-DDD	0.1
4,4'-DDE	0.1
4,4'-DDT	0.1
ALDRIN	0.002**
ALPHA-BHC	0.006**
BETA-BHC	0.02**
DELTA-BHC	2.1
DIELDRIN	0.002**
GAMMA-BHC (LINDANE)	0.2
HEPTACHLOR	0.4
HEPTACHLOR EPOXIDE	0.2

** = GCTL is equal to the practical quantitation limit (PQL) according to FAC 62-780.680(1)(C). The PQL value was 0.050 µg/L for each of these analyses.

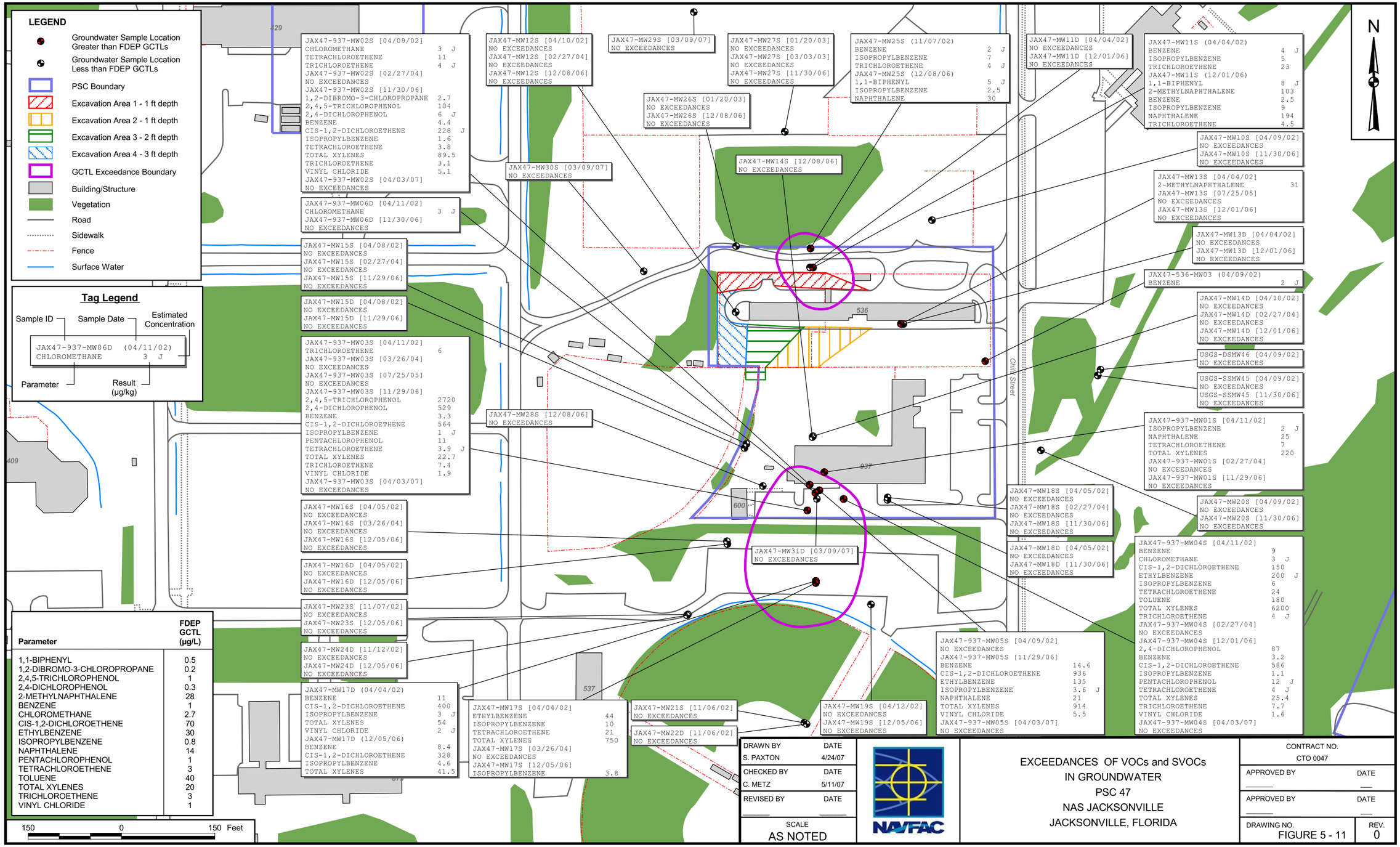
DRAWN BY S. PAXTON	DATE 4/25/07
CHECKED BY C. METZ	DATE 10/18/07
REVISED BY S. PAXTON	DATE 10/18/07
SCALE AS NOTED	

NAVFAC

EXCEEDANCES OF PESTICIDES
IN GROUNDWATER
PSC 47
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

CONTRACT NO. CTO 0047
APPROVED BY ____ DATE ____
APPROVED BY ____ DATE ____
DRAWING NO. FIGURE 5 - 10
REV. 0

P:\GIS\JACKSONVILLE_NAS\APR\PSC47.APR VOC/SVOC EXCEEDANCE IN GROUNDWATER TAG LAYOUT 5/11/07 SP



DRAWN BY	DATE
S. PAXTON	4/24/07
CHECKED BY	DATE
C. METZ	5/11/07
REVISED BY	DATE
SCALE	
AS NOTED	

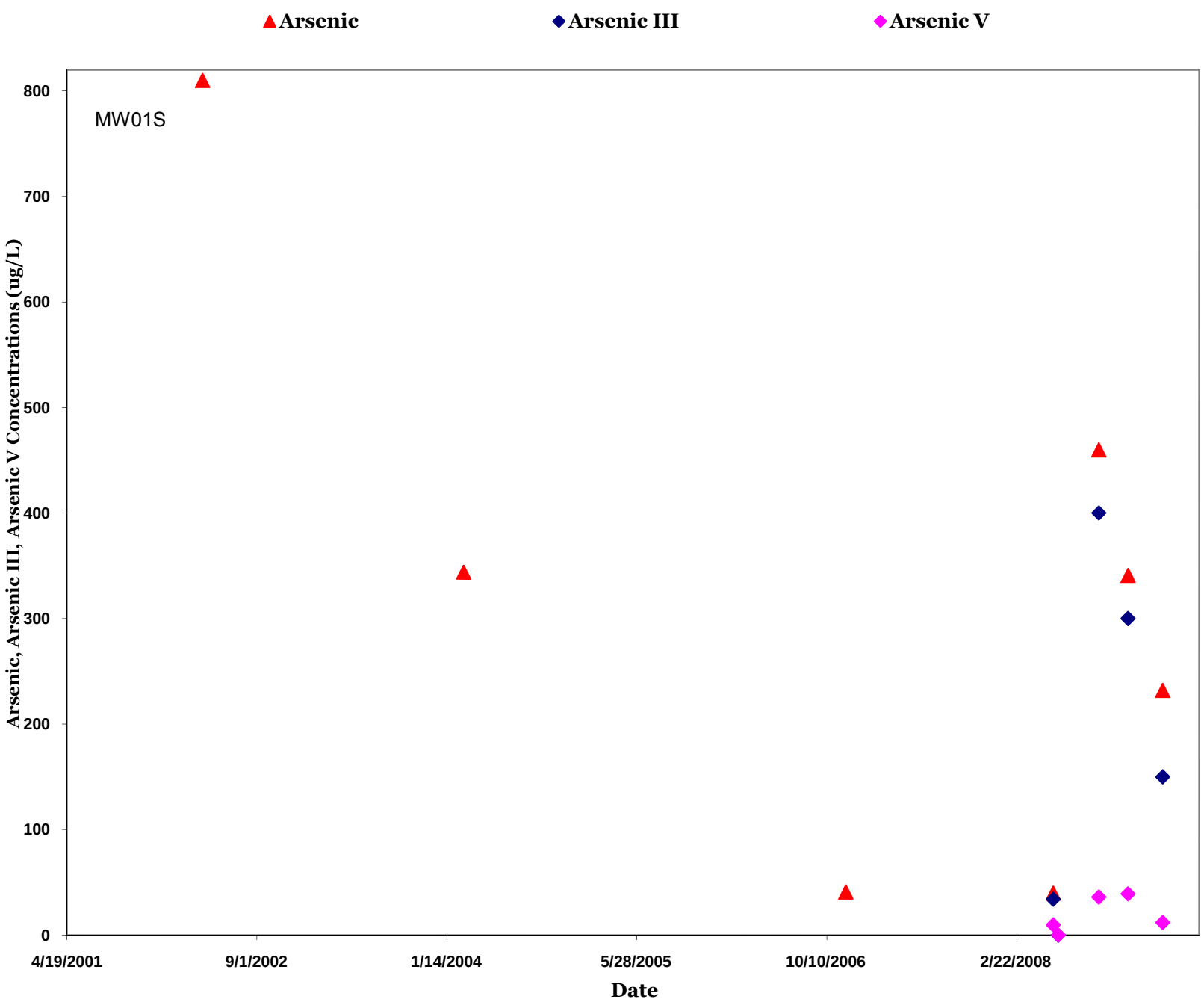
NAVFAC

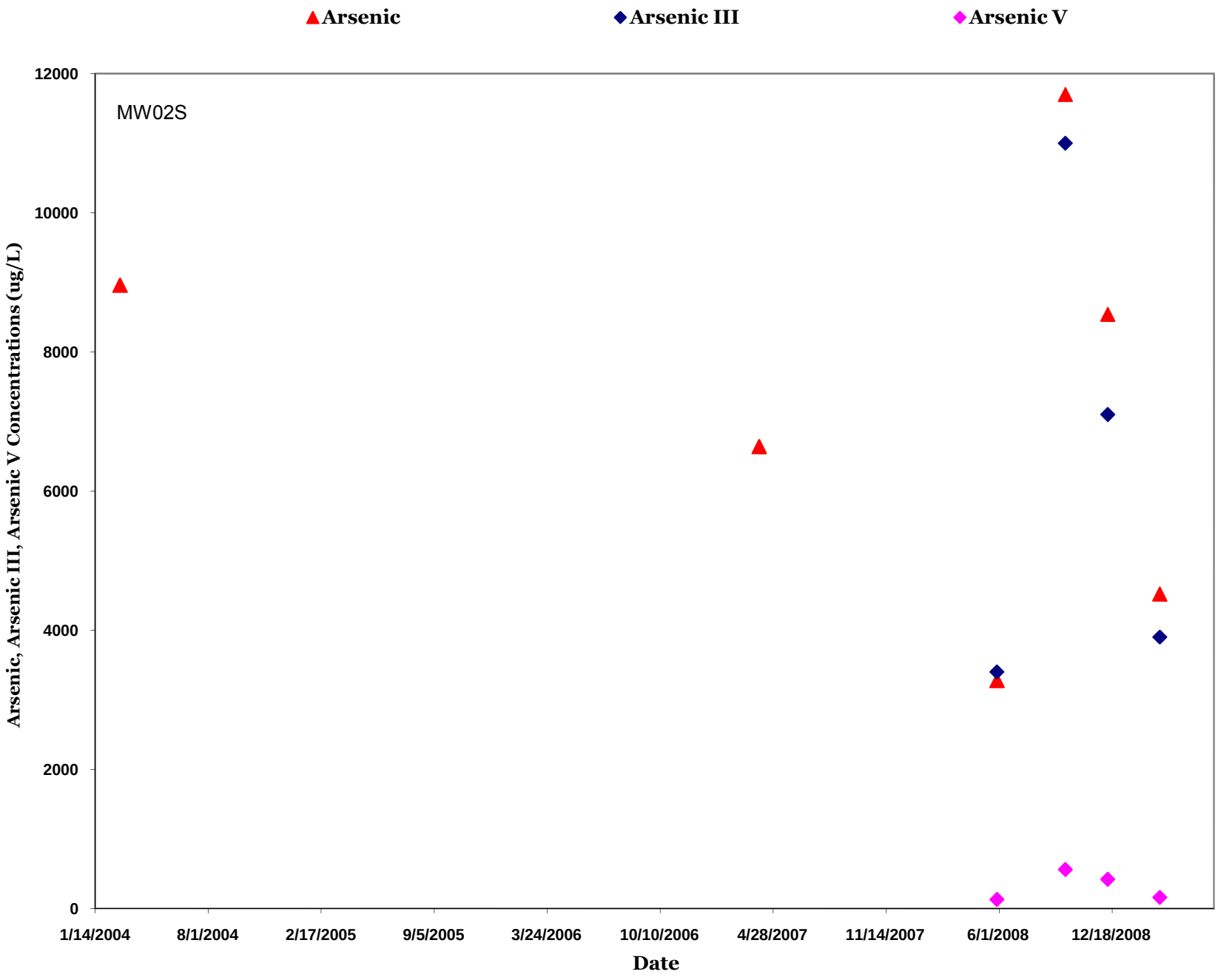
EXCEEDANCES OF VOCs and SVOCs
IN GROUNDWATER
PSC 47
NAS JACKSONVILLE
JACKSONVILLE, FLORIDA

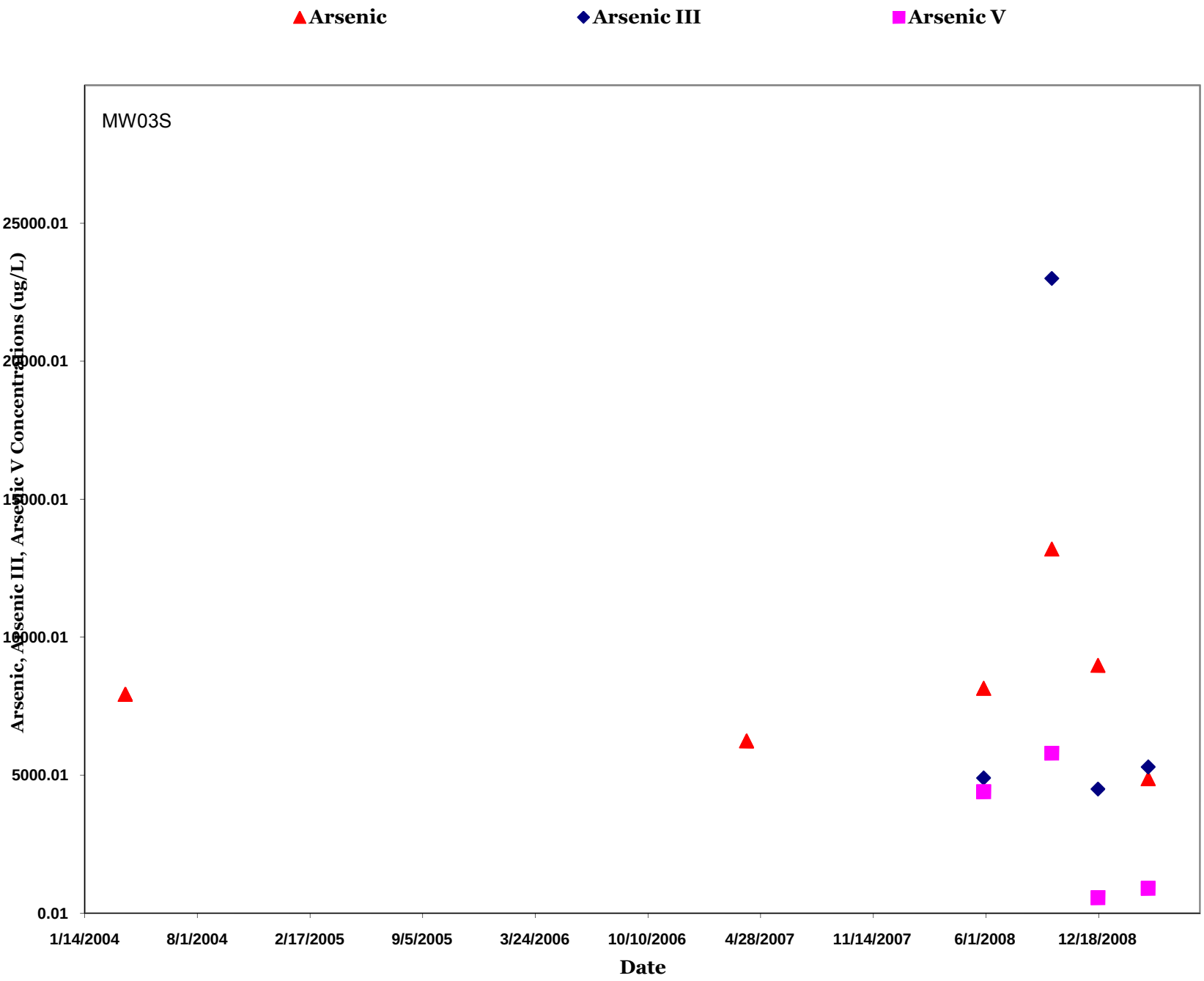
CONTRACT NO.
CTO 0047

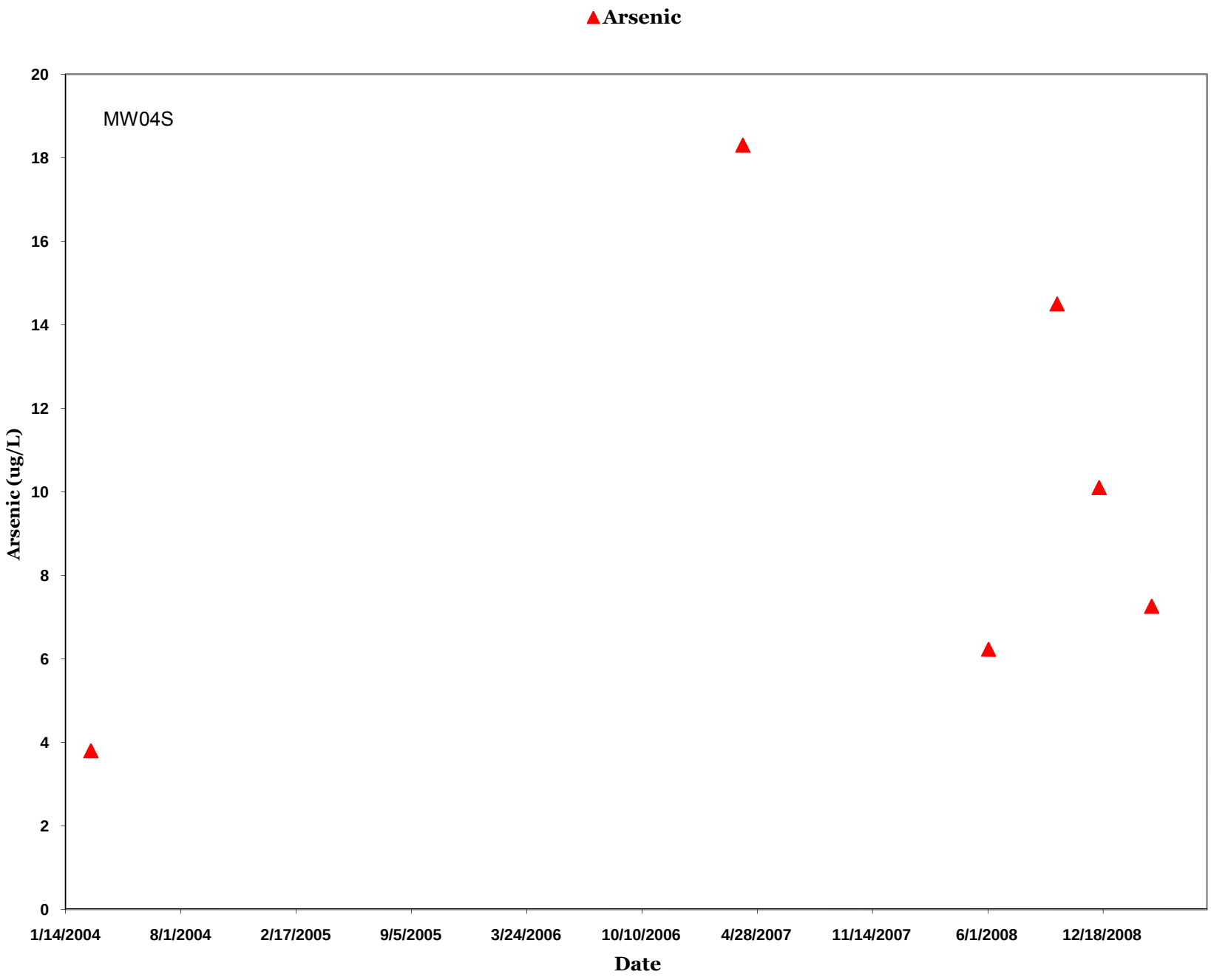
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO. FIGURE 5 - 11	REV. 0

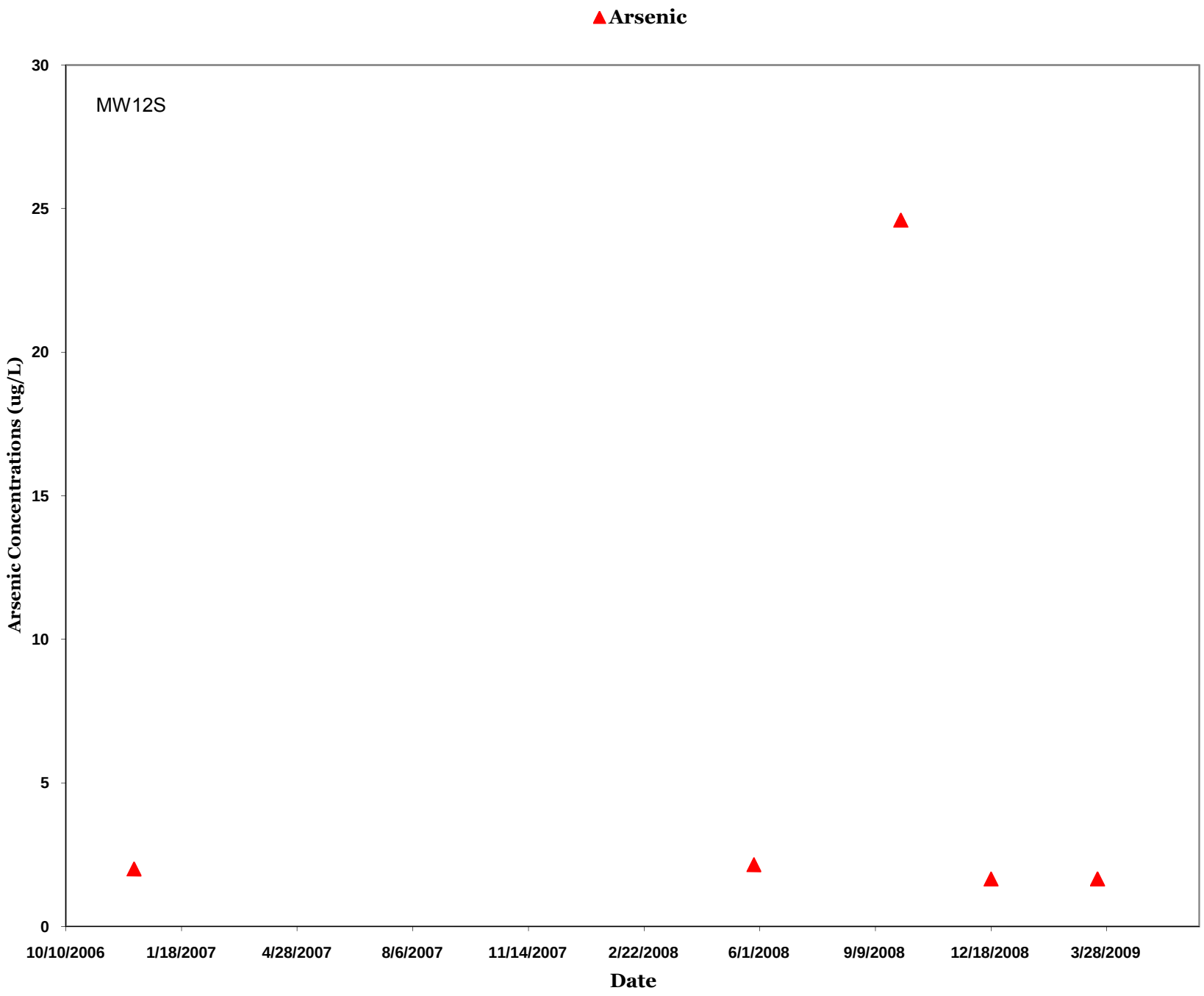
Historical Trends, Arsenic

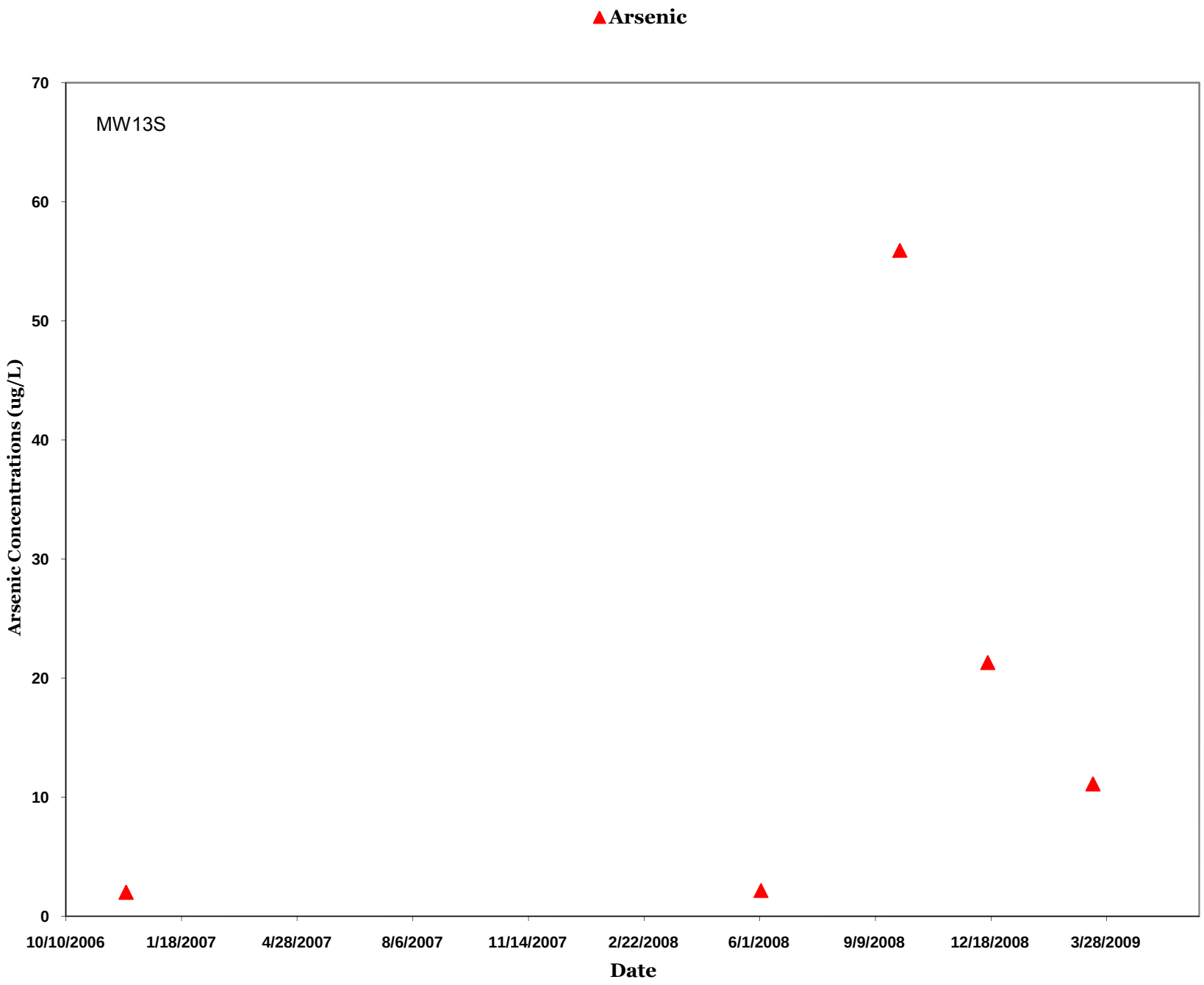

Arsenic
Arsenic III
Arsenic V
MW01S
Arsenic, Arsenic III, Arsenic V Concentrations (ug/L)
800
700
600
500
400
300
200
100
0
4/19/2001
9/1/2002
1/14/2004
5/28/2005
10/10/2006
2/22/2008
Date

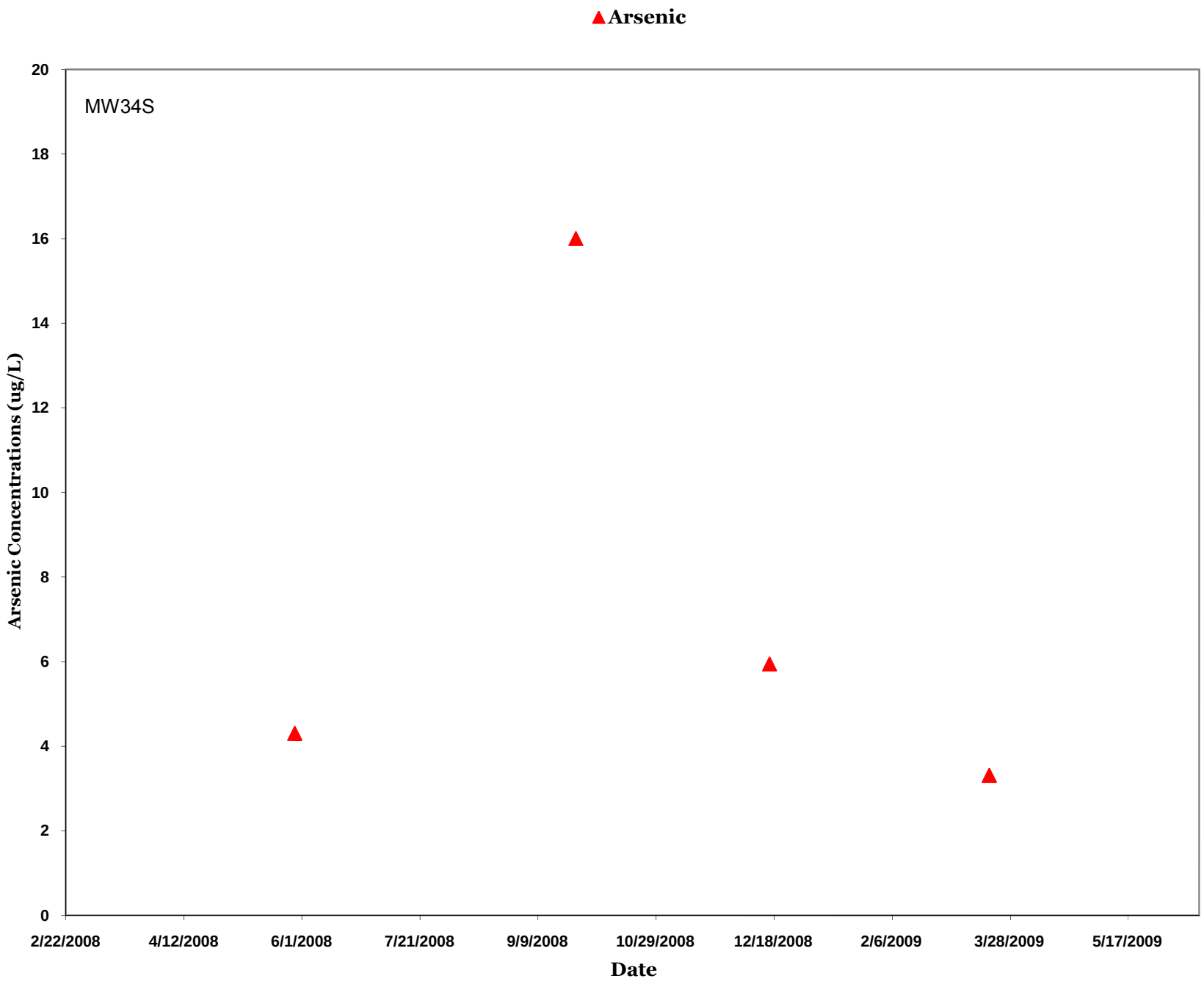

Arsenic
Arsenic III
Arsenic V
MW02S
Arsenic, Arsenic III, Arsenic V Concentrations (ug/L)
12000
10000
8000
6000
4000
2000
0
1/14/2004
8/1/2004
2/17/2005
9/5/2005
3/24/2006
10/10/2006
4/28/2007
11/14/2007
6/1/2008
12/18/2008
Date

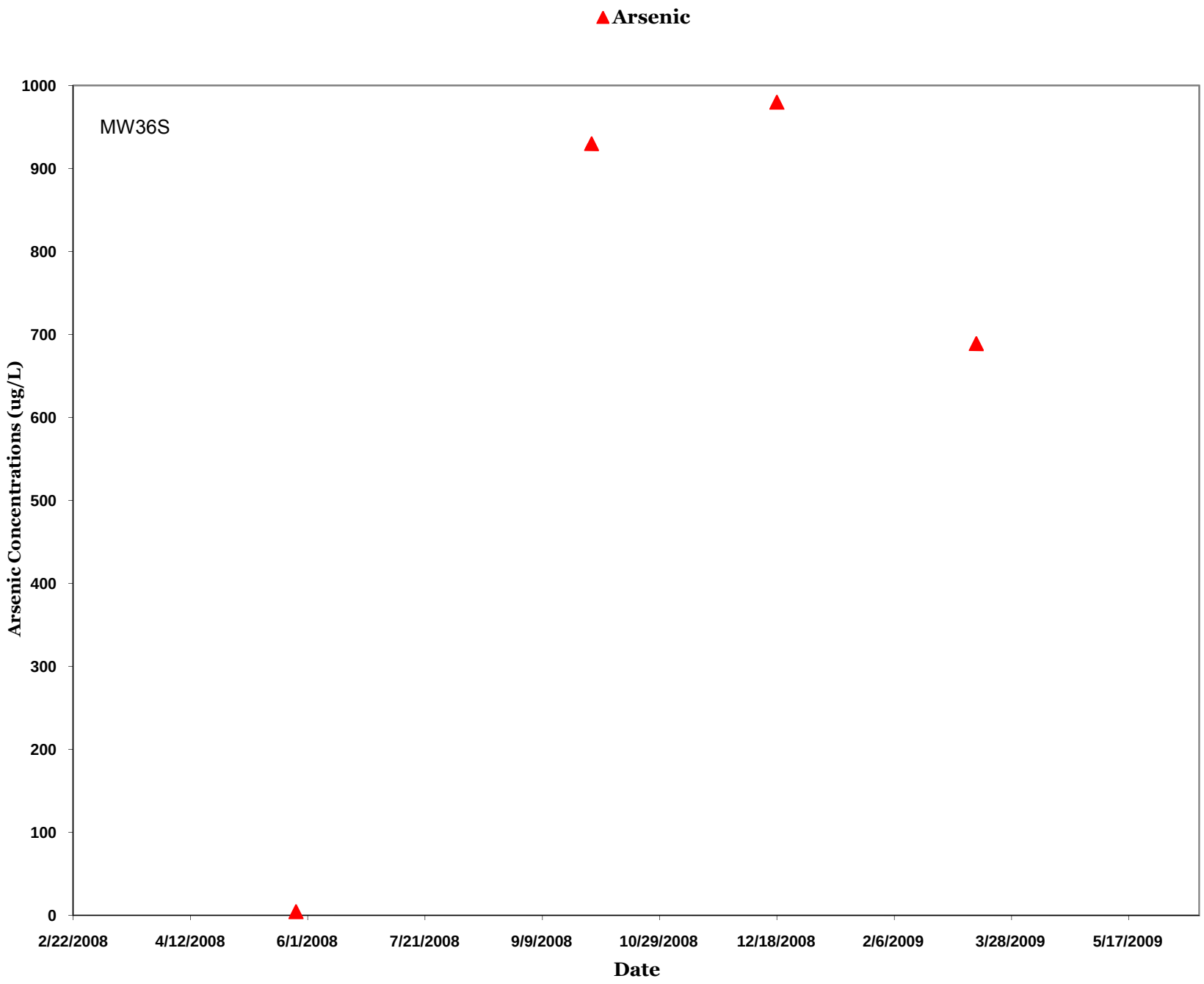

Arsenic
Arsenic III
Arsenic V
MW03S
Arsenic, Arsenic III, Arsenic V Concentrations (ug/L)
25000.01
20000.01
15000.01
10000.01
5000.01
0.01
1/14/2004
8/1/2004
2/17/2005
9/5/2005
3/24/2006
10/10/2006
4/28/2007
11/14/2007
6/1/2008
12/18/2008
Date

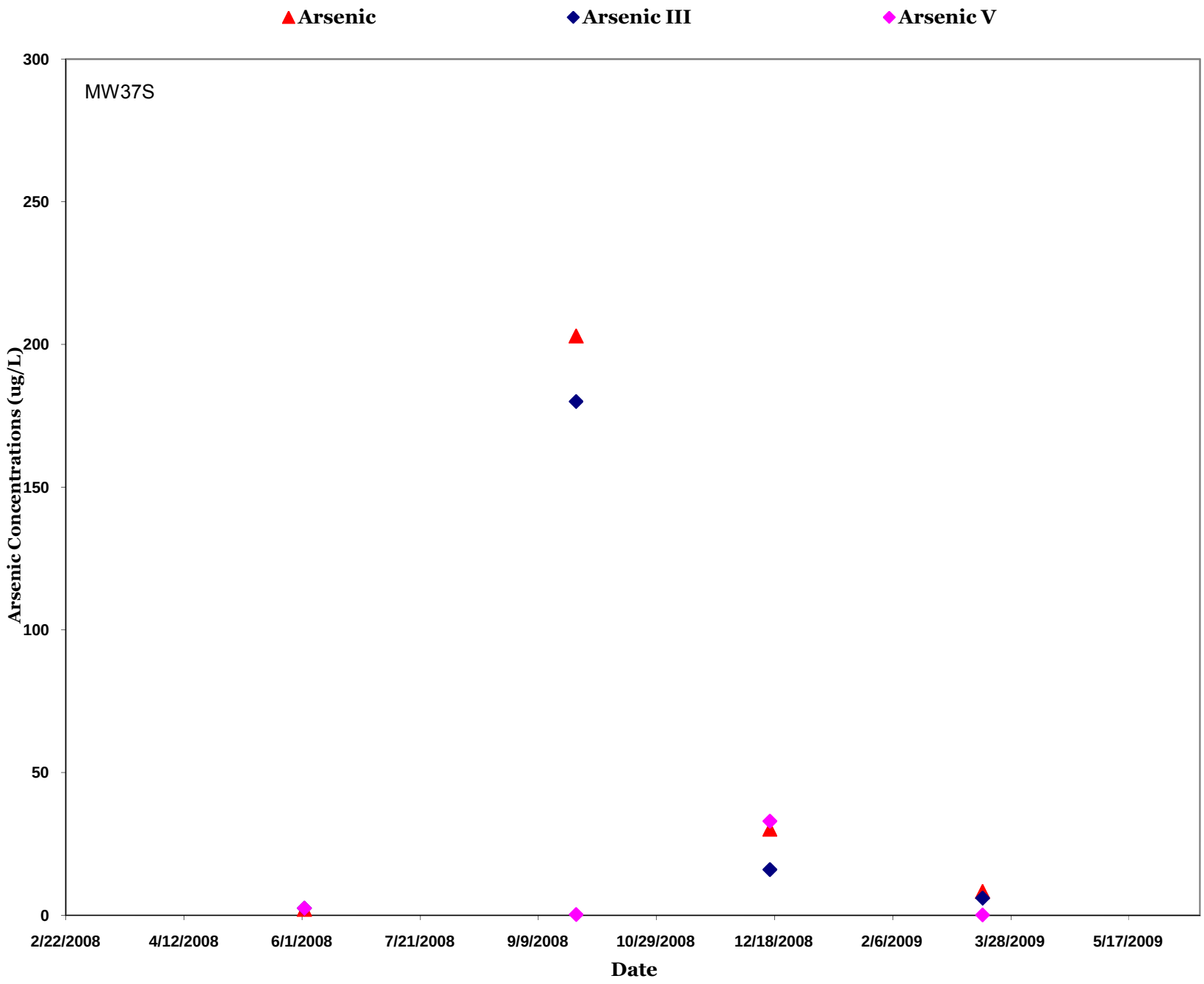

Arsenic
MW04S
Arsenic (ug/L)
20
18
16
14
12
10
8
6
4
2
0
1/14/2004
8/1/2004
2/17/2005
9/5/2005
3/24/2006
10/10/2006
4/28/2007
11/14/2007
6/1/2008
12/18/2008
Date

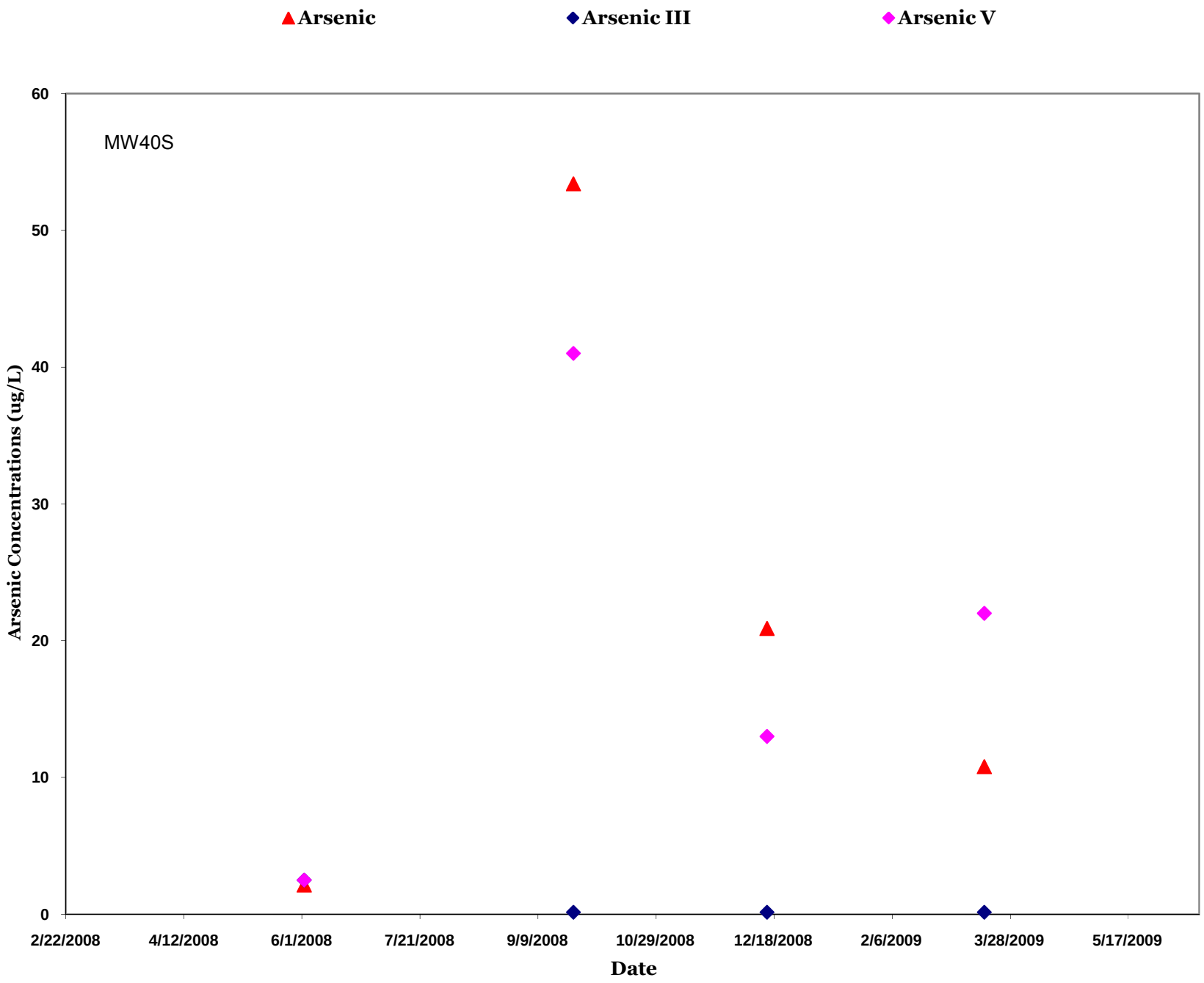

Arsenic
MW12S
Arsenic Concentrations (ug/L)
30
25
20
15
10
5
0
10/10/2006
1/18/2007
4/28/2007
8/6/2007
11/14/2007
2/22/2008
6/1/2008
9/9/2008
12/18/2008
3/28/2009
Date

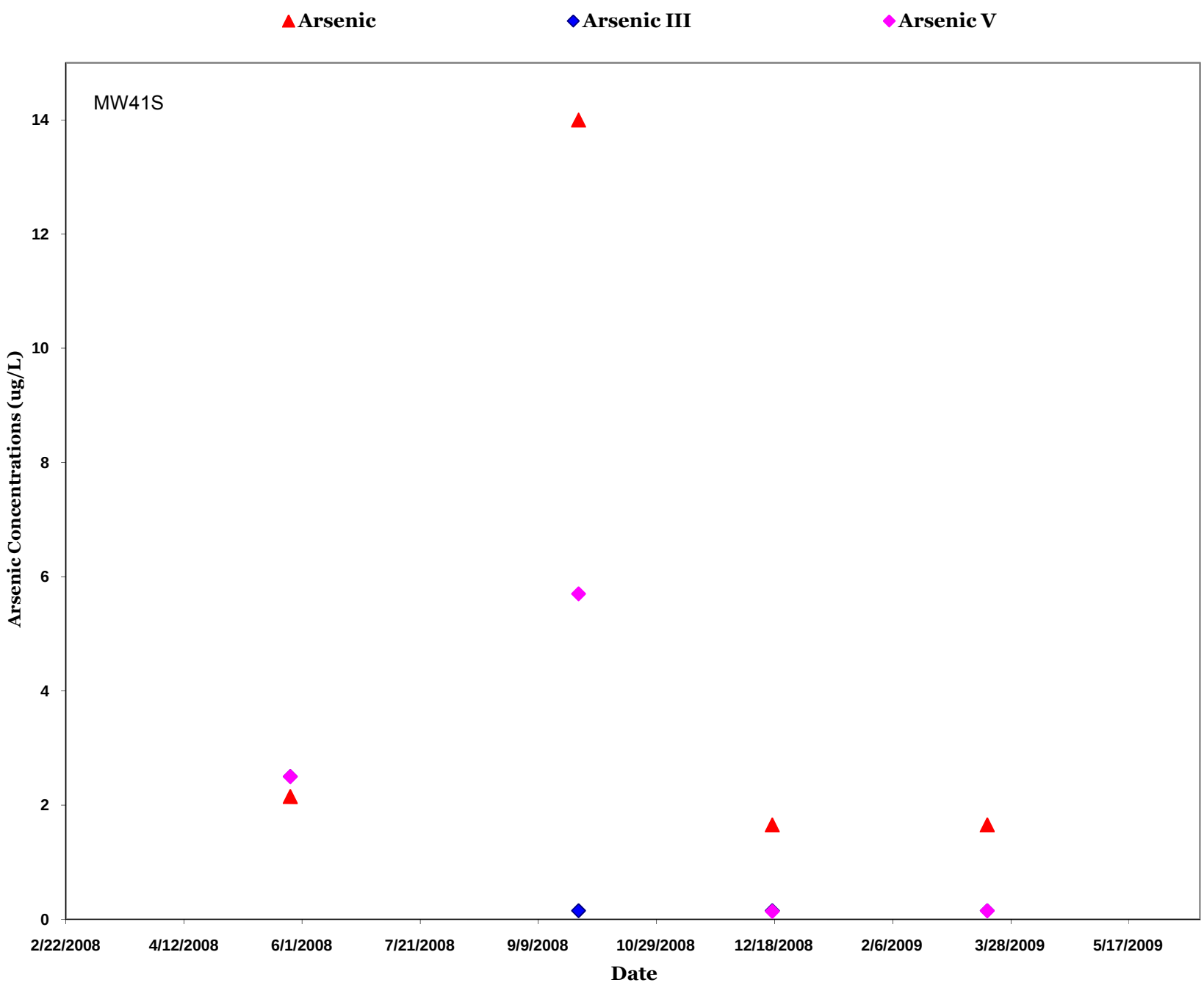

Arsenic
MW13S
Arsenic Concentrations (ug/L)
70
60
50
40
30
20
10
0
10/10/2006
1/18/2007
4/28/2007
8/6/2007
11/14/2007
2/22/2008
6/1/2008
9/9/2008
12/18/2008
3/28/2009
Date

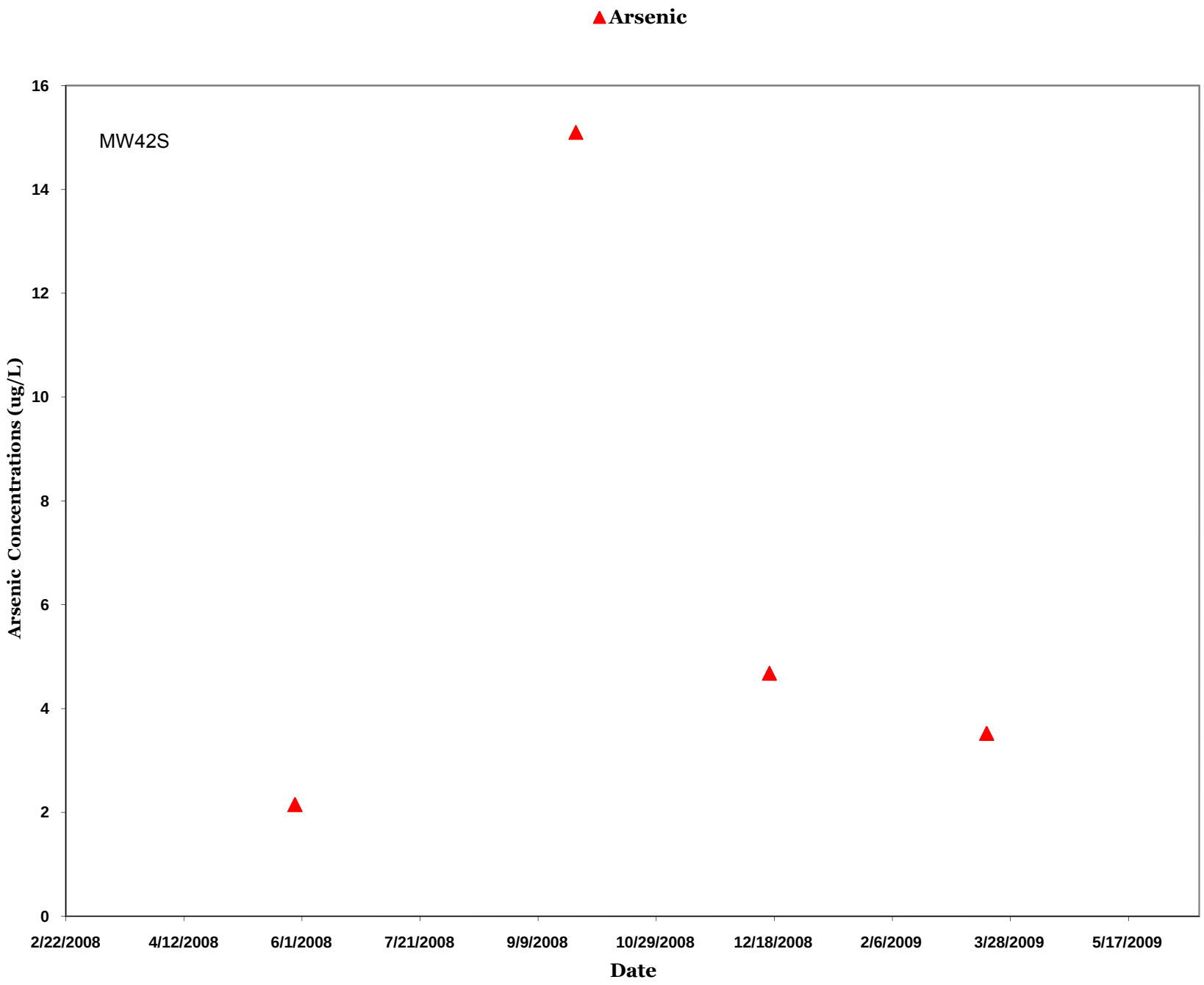

Arsenic
MW34S
Arsenic Concentrations (ug/L)
20
18
16
14
12
10
8
6
4
2
0
2/22/2008
4/12/2008
6/1/2008
7/21/2008
9/9/2008
10/29/2008
12/18/2008
2/6/2009
3/28/2009
5/17/2009
Date


Arsenic
MW36S
Arsenic Concentrations (ug/L)
1000
900
800
700
600
500
400
300
200
100
0
2/22/2008
4/12/2008
6/1/2008
7/21/2008
9/9/2008
10/29/2008
12/18/2008
2/6/2009
3/28/2009
5/17/2009
Date


Arsenic
Arsenic III
Arsenic V
MW37S
Arsenic Concentrations (ug/L)
300
250
200
150
100
50
0
2/22/2008
4/12/2008
6/1/2008
7/21/2008
9/9/2008
10/29/2008
12/18/2008
2/6/2009
3/28/2009
5/17/2009
Date


Arsenic
Arsenic III
Arsenic V
MW40S
Arsenic Concentrations (ug/L)
60
50
40
30
20
10
0
2/22/2008
4/12/2008
6/1/2008
7/21/2008
9/9/2008
10/29/2008
12/18/2008
2/6/2009
3/28/2009
5/17/2009
Date


Arsenic
Arsenic III
Arsenic V
MW41S
Arsenic Concentrations (ug/L)
0
2
4
6
8
10
12
14
2/22/2008
4/12/2008
6/1/2008
7/21/2008
9/9/2008
10/29/2008
12/18/2008
2/6/2009
3/28/2009
5/17/2009
Date


Arsenic
MW42S
Arsenic Concentrations (ug/L)
16
14
12
10
8
6
4
2
0
2/22/2008
4/12/2008
6/1/2008
7/21/2008
9/9/2008
10/29/2008
12/18/2008
2/6/2009
3/28/2009
5/17/2009
Date

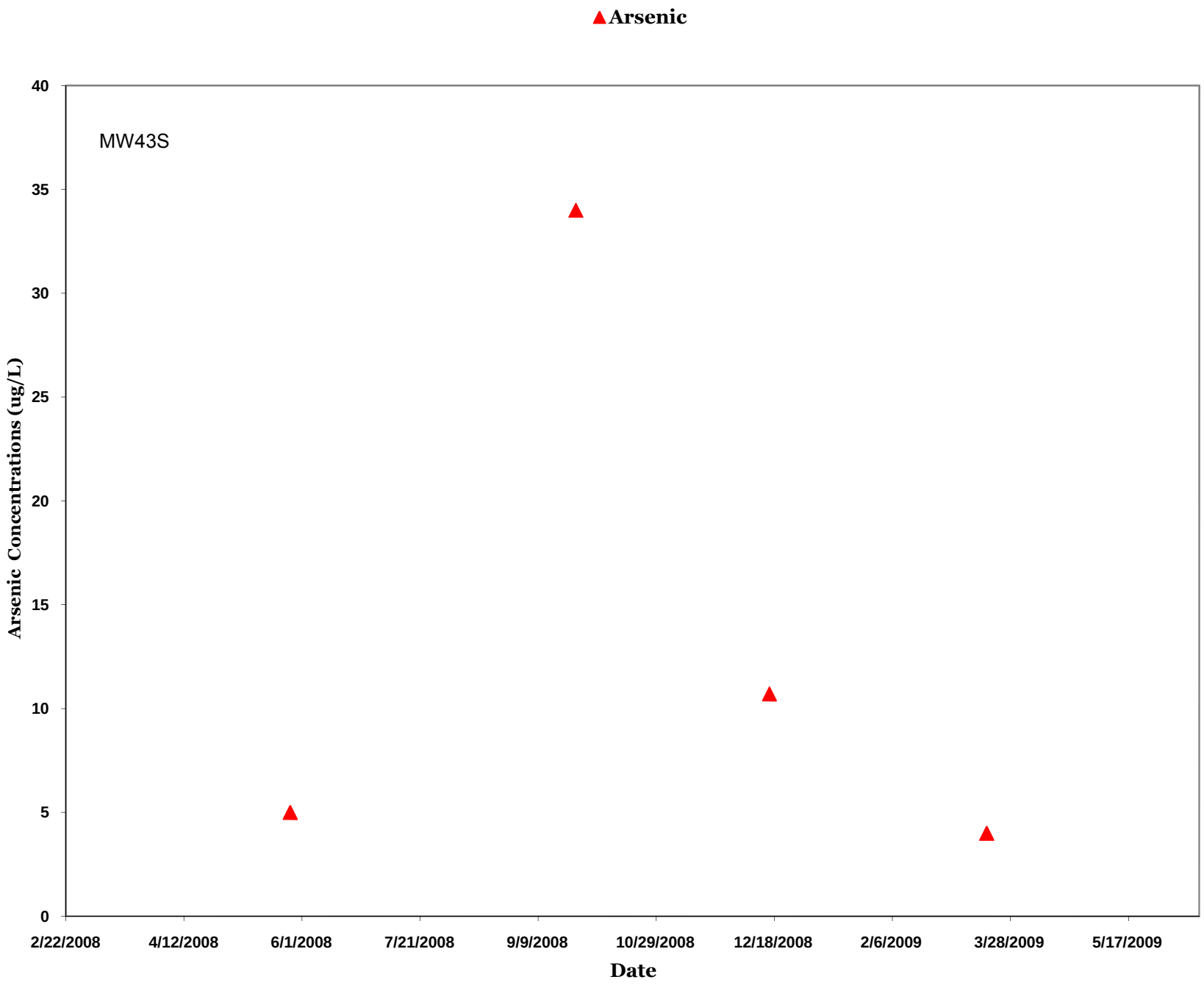

Arsenic
MW43S
Arsenic Concentrations (ug/L)
40
35
30
25
20
15
10
5
0
2/22/2008
4/12/2008
6/1/2008
7/21/2008
9/9/2008
10/29/2008
12/18/2008
2/6/2009
3/28/2009
5/17/2009
Date

Table 3-1
Groundwater Analytical Data Summary
May 2008
NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		MW-01S	MW-02S	MW-03S	MW-04S	MW-10S	MW-11S	MW-12S	MW-13S	MW-14S	MW-15S	MW-25S	MW-26S
	SampleID		JAX47-937-MW01S	JAX47-937-MW2S	JAX47-937-MW3S	JAX47-937-MW4S	JAX47-MW-10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S
	Sample Date		5/28/2008	5/28/2008	5/28/2008	6/2/2008	6/19/2008	5/29/2008	5/27/2008	6/2/2008	6/2/2008	6/2/2008	5/29/2008	5/28/2008
	Units in ug/L													
Parameter	GCTL[1]	NADC												
SW6010B														
Arsenic	10	100	39.9	3280	8150	6.23 J	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	5.12 J
SW8081														
Aldrin	0.002	0.2	0.026 U	0.26 U	0.51 U	0.26 U	0.051 UJ	0.025 U	0.025 U	0.026 U	0.025 U	0.026 U	0.026 U	0.026 U
alpha bhc (alpha hexachlorocyclohexane)	0.006	0.6	0.0092 U	0.092 U	1.1	0.092 U	0.01 UJ	6.4	0.088	6.4	0.0091 U	0.0092 U	1.4	0.0092 U
alpha endosulfan	42	420	0.051 U	0.51 U	1 U	0.51 U	0.051 UJ	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U	0.052 U	0.051 U
alpha-chlordane	NA	NA	0.051 U	0.51 U	1 U	0.51 U	0.051 UJ	0.05 U	0.05 U	0.23 J	0.05 U	0.051 U	0.052 U	0.051 U
beta bhc (beta hexachlorocyclohexane)	0.02	2	0.051 U	0.51 U	3 J	0.51 U	0.051 UJ	2	0.72	1.1	0.05 U	0.051 U	1.3	0.051 U
beta endosulfan	42	420	0.051 U	0.51 U	1 U	0.51 U	0.051 U	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U	0.052 U	0.051 U
chlordane	2	200	0.51 U	5.1 U	10 U	5.1 U	0.51 U	0.5 U	0.5 U	0.43 J	0.5 U	0.51 U	0.52 U	0.51 U
delta bhc (delta hexachlorocyclohexane)	2.1	21	0.051 U	0.51 U	1.6	0.51 U	0.051 U	6.2	0.023 J	5.8	0.05 U	0.051 U	2.3	0.051 U
Dieldrin	0.002	0.2	0.0083 U	0.083 U	1.1	0.083 U	0.051 UJ	0.0082 U	0.11	0.0083 U	0.0082 U	0.0083 U	0.0084 U	0.0047 J
endosulfan sulfate	42	420	0.051 U	0.51 U	1 U	0.51 U	0.051 U	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U	0.052 U	0.051 U
endrin	2	20	0.051 U	0.51 U	1 U	0.51 U	0.051 UJ	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U	0.052 U	0.051 U
endrin aldehyde	NA	NA	0.051 U	0.51 U	1 U	0.51 U	0.051 U	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U	0.052 U	0.051 U
endrin ketone	NA	NA	0.051 U	0.51 U	0.29 J	2 J	0.051 U	0.05 U	0.032 J	0.051 U	0.05 U	0.051 U	0.052 U	0.051 U
gamma bhc (lindane)	0.2	20	0.051 U	0.51 U	2.1	0.51 U	0.051 UJ	9.6	0.082	6.5	0.05 U	0.051 U	1.7	0.051 U
gamma-chlordane	NA	NA	0.051 U	0.51 U	1 U	0.51 U	0.051 UJ	0.05 U	0.05 U	0.11	0.05 U	0.051 U	0.052 U	0.051 U
heptachlor	0.4	40	0.051 U	0.51 U	1 U	0.51 U	0.051 UJ	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U	0.052 U	0.051 U
heptachlor epoxide	0.2	20	0.051 U	0.51 U	1 U	0.51 U	0.051 UJ	0.05 U	0.097 J	0.051 U	0.034 J	0.051 U	0.052 U	0.02 J
methoxychlor	40	400	0.051 U	0.51 U	1 U	0.51 U	0.051 U	0.05 U	0.05 U	0.051 U	0.05 U	0.051 U	0.052 U	0.051 U
p,p'-DDD	0.1	10	0.051 U	0.51 U	18	0.51 U	0.051 U	0.15 J	0.05 U	0.92	0.039 J	0.051 U	0.052 U	0.051 U
p,p'-DDE	0.1	10	0.051 U	0.51 U	0.17 J	0.51 U	0.051 UJ	0.05 U	0.05 U	0.051 U	0.007 J	0.051 U	0.052 U	0.051 U
p,p'-DDT	0.1	10	0.051 U	0.51 U	0.57 J	0.51 U	0.051 UJ	0.05 U	0.0077 J	1	0.05 U	0.051 U	0.052 U	0.051 U
toxaphene	3	300	0.55 U	5.5 U	11 U	5.5 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.56 U	0.55 U
SW8260B														
	Sample Date		6/10/2008					6/10/2008					6/10/2008	
1,1,1-Trichloroethane	200	2000	1 U			10 U		1 U		1 U			1 U	
1,1,2,2-Tetrachloroethane	0.2	20	1.1 U			11.1 U		1.1 U		1.1 U			1.1 U	
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000	2.4 U			23.7 U		2.4 U		2.4 U			2.4 U	
1,1,2-Trichloroethane	5	500	1.7 U			17.1 U		1.7 U		1.7 U			1.7 U	
1,1-Dichloroethane	70**	700	1 U			10 U		1 U		1 U			1 U	
1,1-Dichloroethene	7**	70	1.1 U			11.1 U		1.1 U		1.1 U			1.1 U	
1,2,3-trichlorobenzene	70	700	1 U			10 U		1 U		6.5			1 U	
1,2,4-Trichlorobenzene	70	700	1.5 U			15.3 U		1.5 U		18.3			1.5 U	
1,2-Dibromo-3-chloropropane	0.2	20	6 U			60 U		6 U		6 U			6 U	
1,2-Dibromoethane (Ethylene dibromide)	0.02	2	1.1 U			11.1 U		1.1 U		1.1 U			1.1 U	
1,2-Dichlorobenzene	600	6000	1.1 U			11.4 U		1.1 U		5.3			0.33 J	
1,2-Dichloroethane	3	300	1.3 U			13.2 U		1.3 U		1.3 U			1.3 U	
1,2-Dichloropropane	5	500	1.6 U			15.9 U		1.6 U		1.6 U			1.6 U	
1,3-Dichlorobenzene	210	2100	1 U			10 U		1 U		3.1			1 U	
1,4-Dichlorobenzene	75	7500	1 U			10 U		1 U		8.3			0.33 J	
2-Hexanone	280	2800	5.1 U			51 U		5.1 U		5.1 U			5.1 U	
Acetone	6300	63000	18 U			106 J		18 U		18 U			18 U	
Benzene	1	100	0.48 J			18.6		1 U		0.94 J			0.3 J	
Bromochloromethane	91	910	2.2 U			22.2 U		2.2 U		2.2 U			2.2 U	
Bromodichloromethane	0.6	60	1.3 U			13.2 U		1.3 U		1.3 U			1.3 U	
Bromoform	4.4	440	1.9 U			18.6 U		1.9 U		1.9 U			1.9 U	
Bromomethane	9.8	98	1.4 U			14.4 U		1.4 U		1.4 U			1.4 U	
Carbon disulfide	700	7000	1.1 U			11.4 U		1.1 U		1.1 U			1.1 U	
Carbon tetrachloride	3	300	1.5 U			15.3 U		1.5 U		1.5 U			1.5 U	
Chlorobenzene	100	1000	1 U			10 U		0.64 J		5.1			1.8	

Table 3-1
Groundwater Analytical Data Summary
May 2008
NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		MW-01S	MW-02S	MW-03S	MW-04S	MW-10S	MW-11S	MW-12S	MW-13S	MW-14S	MW-15S	MW-25S	MW-26S
	SampleID		JAX47-937-MW01S	JAX47-937-MW2S	JAX47-937-MW3S	JAX47-937-MW4S	JAX47-MW-10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S
	Sample Date		5/28/2008	5/28/2008	5/28/2008	6/2/2008	6/19/2008	5/29/2008	5/27/2008	6/2/2008	6/2/2008	6/2/2008	5/29/2008	5/28/2008
	Units in ug/L													
Parameter	GCTL[1]	NADC												
Chloroethane	12	1200	2.8 U			28.5 U		2.8 U		2.8 U			2.8 U	
Chloroform	70	700	1 U			10 U		1 U		1.4			0.92 J	
Chloromethane	2.7	270	1.4 U			14.4 U		1.4 U		1.4 U			1.4 U	
cis-1,2-Dichloroethene	70	700	48.9			705		1 U		1 U			1 U	
cis-1,3-Dichloropropene	NA	NA	1 U			10 U		1 U		1 U			1 U	
cyclohexane	NA	NA	1 UJ			10 U		1.7		1 U			1 U	
Dibromochloromethane	0.4	40	1 U			10 U		1 U		1 U			1 U	
Dichlorodifluoromethane	1400	14000	1.7 U			16.8 U		1.7 U		1.7 U			1.7 U	
Ethylbenzene	30	300	1 U			379		0.58 J		0.38 J			1 U	
Isopropylbenzene (Cumene)	0.8	8	1 U			15.1		0.44 J		0.38 J			1.5	
methyl acetate	3000	30000	7.2 U			72 U		7.2 U		7.2 U			7.2 U	
Methyl ethyl ketone (2-butanone)	4200	42000	6.6 U			66 U		6.6 U		6.6 U			6.6 U	
Methyl isobutyl ketone (4-methyl-2-pentanone)	560	5600	5 U			50 U		5 U		5 U			5 U	
methylcyclohexane	NA	NA	1.9 U			19.2 U		2.1		1.9 U			1.9 U	
Methylene chloride	5	500	1.4 U			13.5 U		1.4 U		1.4 U			1.4 U	
Styrene	100	1000	1 U			10 U		1 U		1 U			1 U	
tert-butyl methyl ether	20	200	1 U			10 U		1 U		1 U			1 U	
Tetrachloroethene (PCE)	3	300	2			413		1.7 U		1.7 U			1.7 U	
Toluene	40	400	1 U			308		1 U		1 U			1 U	
trans-1,2-Dichloroethene	100	1000	1.5			11.7 U		1.2 U		1.2 U			1.2 U	
trans-1,3-Dichloropropene	NA	NA	1.2 U			11.7 U		1.2 U		1.2 U			1.2 U	
Trichloroethene (TCE)	3	300	1.8			19.3		0.38 J		1.1 U			1.1 U	
Trichlorofluoromethane	2100	21000	1.4 U			14.4 U		1.4 U		1.4 U			1.4 U	
Vinyl chloride	1	100	1.4 U			13.8 U		1.4 U		1.4 U			1.4 U	
Xylenes, total	20	200	3 U			11200		3 U		0.57 J			3 U	
SW8270C														
	Sample Date		5/28/2008					5/29/2008					6/2/2008	
1,2,4,5-tetrachlorobenzene	2.1	21	6.8 U			6.8 U		6.8 U		6.8 U			6.8 U	
2,2'-Oxybis(1-chloro)propane	10	100	10.2 U			10.2 U		10.2 U		10.2 U			10.2 U	
2,4,5-Trichlorophenol	1	10	10.5 U			10.5 U		10.5 U		10.5 U			10.5 U	
2,4,6-Trichlorophenol	3.2	320	11.1 U			11.1 U		11.1 U		11.1 U			11.1 U	
2,4-Dichlorophenol	0.3	3	9.5 U			9.6 U		9.6 U		9.5 U			9.5 U	
2,4-Dimethylphenol	140	1400	7.1 U			45		p		7.1 U			7.1 U	
2,4-Dinitrophenol	14	140	20.5 U			20.6 U		20.6 U		20.5 U			20.5 U	
2,4-Dinitrotoluene	0.05	5	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
2,6-Dinitrotoluene	0.05	5	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
2-Chloronaphthalene	560	5600	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
2-Chlorophenol	35	350	8.9 U			9 U		9 U		8.9 U			8.9 U	
2-Methylnaphthalene	28	280	8.6 U			52.4		87.6		8 J			9.5	
2-Methylphenol (o-Cresol)	35**	350	8 U			25		8 U		8 U			8 U	
2-Nitroaniline	21	210	9.2 U			9.3 U		9.3 U		9.2 U			9.2 U	
2-Nitrophenol	NA	NA	10.5 U			10.5 U		10.5 U		10.5 U			10.5 U	
3,3'-Dichlorobenzidine	0.08	8	8.3 U			8.4 U		8.4 U		8.3 U			8.3 U	
3-Nitroaniline	1.7	170	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
4,6-Dinitro-2-methylphenol	NA	NA	20.5 U			20.6 U		20.6 U		20.5 U			20.5 U	
4-Bromophenyl phenyl ether	70	700	7.1 U			7.1 U		7.1 U		7.1 U			7.1 U	
4-Chloro-3-methylphenol	63	630	8.3 U			8.4 U		8.4 U		8.3 U			8.3 U	
4-Chloroaniline	28	280	9.2 U			9.3 U		9.3 U		9.2 U			9.2 U	
4-Chlorophenyl phenyl ether	NA	NA	7.7 U			7.7 U		7.7 U		7.7 U			7.7 U	
4-Methylphenol (p-Cresol)	3.5**	35	18.8 U			27.4		18.9 U		18.8 U			18.8 U	
4-Nitroaniline	1.7	170	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
4-Nitrophenol	56	560	10.2 U			10.3 U		10.3 U		10.2 U			10.2 U	

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PSC 47 Groundwater Sampling	StationID		MW-01S	MW-02S	MW-03S	MW-04S	MW-10S	MW-11S	MW-12S	MW-13S	MW-14S	MW-15S	MW-25S	MW-26S
	SampleID		JAX47-937-MW01S	JAX47-937-MW2S	JAX47-937-MW3S	JAX47-937-MW4S	JAX47-MW-10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S
	Sample Date		5/28/2008	5/28/2008	5/28/2008	6/2/2008	6/19/2008	5/29/2008	5/27/2008	6/2/2008	6/2/2008	6/2/2008	5/29/2008	5/28/2008
	Units in ug/L													
Parameter	GCTL[1]	NADC												
Acenaphthene	20	200	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
Acenaphthylene	210	2100	9.2 U			9.3 U		9.3 U		9.2 U			9.2 U	
Acetophenone	700	7000	12.3 U			43.5		4.2 J		12.3 U			12.3 U	
Anthracene	2100	21000	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
Atrazine	3	300	4.1 U			4.1 U		4.1 U		4.1 U			4.1 U	
Benzaldehyde	700	7000	4.1 U			4.1 U		4.1 U		4.1 U			4.1 U	
Benzo(a)anthracene	0.05	5	8 U			8 U		8 U		8 U			8 U	
Benzo(a)pyrene	0.2	20	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
Benzo(b)fluoranthene	0.05	5	8 U			8 U		8 U		8 U			8 U	
Benzo(g,h,i)perylene	210	2100	8 U			8 U		8 U		8 U			8 U	
Benzo(k)fluoranthene	0.5	50	8.9 U			9 U		9 U		8.9 U			8.9 U	
Benzyl butyl phthalate	140**	1400	9.2 U			9.3 U		9.3 U		9.2 U			9.2 U	
biphenyl (diphenyl)	0.5	5	4.1 U			2.2 J		9.2		4.1 U			1.3 J	
Bis(2-Chloroethoxy) methane	NA	NA	10.8 U			5.3 J		10.8 U		10.8 U			10.8 U	
bis(2-Chloroethyl) ether (2-Chloroethyl ether)	0.03	3	9.2 U			9.3 U		9.3 U		9.2 U			9.2 U	
bis(2-Ethylhexyl) phthalate	6	600	13.5 U			13.6 U		13.6 U		13.5 U			13.5 U	
caprolactam	NA	NA	0.74 J			4.1 U		4.1 U		8.8 JB			12.5 JB	
Carbazole	1.8	180	9.5 U			9.6 U		9.6 U		9.5 U			9.5 U	
Chrysene	4.8	480	8.9 U			9 U		9 U		8.9 U			8.9 U	
Di-n-butyl phthalate	700	7000	8.9 U			9 U		9 U		8.9 U			8.9 U	
Di-n-octylphthalate	140	1400	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
Dibenz(a,h)anthracene	0.005	0.5	8.3 U			8.4 U		8.4 U		8.3 U			8.3 U	
Dibenzofuran	28	280	8.3 U			8.4 U		8.4 U		8.3 U			8.3 U	
Diethyl phthalate	5600	56000	8.6 U			26.3		8.6 U		8.6 U			8.6 U	
Dimethyl phthalate	70000	700000	9.2 U			9.3 U		9.3 U		9.2 U			9.2 U	
Fluoranthene	280	2800	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
Fluorene	280	2800	8.9 U			9 U		9 U		8.9 U			8.9 U	
Hexachlorobenzene	1	100	8 U			8 U		8 U		8 U			8 U	
Hexachlorobutadiene	0.4	40	7.7 U			7.7 U		7.7 U		7.7 U			7.7 U	
Hexachlorocyclopentadiene	50	500	6.8 U			6.8 U		6.8 U		6.8 U			6.8 U	
Hexachloroethane	2.5	250	8 U			8 U		8 U		8 U			8 U	
Indeno(1,2,3-c,d)pyrene	0.05	5	8 U			8 U		8 U		8 U			8 U	
Isophorone	37	3700	11.7 U			11.8 U		11.8 U		11.7 U			11.7 U	
n-Nitrosodi-n-propylamine	0.005	0.5	9.2 U			9.3 U		9.3 U		9.2 U			9.2 U	
n-Nitrosodiphenylamine	7.1	710	10.5 U			10.5 U		10.5 U		10.5 U			10.5 U	
Naphthalene	14**	140	8.6 U			102		227		7 J			18.8	
Nitrobenzene	3.5	35	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
Pentachlorophenol	1	100	20.5 U			20.6 U		20.6 U		20.5 U			20.5 U	
Phenanthrene	210	2100	8.6 U			8.6 U		8.6 U		8.6 U			8.6 U	
Phenol	10	100	20.5 U			6.8 J		20.6 U		20.5 U			20.5 U	
Pyrene	210	2100	8.9 U			9 U		9 U		8.9 U			8.9 U	
SW6010B														
	Sample Date												5/29/2008	
Iron-Dissolved	300	3000	774			28800		34.5 J		362			647	
Manganese-Dissolved	50	500	91.6			299		2.53 J		7.32 J			17.9	
1632AM														
Arsenic-III	NA	NA	34	3400	4900						5.0 U	5.0 U		
Arsenic-V	NA	NA	9.7	130	4400						5.0 U	5.0 U		
A3500D														
Ferrous Iron	NA	NA	360 U			7210		972		314 J			835	
E310.1														
Alkalinity, total (as CaCO3)	NA	NA	9000 J			20000		12000 J		9000 J			11000 J	

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PSC 47 Groundwater Sampling	StationID		MW-01S	MW-02S	MW-03S	MW-04S	MW-10S	MW-11S	MW-12S	MW-13S	MW-14S	MW-15S	MW-25S	MW-26S
	SampleID		JAX47-937-MW01S	JAX47-937-MW2S	JAX47-937-MW3S	JAX47-937-MW4S	JAX47-MW-10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S
	Sample Date		5/28/2008	5/28/2008	5/28/2008	6/2/2008	6/19/2008	5/29/2008	5/27/2008	6/2/2008	6/2/2008	6/2/2008	5/29/2008	5/28/2008
	Units in ug/L													
Parameter	GCTL[1]	NADC												
RSK-175														
Ethane	NA	NA	1.8 U			1.8 U		1.8 U		1.8 U			1.8 U	
Ethene	NA	NA	1.3 U			1.3 U		1.3 U		1.3 U			1.3 U	
Methane	NA	NA	83.3 B			1400 B		85.6 B		20.3 B			37.3 B	
SM4500-SO3														
Sulfide	NA	NA	6 J			3000		5.8 U		5.8 U			5.8 U	
SM5310C														
Total organic carbon	NA	NA	7600 J			35000		13000		6600 J			7000 J	
SW300.1														
Nitrogen, nitrate (as n)	10000	100000	26.8 J			100 U		544		1690			945	
Sulfate (as SO4)	250000	2500000	116000			92200 B		13600		52200 B			33200	

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC Groundwater Cleanup Target Levels (GCTLs) reported in µg/L
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated method and/or calibration blank.
Values Bolded are analytes not detected by the Lab but are above the GCTL
Values Shaded Pale Yellow are analytes not detected by the Lab but are above the NADC
Values Bolded and Shaded Pale Yellow are analytes not detected by the Lab but are above both GCTL and NADC
Values Bold and Pale Blue are hits exceeding the GCTL
Values Shaded Grey are hits that exceed the NADC
Values Bold and Shaded Grey are hits that exceed both GCTL and NADC
NA - Not Available at time of rule adoption

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Groundwater Analytical Data Summary
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PSC 47 Groundwater Sampling	StationID		MW-30S	MW-32S	MW-33S	MW-34S	3280	MW-36S	MW-37S	MW-38S	MW-39S	MW-40S	MW-41S	MW-42S	MW-43S
	SampleID		JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	Sample Date		5/28/2008	5/29/2008	5/27/2008	5/29/2008	5/28/2008	5/27/2008	6/2/2008	5/27/2008	6/2/2008	6/2/2008	5/27/2008	5/27/2008	5/27/2008
	Units in ug/L														
Parameter	GCTL[1]	NADC													
SW6010B															
Arsenic	10	100	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.3 U	4.99 J
SW8081															
Aldrin	0.002	0.2	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.026 U	0.025 U	0.026 U	0.025 U	0.025 U	0.026 U	0.026 U
alpha bhc (alpha hexachlorocyclohexane)	0.006	0.6	0.0092 U	0.0093 U	0.41	0.0094 U	0.0092 U	0.87	0.0092 U	0.12	0.0092 U	0.0091 U	0.038 J	1.6	6.3
alpha endosulfan	42	420	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.051 U	0.05 U	0.051 U	0.05 U	0.05 U	0.051 U	0.051 U
alpha-chlordane	NA	NA	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.0079 J	0.01 J	0.051 U	0.069 J	0.05 U	0.051 U	0.051 U
beta bhc (beta hexachlorocyclohexane)	0.02	2	0.051 U	0.0094 J	0.43	0.61	0.051 U	0.35 J	0.051 U	0.017 J	0.051 U	0.05 U	0.098	0.74	6.9
beta endosulfan	42	420	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.051 U	0.05 U	0.051 U	0.05 U	0.05 U	0.051 U	0.051 U
chlordane	2	200	0.51 U	0.52 U	0.51 U	0.52 U	0.51 U	0.51 U	0.51 U	0.5 U	0.51 U	0.5 U	0.5 U	0.51 U	0.51 U
delta bhc (delta hexachlorocyclohexane)	2.1	21	0.051 U	0.0058 J	0.084	0.052 U	0.051 U	0.59	0.051 U	0.078	0.051 U	0.05 U	0.026 J	2.4	6.5
Dieldrin	0.002	0.2	0.0083 U	0.0084 U	0.19	0.0084 U	0.0083 U	0.0083 U	0.0083 U	0.0046 J	0.0083 U	0.0082 U	0.0082 U	0.0082 U	0.0082 U
endosulfan sulfate	42	420	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.051 U	0.05 U	0.051 U	0.05 U	0.05 U	0.051 U	0.051 U
endrin	2	20	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.051 U	0.05 U	d	0.05 U	0.05 U	0.051 U	0.051 U
endrin aldehyde	NA	NA	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.051 U	0.05 U	0.051 U	0.05 U	0.05 U	0.051 U	0.051 U
endrin ketone	NA	NA	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.051 U	0.05 U	0.051 U	0.05 U	0.05 U	0.051 U	0.051 U
gamma bhc (lindane)	0.2	20	0.051 U	0.052 U	0.38	0.0043 J	0.051 U	2.4	0.051 U	0.082	0.051 U	0.05 U	0.0041 J	1.5	8.1
gamma-chlordane	NA	NA	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.048 J	0.024 J	0.051 U	0.028 J	0.05 U	0.051 U	0.051 U
heptachlor	0.4	40	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.051 U	0.05 U	0.051 U	0.05 U	0.05 U	0.051 U	0.051 U
heptachlor epoxide	0.2	20	0.051 U	0.0096 J	0.22	0.052 U	0.051 U	0.051 U	0.051 U	0.011 J	0.051 U	0.05 U	0.038 J	0.051 U	0.051 U
methoxychlor	40	400	0.051 U	0.052 U	0.051 U	0.052 U	0.051 U	0.051 U	0.051 U	0.05 U	0.051 U	0.05 U	0.05 U	0.051 U	0.051 U
p,p'-DDD	0.1	10	0.051 U	0.052 U	0.051 U	0.066	0.051 U	4.7	0.051 U	0.039 J	0.051 U	3.4	0.05 U	0.16 J	0.051 U
p,p'-DDE	0.1	10	0.051 U	0.052 U	0.051 U	0.0096 J	0.051 U	0.032 J	0.051 U	0.05 U	0.051 U	0.05 U	0.05 U	0.07 J	0.051 U
p,p'-DDT	0.1	10	0.012 J	0.052 U	0.051 U	0.94	0.051 U	6.4	0.051 U	0.0026 J	0.051 U	0.15	0.05 U	0.061	0.015 J
toxaphene	3	300	0.55 U	0.56 U	0.55 U	0.56 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U
SW8260B															
	Sample Date			6/10/2008		6/10/2008								6/10/2008	
1,1,1-Trichloroethane	200	2000		1 U		1 U			1 U		1 U	1 U		1 U	
1,1,2,2-Tetrachloroethane	0.2	20		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000		2.4 U		2.4 U			2.4 U		2.4 U	2.4 U		2.4 U	
1,1,2-Trichloroethane	5	500		1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
1,1-Dichloroethane	70**	700		1 U		1 U			1 U		1 U	1 U		1 U	
1,1-Dichloroethene	7**	70		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
1,2,3-trichlorobenzene	70	700		1 U		1 U			1 U		1 U	1 U		1 U	
1,2,4-Trichlorobenzene	70	700		1.5 U		1.5 U			1.5 U		1.5 U	1.5 U		1.5 U	
1,2-Dibromo-3-chloropropane	0.2	20		6 U		6 U			6 U		6 U	6 U		6 U	
1,2-Dibromoethane (Ethylene dibromide)	0.02	2		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
1,2-Dichlorobenzene	600	6000		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
1,2-Dichloroethane	3	300		1.3 U		1.3 U			1.3 U		1.3 U	1.3 U		1.3 U	
1,2-Dichloropropane	5	500		1.6 U		1.6 U			1.6 U		1.6 U	1.6 U		1.6 U	
1,3-Dichlorobenzene	210	2100		1 U		1 U			1 U		1 U	1 U		1 U	
1,4-Dichlorobenzene	75	7500		1 U		1 U			1 U		1 U	1 U		1.9	
2-Hexanone	280	2800		5.1 U		5.1 U			5.1 U		5.1 U	5.1 U		5.1 U	
Acetone	6300	63000		18 U		18 U			18 U		18 U	18 U		18 U	
Benzene	1	100		1 U		1 U			1 U		1 U	1 U		0.35 J	
Bromochloromethane	91	910		2.2 U		2.2 U			2.2 U		2.2 U	2.2 U		2.2 U	
Bromodichloromethane	0.6	60		1.3 U		1.3 U			1.3 U		1.3 U	1.3 U		1.3 U	
Bromoform	4.4	440		1.9 U		1.9 U			1.9 U		1.9 U	1.9 U		1.9 U	
Bromomethane	9.8	98		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Carbon disulfide	700	7000		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
Carbon tetrachloride	3	300		1.5 U		1.5 U			1.5 U		1.5 U	1.5 U		1.5 U	
Chlorobenzene	100	1000		1 U		1 U			1 U		1 U	1 U		1.4	

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PSC 47 Groundwater Sampling	StationID		MW-30S	MW-32S	MW-33S	MW-34S	3280	MW-36S	MW-37S	MW-38S	MW-39S	MW-40S	MW-41S	MW-42S	MW-43S
	SampleID		JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	Sample Date		5/28/2008	5/29/2008	5/27/2008	5/29/2008	5/28/2008	5/27/2008	6/2/2008	5/27/2008	6/2/2008	6/2/2008	5/27/2008	5/27/2008	5/27/2008
	Units in ug/L														
Parameter	GCTL[1]	NADC													
Chloroethane	12	1200		2.8 U		2.8 U			2.8 U		2.8 U	2.8 U		2.8 U	
Chloroform	70	700		1 U		1 U			1 U		1 U	1 U		1 U	
Chloromethane	2.7	270		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
cis-1,2-Dichloroethene	70	700		1 U		1 U			1 U		1 U	1 U		1 U	
cis-1,3-Dichloropropene	NA	NA		1 U		1 U			1 U		1 U	1 U		1 U	
cyclohexane	NA	NA		1 U		1 U			1 U		1 U	1 U		1 U	
Dibromochloromethane	0.4	40		1 U		1 U			1 U		1 U	1 U		1 U	
Dichlorodifluoromethane	1400	14000		1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
Ethylbenzene	30	300		1 U		1 U			1 U		1 U	1 U		0.6 J	
Isopropylbenzene (Cumene)	0.8	8		1 U		1 U			1 U		1 U	1 U		4.5	
methyl acetate	3000	30000		7.2 U		7.2 U			7.2 U		7.2 U	7.2 U		7.2 U	
Methyl ethyl ketone (2-butanone)	4200	42000		6.6 U		6.6 U			6.6 U		6.6 U	6.6 U		6.6 U	
Methyl isobutyl ketone (4-methyl-2-pentanone)	560	5600		5 U		5 U			5 U		5 U	5 U		5 U	
methylcyclohexane	NA	NA		1.9 U		1.9 U			1.9 U		1.9 U	1.9 U		1.9 U	
Methylene chloride	5	500		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		0.82 JB	
Styrene	100	1000		1 U		1 U			1 U		1 U	1 U		1 U	
tert-butyl methyl ether	20	200		1 U		1 U			1 U		1 U	1 U		1 U	
Tetrachloroethene (PCE)	3	300		1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
Toluene	40	400		1 U		1 U			1 U		1 U	1 U		1 U	
trans-1,2-Dichloroethene	100	1000		1.2 U		1.2 U			1.2 U		1.2 U	1.2 U		1.2 U	
trans-1,3-Dichloropropene	NA	NA		1.2 U		1.2 U			1.2 U		1.2 U	1.2 U		1.2 U	
Trichloroethene (TCE)	3	300		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
Trichlorofluoromethane	2100	21000		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Vinyl chloride	1	100		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Xylenes, total	20	200		3 U		3 U			3 U		3 U	3 U		3 U	
SW8270C															
	Sample Date			5/29/2008		5/29/2008								5/27/2008	
1,2,4,5-tetrachlorobenzene	2.1	21		6.8 U		6.8 U			6.8 U		6.8 U	6.8 U		6.8 U	
2,2'-Oxybis(1-chloro)propane	10	100		10.2 U		10.2 U			10.2 U		10.2 U	10.2 U		10.2 U	
2,4,5-Trichlorophenol	1	10		10.5 U		10.5 U			10.5 U		10.5 U	10.5 U		10.5 U	
2,4,6-Trichlorophenol	3.2	320		11.1 U		11.1 U			11.1 U		11.1 U	11.1 U		11.1 U	
2,4-Dichlorophenol	0.3	3		9.5 U		9.6 U			9.6 U		9.6 U	9.5 U		9.6 U	
2,4-Dimethylphenol	140	1400		7.1 U		7.1 U			7.1 U		7.1 U	7.1 U		7.1 U	
2,4-Dinitrophenol	14	140		20.5 U		20.6 U			20.6 U		20.6 U	20.5 U		20.6 U	
2,4-Dinitrotoluene	0.05	5		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
2,6-Dinitrotoluene	0.05	5		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
2-Chloronaphthalene	560	5600		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
2-Chlorophenol	35	350		8.9 U		9 U			9 U		9 U	8.9 U		9 U	
2-Methylnaphthalene	28	280		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		14.1	
2-Methylphenol (o-Cresol)	35**	350		8 U		8 U			8 U		8 U	8 U		8 U	
2-Nitroaniline	21	210		9.2 U		9.3 U			9.3 U		9.3 U	9.2 U		9.3 U	
2-Nitrophenol	NA	NA		10.5 U		10.5 U			10.5 U		10.5 U	10.5 U		10.5 U	
3,3'-Dichlorobenzidine	0.08	8		8.3 U		8.4 U			8.4 U		8.4 U	8.3 U		8.4 U	
3-Nitroaniline	1.7	170		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
4,6-Dinitro-2-methylphenol	NA	NA		20.5 U		20.6 U			20.6 U		20.6 U	20.5 U		20.6 U	
4-Bromophenyl phenyl ether	70	700		7.1 U		7.1 U			7.1 U		7.1 U	7.1 U		7.1 U	
4-Chloro-3-methylphenol	63	630		8.3 U		8.4 U			8.4 U		8.4 U	8.3 U		8.4 U	
4-Chloroaniline	28	280		9.2 U		9.3 U			9.3 U		9.3 U	9.2 U		9.3 U	
4-Chlorophenyl phenyl ether	NA	NA		7.7 U		7.7 U			7.7 U		7.7 U	7.7 U		7.7 U	
4-Methylphenol (p-Cresol)	3.5**	35		18.8 U		18.9 U			18.9 U		18.9 U	18.8 U		18.9 U	
4-Nitroaniline	1.7	170		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
4-Nitrophenol	56	560		10.2 U		10.3 U			10.3 U		10.3 U	10.2 U		10.3 U	

Table 3-1
Groundwater Analytical Data Summary
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NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		MW-30S	MW-32S	MW-33S	MW-34S	3280	MW-36S	MW-37S	MW-38S	MW-39S	MW-40S	MW-41S	MW-42S	MW-43S
	SampleID		JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	Sample Date		5/28/2008	5/29/2008	5/27/2008	5/29/2008	5/28/2008	5/27/2008	6/2/2008	5/27/2008	6/2/2008	6/2/2008	5/27/2008	5/27/2008	5/27/2008
	Units in ug/L														
Parameter	GCTL[1]	NADC													
Acenaphthene	20	200		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
Acenaphthylene	210	2100		9.2 U		9.3 U			9.3 U		9.3 U	9.2 U		9.3 U	
Acetophenone	700	7000		12.3 U		12.4 U			12.4 U		12.4 U	12.3 U		12.4 U	
Anthracene	2100	21000		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
Atrazine	3	300		4.1 U		4.1 U			4.1 U		4.1 U	4.1 U		4.1 U	
Benzaldehyde	700	7000		4.1 U		4.1 U			4.1 U		4.1 U	4.1 U		4.1 U	
Benzo(a)anthracene	0.05	5		8 U		8 U			8 U		8 U	8 U		8 U	
Benzo(a)pyrene	0.2	20		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
Benzo(b)fluoranthene	0.05	5		8 U		8 U			8 U		8 U	8 U		8 U	
Benzo(g,h,i)perylene	210	2100		8 U		8 U			8 U		8 U	8 U		8 U	
Benzo(k)fluoranthene	0.5	50		8.9 U		9 U			9 U		9 U	8.9 U		9 U	
Benzyl butyl phthalate	140**	1400		9.2 U		9.3 U			9.3 U		9.3 U	9.2 U		9.3 U	
biphenyl (diphenyl)	0.5	5		4.1 U		4.1 U			4.1 U		4.1 U	4.1 U		8.6	
Bis(2-Chloroethoxy) methane	NA	NA		10.8 U		10.8 U			10.8 U		10.8 U	10.8 U		10.8 U	
bis(2-Chloroethyl) ether (2-Chloroethyl ether)	0.03	3		9.2 U		9.3 U			9.3 U		9.3 U	9.2 U		9.3 U	
bis(2-Ethylhexyl) phthalate	6	600		13.5 U		13.6 U			13.6 U		13.6 U	13.5 U		13.6 U	
caprolactam	NA	NA		15.5 JB		17.5 JB			11.7 JB		18 JB	14.4 JB		19.5 JB	
Carbazole	1.8	180		9.5 U		9.6 U			9.6 U		9.6 U	9.5 U		9.6 U	
Chrysene	4.8	480		8.9 U		9 U			9 U		9 U	8.9 U		9 U	
Di-n-butyl phthalate	700	7000		8.9 U		9 U			9 U		9 U	8.9 U		9 U	
Di-n-octylphthalate	140	1400		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
Dibenz(a,h)anthracene	0.005	0.5		8.3 U		8.4 U			8.4 U		8.4 U	8.3 U		8.4 U	
Dibenzofuran	28	280		8.3 U		8.4 U			8.4 U		8.4 U	8.3 U		8.4 U	
Diethyl phthalate	5600	56000		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
Dimethyl phthalate	70000	700000		9.2 U		9.3 U			9.3 U		9.3 U	9.2 U		9.3 U	
Fluoranthene	280	2800		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
Fluorene	280	2800		8.9 U		9 U			9 U		9 U	8.9 U		9 U	
Hexachlorobenzene	1	100		8 U		8 U			8 U		8 U	8 U		8 U	
Hexachlorobutadiene	0.4	40		7.7 U		7.7 U			7.7 U		7.7 U	7.7 U		7.7 U	
Hexachlorocyclopentadiene	50	500		6.8 U		6.8 U			6.8 U		6.8 U	6.8 U		6.8 U	
Hexachloroethane	2.5	250		8 U		8 U			8 U		8 U	8 U		8 U	
Indeno(1,2,3-c,d)pyrene	0.05	5		8 U		8 U			8 U		8 U	8 U		8 U	
Isophorone	37	3700		11.7 U		11.8 U			11.8 U		11.8 U	11.7 U		11.8 U	
n-Nitrosodi-n-propylamine	0.005	0.5		9.2 U		9.3 U			9.3 U		9.3 U	9.2 U		9.3 U	
n-Nitrosodiphenylamine	7.1	710		10.5 U		10.5 U			10.5 U		10.5 U	10.5 U		10.5 U	
Naphthalene	14**	140		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		10.1	
Nitrobenzene	3.5	35		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
Pentachlorophenol	1	100		20.5 U		20.6 U			20.6 U		20.6 U	20.5 U		20.6 U	
Phenanthrene	210	2100		8.6 U		8.6 U			8.6 U		8.6 U	8.6 U		8.6 U	
Phenol	10	100		20.5 U		20.6 U			20.6 U		20.6 U	20.5 U		20.6 U	
Pyrene	210	2100		8.9 U		9 U			9 U		9 U	8.9 U		9 U	
SW6010B															
	Sample Date														
Iron-Dissolved	300	3000		67		143			1420		152	25.8 J		56.3	
Manganese-Dissolved	50	500		28.3		25.6			15		7.45 J	6.34 J		10.9	
1632AM															
Arsenic-III	NA	NA					5.0 U		5.0 U		5.0 U	5.0 U	5.0 U		
Arsenic-V	NA	NA					5.0 U		5.0 U		5.0 U	5.0 U	5.0 U		
A3500D															
Ferrous Iron	NA	NA		360 U		360 U			766		360 U	360 U		360 U	
E310.1															
Alkalinity, total (as CaCO3)	NA	NA		6000 J		11000 J			12000 J		52000	110000		23000	

Table 3-1
Groundwater Analytical Data Summary
May 2008
NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		MW-30S	MW-32S	MW-33S	MW-34S	3280	MW-36S	MW-37S	MW-38S	MW-39S	MW-40S	MW-41S	MW-42S	MW-43S
	SampleID		JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	Sample Date		5/28/2008	5/29/2008	5/27/2008	5/29/2008	5/28/2008	5/27/2008	6/2/2008	5/27/2008	6/2/2008	6/2/2008	5/27/2008	5/27/2008	5/27/2008
	Units in ug/L														
Parameter	GCTL[1]	NADC													
RSK-175															
Ethane	NA	NA		1.8 U		1.8 U			1.8 U		1.8 U	1.8 U		0.21 J	
Ethene	NA	NA		1.3 U		1.3 U			1.3 U		1.3 U	1.3 U		1.3 U	
Methane	NA	NA		2.7 B		2.8 B			4.8 B		2.6 B	2.5 B		53.4 B	
SM4500-SO3															
Sulfide	NA	NA		5.8 U		27 J			5.8 U		5.8 U	5.8 U		12 J	
SM5310C															
Total organic carbon	NA	NA		3400 U		3400 U			6600 J		4200 J	5000 J		6700 J	
SW300.1															
Nitrogen, nitrate (as n)	10000	100000		134		104			100 U		5010	4200		3050	
Sulfate (as SO4)	250000	2500000		11500		18600			15800		13000	18800		37100	

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC Groundwater Cleanup Target Levels (GCTLs) reported in µg/L
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated method and/or calibration blank.
Values Bolded are analytes not detected by the Lab but are above the GCTL
Values Shaded Pale Yellow are analytes not detected by the Lab but are above the NADC
Values Bolded and Shaded Pale Yellow are analytes not detected by the Lab but are above both GCTL and NADC
Values Bold and Pale Blue are hits exceeding the GCTL
Values Shaded Grey are hits that exceed the NADC
Values Bold and Shaded Grey are hits that exceed both GCTL and NADC
NA - Not Available at time of rule adoption

Table 3-2
Groundwater Statistical Data Summary
May 2008 through March 2009
PSC 47, NAS Jacksonville

Parameter	Number of Samples	Number of Detects				Minimum Concentration (ug/L)				Maximum Concentration (ug/L)				GCTL (ug/L)	Exceed GCTL				NADC (ug/L)	Exceed NADC				Location of Maximum Concentration				Location of Minimum Concentration			
		Q1	Q2	Q3	Q4	baseline	Q2	Q3	Q4	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Arsenic	25	6	19	17	16	4.99 J	4.62 B	3.5 B	3.52 J	8150	13200	8980	4870	10	3	13	9	6	100	2	5	4	4	MW03S	MW03S	MW03S	MW03S	MW43S	MW35S	MW33S	MW42S
Pesticides																															
alpha BHC	25	11	13	15	11	0.038 J	0.0054	0.0055 JB	0.0066	6.4	3.6	6.2	9.1 J	0.01	11	12	14	11	0.60	7	4	7	6	MW11S,MW13S	MW03S	MW43S	MW43S	MW41S	MW25S	MW39S	MW12S
beta BHC	25	13	14	15	14	0.0094 J	0.021 J	0.0400	0.016 J	6.9	15.0	7.3	8.4	0.02	11	14	15	12	2.00	2	4	5	3	MW43S	MW36S	MW43S	MW43S	MW32S	MW26S	MW26S	MW30S
delta BHC	25	12	12	12	12	0.0058 J	0.004 J	0.046 J	0.0085	6.5	4.8	7.6	10.0	2.1	5	2	4	3	21	0	0	0	0	MW43S	MW03S	MW43S	MW43S	MW32S	MW14S	MW41S	MW34S
Dieldrin	25	5	10	9	9	0.0046 J	0.0037	0.0042 J	0.0039	1.1	3.7	0.8 J	0.29	0.002	5	10	9	9	0.2	1	2	4	2	MW03S	MW03S	MW03S	MW03S	MW38S	MW41S	MW41S	MW35S
gamma BHC	25	12	13	13	12	0.0041 J	0.0031	0.011 J	0.0045 J	9.6	11.0	7.5	10.0	0.2	8	6	9	7	20	0	0	0	0	MW11S	MW36S	MW43S	MW43S	MW41S	MW12S	MW39S	MW10S
heptachlor epoxide	25	7	6	9	5	0.0096 J	0.0062 J	0.0047 J	0.0310	0.22	0.61	0.31	0.46	0.2	1	1	1	1	20	0	0	0	0	MW33S	MW43S	MW33S	MW33S	MW32S	MW14S	MW38S	MW41S
p,p'-DDD	25	9	11	9	7	0.039 J	0.0039 J	0.007 J	0.0130	18	32	14	11 JB	0.1	6	4	5	4	10	1	1	2	1	MW 03S	MW 03S	MW02S,MW03S	MW 03S	MW14S, MW38S	MW35S	MW14S	MW14S
p,p'-DDE	25	5	4	5	4	0.007 J	0.0039 J	0.0048 J	.010 J	0.17 J	0.069 J	0.23	0.11	0.1	1	0	2	1	10	0	0	0	0	MW03S	MW13S	MW03S	MW03S	MW14S	MW40S	MW14S	MW14S
p,p'-DDT	25	10	12	7	8	0.0026 J	0.0016 J	0.034 J	0.0016 J	6.4	8.5	4.2	2.6	0.1	5	4	4	2	10	0	0	0	0	MW36S	MW36S	MW36S	MW36S	MW38S	MW37S	MW42S	MW37S
Volatile Organic Compounds																															
Benzene	11	5	3	5	5	0.3 J	0.5 J	0.49 J	0.54 J	18.6	9.7	5.6 J	3.2	1	1	2	3	3	100	0	0	0	0	MW04S	MW04S	MW04S	MW04S	MW25S	MW11S	MW13S	MW13S
cis-1,2-Dichloroethene	11	2	3	3	3	48.9	1.2	2.1	2.0	705	439	292	194	70	1	2	2	2	700	1	0	0	0	MW04S	MW04S	MW04S	MW04S	MW01S	MW11S	MW11S	MW11S
Ethylbenzene	11	4	3	4	4	0.38 J	1.10	1.20	0.53 J	379	222	123	68.3	30	1	1	1	1	300	1	0	0	0	MW04S	MW04S	MW04S	MW04S	MW13S	MW11S	MW42S	MW42S
Isopropylbenzene (Cumene)	11	5	3	3	4	0.38 J	0.78 J	0.53 J	1.20	15.1	9.1	4.7	5.7	0.8	3	2	2	4	8	1	1	0	0	MW04S	MW04S	MW11S	MW11S	MW13S	MW01S	MW01S	MW01S
Tetrachloroethene (PCE)	11	2	2	2	2	2	0.7 J	0.9 J	1.4 J	413	95	93.7	67.1	3	1	1	1	1	300	1	0	0	0	MW04S	MW04S	MW04S	MW04S	MW01S	MW01S	MW01S	MW01S
Toluene	11	1	3	1	2	308	1.0 JB	55.4 JB	6.1	308	133 JB	55.4 JB	17.6	40	1	1	1	0	400	0	0	0	0	MW04S	MW04S	MW04S	MW04S	MW04S	MW01S	MW04S	MW01S
Trichloroethene (TCE)	11	3	3	3	3	0.38 J	1.7	1.50	1.40	19.3	7.2	6.2 J	4.6	3	1	1	2	1	300	0	0	0	0	MW04S	MW04S	MW04S	MW11S	MW11S	MW01S	MW01S	MW01S
Xylenes, total	11	2	3	5	5	0.57 J	2.6 J	0.58 J	0.93 J	11200	5490	3390 JB	1320	20	1	2	1	2	200	1	1	1	2	MW04S	MW04S	MW04S	MW04S	MW13S	MW11S	MW13S	MW13S
Semi-volatile Organic Compounds																															
2-Methylnaphthalene	11	5	3	4	5	8 J	4.8 J	3.2 J	11.4	87.6	51	36.4	48.7	28	2	1	1	2	280	0	0	0	0	MW11S	MW04S	MW04S	MW11S	MW13S	MW01S	MW01S	MW01S
4-Methylphenol (p-Cresol)	11	1	1	0	0	27.4	9.9 J	NA	NA	27.4	9.9 J	NA	NA	35	1	0	NA	NA	350	0	0	NA	NA	MW04S	MW04S	NA	NA	MW04S	MW04S	NA	NA
biphenyl (diphenyl)	11	4	3	1	4	1.3 J	0.76 J	3.4 J	1.1 J	9.2	3.1 J	3.4 J	6.8	0.5	4	3	1	4	5	2	0	0	2	MW11S	MW04S	MW11S	MW42S	MW25S	MW01S	MW11S	MW01S
Naphthalene	11	5	3	4	5	7 J	7.6 J	4.6 J	7 J	227	91.3	78.5	166	14	3	2	3	4	140	1	0	0	1	MW11S	MW04S	MW11S	MW11S	MW13S	MW01S	MW01S	MW13S
Natural Attenuation Parameters																															
Iron-Dissolved	11	11	11	11	11	25.8 J	9.85 B	6.18 J	8.31 B	28800	30300 JB	30100 B	25700	300	5	3	5	5	3000	1	2	2	2	MW04S	MW01S	MW04S	MW04S	MW40S	MW39S	MW40S	MW39S
Manganese-Dissolved	11	11	11	9	11	2.53 J	1.3 JB	4.03 J	1.45 B	299	222 JB	285 B	398	50	2	1	2	2	500	0	0	0	0	MW04S	MW04S	MW04S	MW01S	MW11S	MW34S	MW13S	MW39S
Ferrous Iron	11	5	6	5	6	314 J	96 J	510	99 J	7210	9510	5850	7490	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	MW04S	MW01S	MW01S	MW04S	MW13S	MW42S	MW25S	MW42S
Arsenic-III	10	3	4	4	4	34	180	16	6	4900	23000	7100	5300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	MW03S	MW03S	MW02S	MW03S	MW01S	MW37S	MW37S	MW37S
Arsenic-V	10	3	6	5	4	9.7	1.0 J	13	12	4400	5800	560	900	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	MW03S	MW03S	MW03S	MW03S	MW01S	MW39S	MW40S	MW01S
Alkalinity	11	11	11	11	10	6000 J	22000	8000 J	9000 J	110000	390000	89000	110000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	MW40S	MW13S	MW40S	MW39S	MW32S	MW11S	MW11S	MW04S
Ethane	11	1	0	0	1	0.21 J	NA	NA	0.26 J	0.21 J	NA	NA	0.26 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	MW42S	NA	NA	MW11S	MW42S	NA	NA	MW11S
Ethene	11	0	0	0	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA	NA
Methane	11	11	11	11	11	2.5 B	2.2 JB	2.2 B	2.3 B	1400 B	3380 JB	3250 B	1420 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	MW04S	MW04S	MW04S	MW04S	MW40S	MW13S,MW40S	MW34S,MW40S	MW39S
Sulfide	11	4	1	0	0	6 J	69	NA	NA	3000	69	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	MW04S	MW04S	NA	NA	MW01S	MW04S	NA	NA
Total Organic Carbon	11	9	7	9	8	4200 J	3700 J	3800 J	4800 J	35000	30000	18000	21000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	MW04S	MW37S	MW04S	MW04S	MW39S	MW39S	MW34S	MW42S
Nitrogen, nitrate (as n)	11	9	9	8	9	26.8 J	165 J	221	27.4 B	5010	9480 J	6800 J	6300 J	10000	0	0	0	0	100000	0	0	0	0	MW39S	MW13S	MW40S	MW40S	MW01S	MW25S	MW32S	MW04S
Sulfate	11	11	11	11	11	11500	2030	8590 B	4980	116000	89100 JB	243000 B	307000	250000	0	0	0	2	2500000	0	0	0	0	MW01S	MW04S	MW04S	MW01S	MW32S	MW37S	MW39S	MW39S

ug/L - micrograms per liter
J - estimated value
NA - not available
GCTL - FDEP Groundwater Cleanup Target Level
NADC - FDEP Natural Attenuation Default Concentration

Table 3-3
Groundwater Analytical Results Summary
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PSC 47 Groundwater Sampling	StationID		JAX47-93-MW01S	JAX47-937-MW02S	JAX47-937-MW03S	JAX47-937-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S	JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S
	SampleID		064MW01SQ3	064MW02SQ3	064MW03SQ3	064MW04SQ3	064MW10SQ3	064MW11SQ3	064MW12SQ3	064MW13SQ3	064MW14SQ3	064MW15SQ3	064MW25SQ3	064MW26SQ3	064MW30SQ3	064MW32SQ3	064MW33SQ3	064MW34SQ3
	Sample Date		9/25/2008	9/26/2008	9/26/2008	9/29/2008	10/2/2008	10/1/2008	10/1/2008	9/30/2008	9/29/2008	9/29/2008	9/30/2008	10/2/2008	10/2/2008	10/1/2008	10/1/2008	9/25/2008
	Units in ug/L																	
Parameter	GCTL[1]	NADC																
1632AM																		
Arsenic-III	NA	NA	400	11000	23000						0.3 U	0.3 U						
Arsenic-V	NA	NA	36	560	5800						0.28 U	0.28 U						
A3500D																		
Ferrous Iron	NA	NA	9510			4570		360 U		103 J			360 U			360 U		106 J
E310.1																		
Alkalinity, total (as CaCO3)	NA	NA	24000 JB			50000 JB		22000		390000			37000			24000		140000 JB
RSK-175																		
Ethane	NA	NA	1.8 U			1.8 U		1.8 U		1.8 U			1.8 U			1.8 U		1.8 U
Ethene	NA	NA	1.3 U			1.3 U		1.3 U		1.3 U			1.3 U			1.3 U		1.3 U
Methane	NA	NA	294 JB			3380 JB		32.4 B		2.2 B			21.1 B			3 B		2.3 JB
SM4500-SO3																		
Sulfide	NA	NA	5.8 U															5.8 U
SM4500S-D																		
Sulfide	NA	NA				69		5.8 U		5.8 U			5.8 U			5.8 U		
SM5310C																		
Total organic carbon	NA	NA	12000 J			21000 J		14000 U		14000 U			14000 U			14000 U		17000 J
SW300.1																		
nitrogen, nitrate (as n)	10000	100000	100 UJ			1170 J		1340		9480 J			165 J			439		1110 J
Sulfate (as SO4)	250000	2500000	47900 B			89100 JB		9980		33300			4680			13800		32500
SW6010B																		
Arsenic	10	100	460 B	11700	13200 B	14.5 B	3.31 U	5.21 B	24.6 B	55.9	7.96 B	6.45 B	3.31 U	3.31 U	3.31 U	3.31 U	9.88 B	16 B
Iron-Dissolved	300	3000	30300 JB			19900 JB		38.5 B		21.2 J			209			50.8 B		28.3 JB
Manganese-Dissolved	50	500	29 JB			222 JB		3.39 J		3.26 J			2.32 J			16.5		1.3 JB
SW8081																		
Aldrin	0.002	0.2	0.024 U	2.4 U	2.4 U	0.024 U	0.024 U	0.026 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.026 U	0.024 U	0.024 U
alpha bhc (alpha hexachlorocyclohexane)	0.006	0.6	0.0086 U	0.86 U	3.6	0.0085 U	0.0085 U	1.8	0.028	0.36	0.0085 U	0.0085 U	0.0054 J	0.0085 U	0.0085 U	0.074	0.048	0.023 J
alpha endosulfan	42	420	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	0.21 J	0.047 U	0.047 U	0.022 J	0.019 J	0.047 U	0.051 U	0.047 U	0.56 J
alpha-chlordane	NA	NA	0.018 J	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	1	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.02 J	0.047 U	0.047 U
beta bhc (beta hexachlorocyclohexane)	0.02	2	0.048 U	4.8 U	4.1 J	0.047 U	0.047 U	0.33	0.2	0.25	0.047 U	0.047 U	0.27	0.021 J	0.047 U	7.3	0.65	7
beta endosulfan	42	420	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
chlordane	2	200	0.48 U	48 U	48 U	0.47 U	0.47 U	0.51 U	0.47 U	6.9	0.47 U	0.47 U	0.48 U	0.47 U	0.47 U	0.24 J	0.47 U	0.47 U
delta bhc (delta hexachlorocyclohexane)	2.1	21	0.048 U	4.8 U	4.8	0.047 U	0.047 U	1.7	0.047 U	0.35	0.004 J	0.047 U	0.0081 J	0.025 J	0.047 U	0.86 J	0.03 J	0.047 U
Dieldrin	0.002	0.2	0.0077 U	0.77 U	3.7	0.0077 U	0.0076 U	0.0083 U	0.024	0.41	0.0076 U	0.0077 U	0.0077 U	0.0076 U	0.0076 U	0.17	0.091 J	0.035 J
endosulfan sulfate	42	420	0.048 U	4.8 UJ	4.8 UJ	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
endrin	2	20	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.04 J	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
endrin aldehyde	NA	NA	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
endrin ketone	NA	NA	0.048 U	4.8 U	0.8 J	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
gamma bhc (lindane)	0.2	20	0.048 U	1.1 J	9.7	0.047 U	0.047 U	3.5	0.0031 J	0.37	0.047 U	0.047 U	0.01 J	0.0078 J	0.047 U	0.024 J	0.024 J	0.047 U
gamma-chlordane	NA	NA	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	1.3	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.1 J	0.64 J	0.047 U
heptachlor	0.4	40	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	0.016 J	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
heptachlor epoxide	0.2	20	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	0.19	0.0062 J	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.065	0.047 U
methoxychlor	40	400	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
p,p'-DDD	0.1	10	0.048 U	4.8 U	32	0.047 U	0.047 U	0.051 U	0.047 U	2.6	0.0045 J	0.0049 J	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
p,p'-DDE	0.1	10	0.048 U	4.8 U	4.8 U	0.047 U	0.047 U	0.051 U	0.047 U	0.069 J	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.047 U	0.047 U
p,p'-DDT	0.1	10	0.048 U	4.8 U	1.7 J	0.047 U	0.047 U	0.051 U	0.047 U	0.47	0.047 U	0.047 U	0.048 U	0.047 U	0.047 U	0.051 U	0.0039 J	0.32 J
toxaphene	3	300	0.51 U	51 U	51 U	0.51 U	0.51 U	0.55 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.55 U	0.51 U	0.5 U
SW8260B																		

Table 3-3
Groundwater Analytical Results Summary
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PSC 47 Groundwater Sampling	StationID		JAX47-93-MW01S	JAX47-937-MW02S	JAX47-937-MW03S	JAX47-937-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S	JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S
	SampleID		064MW01SQ3	064MW02SQ3	064MW03SQ3	064MW04SQ3	064MW10SQ3	064MW11SQ3	064MW12SQ3	064MW13SQ3	064MW14SQ3	064MW15SQ3	064MW25SQ3	064MW26SQ3	064MW30SQ3	064MW32SQ3	064MW33SQ3	064MW34SQ3
	Sample Date		9/25/2008	9/26/2008	9/26/2008	9/29/2008	10/2/2008	10/1/2008	10/1/2008	9/30/2008	9/29/2008	9/29/2008	9/30/2008	10/2/2008	10/2/2008	10/1/2008	10/1/2008	9/25/2008
	Units in ug/L																	
1,1,1-Trichloroethane	200	2000	1 U			5 U		1 U		1 U			1 U			1 U		1 U
1,1,2,2-Tetrachloroethane	0.2	20	1.1 U			5.6 U		1.1 U		1.1 U			1.1 U			1.1 U		1.1 U
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000	2.4 U			11.8 U		2.4 U		2.4 U			2.4 U			2.4 U		2.4 U
1,1,2-Trichloroethane	5	500	1.7 U			8.6 U		1.7 U		1.7 U			1.7 U			1.7 U		1.7 U
1,1-Dichloroethane	70**	700	1 U			5 U		1 U		1 U			1 U			1 U		1 U
1,1-Dichloroethene	7**	70	1.1 U			5.6 U		1.1 U		1.1 U			1.1 U			1.1 U		1.1 U
1,2,3-trichlorobenzene	70	700	1 U			5 U		1 U		1 U			1 U			1 U		1 U
1,2,4-Trichlorobenzene	70	700	1.5 U			7.6 U		1.5 U		0.98 J			1.5 U			1.5 U		1.5 U
1,2-Dibromo-3-chloropropane	0.2	20	6 U			30 U		6 U		6 U			6 U			6 U		6 U
1,2-Dibromoethane (Ethylene dibromide)	0.02	2	1.1 U			5.6 U		1.1 U		1.1 U			1.1 U			1.1 U		1.1 U
1,2-Dichlorobenzene	600	6000	1.1 U			5.7 U		0.36 J		0.44 J			1.1 U			1.1 U		1.1 U
1,2-Dichloroethane	3	300	1.3 U			6.6 U		1.3 U		1.3 U			1.3 U			1.3 U		1.3 U
1,2-Dichloropropane	5	500	1.6 U			8 U		1.6 U		1.6 U			1.6 U			1.6 U		1.6 U
1,3-Dichlorobenzene	210	2100	1 U			5 U		1 U		1 U			1 U			1 U		1 U
1,4-Dichlorobenzene	75	7500	1 U			5 U		1		0.89 J			1 U			1 U		1 U
2-Hexanone	280	2800	5.1 U			25.5 U		5.1 U		5.1 U			5.1 U			5.1 U		5.1 U
Acetone	6300	63000	18 U			71.1 JB		18 U		18 U			18 U			18 U		18 U
Benzene	1	100	3			9.7		0.5 J		1 U			1 U			1 U		1 U
Bromochloromethane	91	910	2.2 U			11.1 U		2.2 U		2.2 U			2.2 U			2.2 U		2.2 U
Bromodichloromethane	0.6	60	1.3 U			6.6 U		1.3 U		1.3 U			1.3 U			1.3 U		1.3 U
Bromoform	4.4	440	1.9 U			9.3 U		1.9 U		1.9 U			1.9 U			1.9 U		1.9 U
Bromomethane	9.8	98	1.4 U			7.2 U		1.4 U		1.4 U			1.4 U			1.4 U		1.4 U
Carbon disulfide	700	7000	1.1 U			5.7 U		1.1 U		1.1 U			1.1 U			1.1 U		1.1 U
Carbon tetrachloride	3	300	1.5 U			7.6 U		1.5 U		1.5 U			1.5 U			1.5 U		1.5 U
Chlorobenzene	100	1000	1.2			5 U		2.7		1 U			1 U			1 U		1 U
Chloroethane	12	1200	2.8 U			14.2 U		2.8 U		2.8 U			2.8 U			2.8 U		2.8 U
Chloroform	70	700	1 U			5 U		1 U		1 U			1 U			1 U		1 U
Chloromethane	2.7	270	1.4 U			7.2 U		1.4 U		1.4 U			1.4 U			1.4 U		1.4 U
cis-1,2-Dichloroethene	70	700	160			439		1.2		1 U			1 U			1 U		1 U
cis-1,3-Dichloropropene	NA	NA	1 U			5 U		1 U		1 U			1 U			1 U		1 U
cyclohexane	NA	NA	1 U			5 U		7.2		1 U			1 U			1 U		1 U
Dibromochloromethane	0.4	40	1 U			5 U		1 U		1 U			1 U			1 U		1 U
Dichlorodifluoromethane	1400	14000	1.7 U			8.4 U		1.7 U		1.7 U			1.7 U			1.7 U		1.7 U
Ethylbenzene	30	300	5.2			222		1.1		1 U			1 U			1 U		1 U
Isopropylbenzene (Cumene)	0.8	8	0.78 J			9.1		1.5		1 U			1 U			1 U		1 U
methyl acetate	3000	30000	7.2 U			36 U		7.2 U		7.2 U			7.2 U			7.2 U		7.2 U
Methyl ethyl ketone (2-butanone)	4200	42000	6.6 U			33 U		6.6 U		6.6 U			6.6 U			6.6 U		6.6 U
Methyl isobutyl ketone (4-methyl-2-pentanone)	560	5600	5 U			25 U		5 U		5 U			5 U			5 U		5 U
methylcyclohexane	NA	NA	1.9 U			9.6 U		3.6		1.9 U			1.9 U			1.9 U		1.9 U
Methylene chloride	5	500	1.4 U			6.8 U		1.4 U		1.4 U			1.4 U			1.4 U		1.4 U
Styrene	100	1000	1 U			5 U		1 U		1 U			1 U			1 U		1 U
tert-butyl methyl ether	20	200	1 U			5 U		1 U		1 U			1 U			1 U		1 U
Tetrachloroethene (PCE)	3	300	0.7 J			94.7		1.7 U		1.7 U			1.7 U			1.7 U		1.7 U
Toluene	40	400	1 JB			133 JB		1 U		1 U			1 U			1 U		1 U
trans-1,2-Dichloroethene	100	1000	1 J			5.8 U		1.2 U		1.2 U			1.2 U			1.2 U		1.2 U
trans-1,3-Dichloropropene	NA	NA	1.2 U			5.8 U		1.2 U		1.2 U			1.2 U			1.2 U		1.2 U
Trichloroethene (TCE)	3	300	1.7			7.2		2.8		1.1 U			1.1 U			1.1 U		1.1 U
Trichlorofluoromethane	2100	21000	1.4 U			7.2 U		1.4 U		1.4 U			1.4 U			1.4 U		1.4 U
Vinyl chloride	1	100	1.1 J			6.9 U		1.4 U		1.4 U			1.4 U			1.4 U		1.4 U

Table 3-3
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PSC 47 Groundwater Sampling	StationID		JAX47-93-MW01S	JAX47-937-MW02S	JAX47-937-MW03S	JAX47-937-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S	JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S
	SampleID		064MW01SQ3	064MW02SQ3	064MW03SQ3	064MW04SQ3	064MW10SQ3	064MW11SQ3	064MW12SQ3	064MW13SQ3	064MW14SQ3	064MW15SQ3	064MW25SQ3	064MW26SQ3	064MW30SQ3	064MW32SQ3	064MW33SQ3	064MW34SQ3
	Sample Date		9/25/2008	9/26/2008	9/26/2008	9/29/2008	10/2/2008	10/1/2008	10/1/2008	9/30/2008	9/29/2008	9/29/2008	9/30/2008	10/2/2008	10/2/2008	10/1/2008	10/1/2008	9/25/2008
	Units in ug/L																	
Xylenes, total	20	200	41.7			5490		2.6 J		3 U			3 U			3 U		3 U
SW8270C																		
1,2,4,5-tetrachlorobenzene	2.1	21	6.2 U			6.2 U		6.7 U		6.2 U			6.2 U			6.7 U		6.3 U
2,2'-Oxybis(1-chloro)propane	10	100	9.3 U			9.4 U		10.1 U		9.3 U			9.3 U			10 U		9.4 U
2,4,5-Trichlorophenol	1	10	9.6 U			9.7 U		10.4 U		9.6 U			9.6 U			10.4 U		9.7 U
2,4,6-Trichlorophenol	3.2	320	10.2 U			10.2 U		11 U		10.2 U			10.2 U			11 U		10.3 U
2,4-Dichlorophenol	0.3	3	8.8 U			8.8 U		9.5 U		8.8 U			8.8 U			9.4 U		8.8 U
2,4-Dimethylphenol	140	1400	6.5 U			17.2		7 U		6.5 U			6.5 U			7 U		6.6 U
2,4-Dinitrophenol	14	140	18.9 U			19 U		20.4 U		18.9 U			18.9 U			20.3 U		19 U
2,4-Dinitrotoluene	0.05	5	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
2,6-Dinitrotoluene	0.05	5	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
2-Chloronaphthalene	560	5600	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
2-Chlorophenol	35	350	8.2 U			8.2 U		8.9 U		8.2 U			8.2 U			8.8 U		8.3 U
2-Methylnaphthalene	28	280	4.8 J			51		15		7.9 U			7.9 U			8.5 U		8 U
2-Methylphenol (o-Cresol)	35**	350	7.4 U			14.9		8 U		7.4 U			7.4 U			7.9 U		7.4 U
2-Nitroaniline	21	210	8.5 U			8.5 U		9.2 U		8.5 U			8.5 U			9.1 U		8.6 U
2-Nitrophenol	NA	NA	9.6 U			9.7 U		10.4 U		9.6 U			9.6 U			10.4 U		9.7 U
3,3'-Dichlorobenzidine	0.08	8	7.6 U			7.7 U		8.3 U		7.6 U			7.6 U			8.2 U		7.7 U
3-Nitroaniline	1.7	170	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
4,6-Dinitro-2-methylphenol	NA	NA	18.9 U			19 U		20.4 U		18.9 U			18.9 U			20.3 U		19 U
4-Bromophenyl phenyl ether	70	700	6.5 U			6.5 U		7 U		6.5 U			6.5 U			7 U		6.6 U
4-Chloro-3-methylphenol	63	630	7.6 U			7.7 U		8.3 U		7.6 U			7.6 U			8.2 U		7.7 U
4-Chloroaniline	28	280	8.5 U			8.5 U		9.2 U		8.5 U			8.5 U			9.1 U		8.6 U
4-Chlorophenyl phenyl ether	NA	NA	7.1 U			7.1 U		7.6 U		7.1 U			7.1 U			7.6 U		7.1 U
4-Methylphenol (p-Cresol)	3.5**	35	17.3 U			9.9 J		18.7 U		17.3 U			17.3 U			18.6 U		17.4 U
4-Nitroaniline	1.7	170	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
4-Nitrophenol	56	560	9.4 U			9.5 U		10.2 U		9.4 U			9.4 U			10.2 U		9.5 U
Acenaphthene	20	200	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
Acenaphthylene	210	2100	8.5 U			8.5 U		9.2 U		8.5 U			8.5 U			9.1 U		8.6 U
Acetophenone	700	7000	11.3 U			11.6		12.2 U		11.3 U			11.3 U			12.2 U		11.4 U
Anthracene	2100	21000	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
Atrazine	3	300	3.8 U			3.8 U		4.1 U		3.8 U			3.8 U			4.1 U		3.8 U
Benzaldehyde	NA	NA	3.8 U			3.8 U		4.1 U		3.8 U			3.8 U			4.1 U		3.8 U
Benzo(a)anthracene	0.05	5	7.4 U			7.4 U		8 U		7.4 U			7.4 U			7.9 U		7.4 U
Benzo(a)pyrene	0.2	20	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
Benzo(b)fluoranthene	0.05	5	7.4 U			7.4 U		8 U		7.4 U			7.4 U			7.9 U		7.4 U
Benzo(g,h,i)perylene	210	2100	7.4 U			7.4 U		8 U		7.4 U			7.4 U			7.9 U		7.4 U
Benzo(k)fluoranthene	0.5	50	8.2 U			8.2 U		8.9 U		8.2 U			8.2 U			8.8 U		8.3 U
Benzyl butyl phthalate	140**	1400	8.5 U			8.5 U		9.2 U		8.5 U			8.5 U			9.1 U		8.6 U
biphenyl (diphenyl)	0.5	5	0.76 J			3.1 J		1.3 J		3.8 U			3.8 U			4.1 U		3.8 U
Bis(2-Chloroethoxy) methane	NA	NA	9.9 U			10 U		10.7 U		9.9 U			9.9 U			10.6 U		10 U
bis(2-Chloroethyl) ether (2-Chloroethyl ether)	0.03	3	8.5 U			8.5 U		9.2 U		8.5 U			8.5 U			9.1 U		8.6 U
bis(2-Ethylhexyl) phthalate	6	600	12.4 U			12.5 U		18.1 B		12.4 U			12.4 U			12.2 B		12.6 U
caprolactam	NA	NA	3.8 U			3.8 U		4.1 U		3.8 U			3.8 U			4.1 U		3.8 U
Carbazole	1.8	180	8.8 U			8.8 U		9.5 U		8.8 U			8.8 U			9.4 U		8.8 U
Chrysene	4.8	480	8.2 U			8.2 U		8.9 U		8.2 U			8.2 U			8.8 U		8.3 U
Di-n-butyl phthalate	700	7000	8.2 U			8.2 U		8.9 U		8.2 U			8.2 U			8.8 U		8.3 U
Di-n-octylphthalate	140	1400	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
Dibenz(a,h)anthracene	0.005	0.5	7.6 U			7.7 U		8.3 U		7.6 U			7.6 U			8.2 U		7.7 U

Table 3-3
Groundwater Analytical Results Summary
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PSC 47 Groundwater Sampling	StationID		JAX47-93-MW01S	JAX47-937-MW02S	JAX47-937-MW03S	JAX47-937-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S	JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S
	SampleID		064MW01SQ3	064MW02SQ3	064MW03SQ3	064MW04SQ3	064MW10SQ3	064MW11SQ3	064MW12SQ3	064MW13SQ3	064MW14SQ3	064MW15SQ3	064MW25SQ3	064MW26SQ3	064MW30SQ3	064MW32SQ3	064MW33SQ3	064MW34SQ3
	Sample Date		9/25/2008	9/26/2008	9/26/2008	9/29/2008	10/2/2008	10/1/2008	10/1/2008	9/30/2008	9/29/2008	9/29/2008	9/30/2008	10/2/2008	10/2/2008	10/1/2008	10/1/2008	9/25/2008
	Units in ug/L																	
Dibenzofuran	28	280	7.6 U			7.7 U		8.3 U		7.6 U			7.6 U			8.2 U		7.7 U
Diethyl phthalate	5600	56000	7.9 U			10.6		8.6 U		7.9 U			7.9 U			8.5 U		8 U
Dimethyl phthalate	70000	700000	8.5 U			8.5 U		9.2 U		8.5 U			8.5 U			9.1 U		8.6 U
Fluoranthene	280	2800	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
Fluorene	280	2800	8.2 U			8.2 U		8.9 U		8.2 U			8.2 U			8.8 U		8.3 U
Hexachlorobenzene	1	100	7.4 U			7.4 U		8 U		7.4 U			7.4 U			7.9 U		7.4 U
Hexachlorobutadiene	0.4	40	7.1 U			7.1 U		7.6 U		7.1 U			7.1 U			7.6 U		7.1 U
Hexachlorocyclopentadiene	50	500	6.2 U			6.2 U		6.7 U		6.2 U			6.2 U			6.7 U		6.3 U
Hexachloroethane	2.5	250	7.4 U			7.4 U		8 U		7.4 U			7.4 U			7.9 U		7.4 U
Indeno(1,2,3-c,d)pyrene	0.05	5	7.4 U			7.4 U		8 U		7.4 U			7.4 U			7.9 U		7.4 U
Isophorone	37	3700	10.8 U			10.8 U		11.6 U		10.8 U			10.8 U			11.6 U		10.8 U
n-Nitrosodi-n-propylamine	0.005	0.5	8.5 U			8.5 U		9.2 U		8.5 U			8.5 U			9.1 U		8.6 U
n-Nitrosodiphenylamine	7.1	710	9.6 U			9.7 U		10.4 U		9.6 U			9.6 U			10.4 U		9.7 U
Naphthalene	14**	140	7.6 J			91.3		30		7.9 U			7.9 U			8.5 U		8 U
Nitrobenzene	3.5	35	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
Pentachlorophenol	1	100	18.9 U			19 U		20.4 U		18.9 U			18.9 U			20.3 U		19 U
Phenanthrene	210	2100	7.9 U			8 U		8.6 U		7.9 U			7.9 U			8.5 U		8 U
Phenol	10	100	18.9 U			19 U		20.4 U		18.9 U			18.9 U			20.3 U		19 U
Pyrene	210	2100	8.2 U			8.2 U		8.9 U		8.2 U			8.2 U			8.8 U		8.3 U

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC Groundwater Cleanup Target Levels (GCTLs) reported in µg/L
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated method and/or calibration blank.
Values Bolded are analytes not detected by the Lab but are above the GCTL
Values Shaded Pale Yellow are analytes not detected by the Lab but are above the NADC
Values Bolded and Shaded Pale Yellow are analytes not detected by the Lab but are above both GCTL and NADC
Values Bold and Pale Blue are hits exceeding the GCTL
Values Shaded Grey are hits that exceed the NADC
Values Bold and Shaded Grey are hits that exceed both GCTL and NADC
NA - Not Available at time of rule adoption

Table 3-3
Groundwater Analytical Results Summary
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PSC 47 Groundwater Sampling	StationID		JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	SampleID		064MW35SQ3	064MW36SQ3	064MW37SQ3	064MW38SQ3	064MW39SQ3	064MW40SQ3	064MW41SQ3	064MW42SQ3	064MW43SQ3
	Sample Date		9/29/2008	9/30/2008	9/25/2008	9/30/2008	9/24/2008	9/24/2008	9/26/2008	9/25/2008	10/2/2008
	Units in ug/L										
Parameter	GCTL[1]	NADC									
1632AM											
Arsenic-III	NA	NA	0.3 U		180		0.3 U	0.3 U	0.3 U		
Arsenic-V	NA	NA	0.28 U		0.56 U		1 J	41	5.7 J		
A3500D											
Ferrous Iron	NA	NA			678		360 U	360 U		96 J	
E310.1											
Alkalinity, total (as CaCO3)	NA	NA			120000 JB		63000	210000		64000 JB	
RSK-175											
Ethane	NA	NA			1.8 U		1.8 U	1.8 U		1.8 U	
Ethene	NA	NA			1.3 U		1.3 U	1.3 U		1.3 U	
Methane	NA	NA			227 JB		2.4 JB	2.2 JB		2.9 JB	
SM4500-SO3											
Sulfide	NA	NA			5.8 U					5.8 U	
SM4500S-D											
Sulfide	NA	NA					5.8 U	5.8 U			
SM5310C											
Total organic carbon	NA	NA			30000		3700 J	8100 J		11000 J	
SW300.1											
nitrogen, nitrate (as n)	10000	100000			100 UJ		4250	5570 J		7020 J	
Sulfate (as SO4)	250000	2500000			2030		21600	33000		48200 B	
SW6010B											
Arsenic	10	100	4.62 B	930	203 JB	3.31 U	6.52 B	53.4 B	14 B	15.1 B	34
Iron-Dissolved	300	3000			1080 JB		9.85 B	18.8 B		20.1 JB	
Manganese-Dissolved	50	500			3.73 JB		2.54 B	2.85 B		9.07 JB	
SW8081											
Aldrin	0.002	0.2	0.024 U	0.026 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U	0.024 U
alpha bhc (alpha hexachlorocyclohexane)	0.006	0.6	0.0086 U	1.8	0.0086 U	3.2	0.0085 U	0.0085 U	0.02 J	0.56	0.028
alpha endosulfan	42	420	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.047 U	0.035 J	0.081 J	0.047 U
alpha-chlordane	NA	NA	0.048 U	0.052 U	0.013 J	0.047 U	0.047 U	0.014 J	0.047 U	0.24 J	0.047 U
beta bhc (beta hexachlorocyclohexane)	0.02	2	0.048 U	15	0.048 U	0.6	0.047 U	0.047 U	0.065	0.45	0.4
beta endosulfan	42	420	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U
chlordane	2	200	0.48 U	0.52 U	0.088 J	0.47 U	0.47 U	0.47 U	0.47 U	0.7 J	0.47 U
delta bhc (delta hexachlorocyclohexane)	2.1	21	0.048 U	0.74	0.048 U	3.5	0.047 U	0.047 U	0.0069 J	0.89	0.047 U
Dieldrin	0.002	0.2	0.0077 U	0.0084 U	0.0077 U	0.0049 J	0.0077 U	0.0065 J	0.0037 J	0.02 J	0.0076 U
endosulfan sulfate	42	420	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.047 U	0.047 UJ	0.048 U	0.047 U
endrin	2	20	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U
endrin aldehyde	NA	NA	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U
endrin ketone	NA	NA	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.063 J
gamma bhc (lindane)	0.2	20	0.048 U	11	0.048 U	0.033 J	0.047 U	0.047 U	0.005 J	0.59	0.047 U
gamma-chlordane	NA	NA	0.048 U	0.052 U	0.023 J	0.047 U	0.047 U	0.047 U	0.047 U	0.19 J	0.38 J
heptachlor	0.4	40	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U
heptachlor epoxide	0.2	20	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.011 J	0.082 J	0.048 U	0.61
methoxychlor	40	400	0.048 U	0.052 U	0.048 U	0.047 U	0.047 U	0.047 U	0.047 U	0.048 U	0.047 U
p,p'-DDD	0.1	10	0.0039 J	6.6	0.017 J	0.093	0.047 U	0.35	0.015 J	0.0083 J	0.047 U
p,p'-DDE	0.1	10	0.048 U	0.043 J	0.048 U	0.047 U	0.047 U	0.0039 J	0.015 J	0.048 U	0.047 U
p,p'-DDT	0.1	10	0.0094 J	8.5	0.0016 J	0.048 J	0.047 U	0.039 J	0.028 J	0.021 J	0.0041 J
toxaphene	3	300	0.51 U	0.56 U	0.51 U	0.51 U	0.51 U	0.51 U	0.5 U	0.51 U	0.51 U
SW8260B											

Table 3-3
Groundwater Analytical Results Summary
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PSC 47 Groundwater Sampling	StationID		JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	SampleID		064MW35SQ3	064MW36SQ3	064MW37SQ3	064MW38SQ3	064MW39SQ3	064MW40SQ3	064MW41SQ3	064MW42SQ3	064MW43SQ3
	Sample Date		9/29/2008	9/30/2008	9/25/2008	9/30/2008	9/24/2008	9/24/2008	9/26/2008	9/25/2008	10/2/2008
	Units in ug/L										
1,1,1-Trichloroethane	200	2000			1 U		1 U	1 U		1 U	
1,1,2,2-Tetrachloroethane	0.2	20			1.1 U		1.1 U	1.1 U		1.1 U	
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000			2.4 U		2.4 U	2.4 U		2.4 U	
1,1,2-Trichloroethane	5	500			1.7 U		1.7 U	1.7 U		1.7 U	
1,1-Dichloroethane	70**	700			1 U		1 U	1 U		1 U	
1,1-Dichloroethene	7**	70			1.1 U		1.1 U	1.1 U		1.1 U	
1,2,3-trichlorobenzene	70	700			1 U		1 U	1 U		1 U	
1,2,4-Trichlorobenzene	70	700			1.5 U		1.5 U	1.5 U		1.5 U	
1,2-Dibromo-3-chloropropane	0.2	20			6 U		6 U	6 U		6 U	
1,2-Dibromoethane (Ethylene dibromide)	0.02	2			1.1 U		1.1 U	1.1 U		1.1 U	
1,2-Dichlorobenzene	600	6000			1.1 U		1.1 U	1.1 U		1.1 U	
1,2-Dichloroethane	3	300			1.3 U		1.3 U	1.3 U		1.3 U	
1,2-Dichloropropane	5	500			1.6 U		1.6 U	1.6 U		1.6 U	
1,3-Dichlorobenzene	210	2100			1 U		1 U	1 U		1 U	
1,4-Dichlorobenzene	75	7500			1 U		1 U	1 U		1 U	
2-Hexanone	280	2800			5.1 U		5.1 U	5.1 U		5.1 U	
Acetone	6300	63000			18 U		18 U	18 U		18 U	
Benzene	1	100			1 U		1 U	1 U		1 U	
Bromochloromethane	91	910			2.2 U		2.2 U	2.2 U		2.2 U	
Bromodichloromethane	0.6	60			1.3 U		1.3 U	1.3 U		1.3 U	
Bromoform	4.4	440			1.9 U		1.9 U	1.9 U		1.9 U	
Bromomethane	9.8	98			1.4 U		1.4 U	1.4 U		1.4 U	
Carbon disulfide	700	7000			1.1 U		1.1 U	1.1 U		1.1 U	
Carbon tetrachloride	3	300			1.5 U		1.5 U	1.5 U		1.5 U	
Chlorobenzene	100	1000			1 U		1 U	1 U		1 U	
Chloroethane	12	1200			2.8 U		2.8 U	2.8 U		2.8 U	
Chloroform	70	700			1 U		1 U	1 U		1 U	
Chloromethane	2.7	270			1.4 U		1.4 U	1.4 U		1.4 U	
cis-1,2-Dichloroethene	70	700			1 U		1 U	1 U		1 U	
cis-1,3-Dichloropropene	NA	NA			1 U		1 U	1 U		1 U	
cyclohexane	NA	NA			1 U		1 U	1 U		1 U	
Dibromochloromethane	0.4	40			1 U		1 U	1 U		1 U	
Dichlorodifluoromethane	1400	14000			1.7 U		1.7 U	1.7 U		1.7 U	
Ethylbenzene	30	300			1 U		1 U	1 U		1 U	
Isopropylbenzene (Cumene)	0.8	8			1 U		1 U	1 U		1 U	
methyl acetate	3000	30000			7.2 U		7.2 U	7.2 U		7.2 U	
Methyl ethyl ketone (2-butanone)	4200	42000			6.6 U		6.6 U	6.6 U		6.6 U	
Methyl isobutyl ketone (4-methyl-2-pentanone)	560	5600			5 U		5 U	5 U		5 U	
methylcyclohexane	NA	NA			1.9 U		1.9 U	1.9 U		1.9 U	
Methylene chloride	5	500			1.4 U		1.4 U	1.4 U		1.4 U	
Styrene	100	1000			1 U		1 U	1 U		1 U	
tert-butyl methyl ether	20	200			1 U		1 U	1 U		1 U	
Tetrachloroethene (PCE)	3	300			1.7 U		1.7 U	1.7 U		1.7 U	
Toluene	40	400			4.4 JB		1 U	1 U		1 U	
trans-1,2-Dichloroethene	100	1000			1.2 U		1.2 U	1.2 U		1.2 U	
trans-1,3-Dichloropropene	NA	NA			1.2 U		1.2 U	1.2 U		1.2 U	
Trichloroethene (TCE)	3	300			1.1 U		1.1 U	1.1 U		1.1 U	
Trichlorofluoromethane	2100	21000			1.4 U		1.4 U	1.4 U		1.4 U	
Vinyl chloride	1	100			1.4 U		1.4 U	1.4 U		1.4 U	

Table 3-3
Groundwater Analytical Results Summary
September 2008
NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	SampleID		064MW35SQ3	064MW36SQ3	064MW37SQ3	064MW38SQ3	064MW39SQ3	064MW40SQ3	064MW41SQ3	064MW42SQ3	064MW43SQ3
	Sample Date		9/29/2008	9/30/2008	9/25/2008	9/30/2008	9/24/2008	9/24/2008	9/26/2008	9/25/2008	10/2/2008
	Units in ug/L										
Xylenes, total	20	200			3 U		3 U	3 U		3 U	
SW8270C											
1,2,4,5-tetrachlorobenzene	2.1	21			6.2 U		6.2 U	6.2 U		6.2 U	
2,2'-Oxybis(1-chloro)propane	10	100			9.4 U		9.3 UJ	9.3 U		9.4 U	
2,4,5-Trichlorophenol	1	10			9.7 U		9.6 U	9.6 U		9.7 U	
2,4,6-Trichlorophenol	3.2	320			10.2 U		10.2 U	10.2 U		10.2 U	
2,4-Dichlorophenol	0.3	3			8.8 U		8.8 U	8.8 U		8.8 U	
2,4-Dimethylphenol	140	1400			6.5 U		6.5 U	6.5 U		6.5 U	
2,4-Dinitrophenol	14	140			19 U		18.9 U	18.9 U		19 U	
2,4-Dinitrotoluene	0.05	5			8 U		7.9 U	7.9 U		8 U	
2,6-Dinitrotoluene	0.05	5			8 U		7.9 U	7.9 U		8 U	
2-Chloronaphthalene	560	5600			8 U		7.9 U	7.9 U		8 U	
2-Chlorophenol	35	350			8.2 U		8.2 U	8.2 U		8.2 U	
2-Methylnaphthalene	28	280			8 U		7.9 U	7.9 U		8 U	
2-Methylphenol (o-Cresol)	35**	350			7.4 U		7.4 U	7.4 U		7.4 U	
2-Nitroaniline	21	210			8.5 U		8.5 U	8.5 U		8.5 U	
2-Nitrophenol	NA	NA			9.7 U		9.6 U	9.6 U		9.7 U	
3,3'-Dichlorobenzidine	0.08	8			7.7 U		7.6 U	7.6 U		7.7 U	
3-Nitroaniline	1.7	170			8 U		7.9 U	7.9 U		8 U	
4,6-Dinitro-2-methylphenol	NA	NA			19 U		18.9 U	18.9 U		19 U	
4-Bromophenyl phenyl ether	70	700			6.5 U		6.5 U	6.5 U		6.5 U	
4-Chloro-3-methylphenol	63	630			7.7 U		7.6 U	7.6 U		7.7 U	
4-Chloroaniline	28	280			8.5 U		8.5 U	8.5 U		8.5 U	
4-Chlorophenyl phenyl ether	NA	NA			7.1 U		7.1 U	7.1 U		7.1 U	
4-Methylphenol (p-Cresol)	3.5**	35			17.3 U		17.3 U	17.3 U		17.3 U	
4-Nitroaniline	1.7	170			8 U		7.9 U	7.9 U		8 U	
4-Nitrophenol	56	560			9.5 U		9.4 U	9.4 U		9.5 U	
Acenaphthene	20	200			8 U		7.9 U	7.9 U		8 U	
Acenaphthylene	210	2100			8.5 U		8.5 U	8.5 U		8.5 U	
Acetophenone	700	7000			11.4 U		11.3 U	11.3 U		11.4 U	
Anthracene	2100	21000			8 U		7.9 U	7.9 U		8 U	
Atrazine	3	300			3.8 U		3.8 U	3.8 U		3.8 U	
Benzaldehyde	NA	NA			3.8 U		3.8 U	3.8 U		3.8 U	
Benzo(a)anthracene	0.05	5			7.4 U		7.4 U	7.4 U		7.4 U	
Benzo(a)pyrene	0.2	20			8 U		7.9 U	7.9 U		8 U	
Benzo(b)fluoranthene	0.05	5			7.4 U		7.4 U	7.4 U		7.4 U	
Benzo(g,h,i)perylene	210	2100			7.4 U		7.4 U	7.4 U		7.4 U	
Benzo(k)fluoranthene	0.5	50			8.2 U		8.2 U	8.2 U		8.2 U	
Benzyl butyl phthalate	140**	1400			8.5 U		8.5 U	8.5 U		8.5 U	
biphenyl (diphenyl)	0.5	5			3.8 U		3.8 U	3.8 U		3.8 U	
Bis(2-Chloroethoxy) methane	NA	NA			10 U		9.9 U	9.9 U		10 U	
bis(2-Chloroethyl) ether (2-Chloroethyl ether)	0.03	3			8.5 U		8.5 U	8.5 U		8.5 U	
bis(2-Ethylhexyl) phthalate	6	600			12.5 U		12.4 U	12.4 U		12.5 U	
caprolactam	NA	NA			3.8 U		3.8 U	3.8 U		3.8 U	
Carbazole	1.8	180			8.8 U		8.8 U	8.8 U		8.8 U	
Chrysene	4.8	480			8.2 U		8.2 U	8.2 U		8.2 U	
Di-n-butyl phthalate	700	7000			8.2 U		8.2 U	8.2 U		8.2 U	
Di-n-octylphthalate	140	1400			8 U		7.9 U	7.9 U		8 U	
Dibenz(a,h)anthracene	0.005	0.5			7.7 U		7.6 U	7.6 U		7.7 U	

Table 3-3
Groundwater Analytical Results Summary
September 2008
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PSC 47 Groundwater Sampling	StationID		JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	SampleID		064MW35SQ3	064MW36SQ3	064MW37SQ3	064MW38SQ3	064MW39SQ3	064MW40SQ3	064MW41SQ3	064MW42SQ3	064MW43SQ3
	Sample Date		9/29/2008	9/30/2008	9/25/2008	9/30/2008	9/24/2008	9/24/2008	9/26/2008	9/25/2008	10/2/2008
	Units in ug/L										
Dibenzofuran	28	280			7.7 U		7.6 U	7.6 U		7.7 U	
Diethyl phthalate	5600	56000			8 U		7.9 U	7.9 U		8 U	
Dimethyl phthalate	70000	700000			8.5 U		8.5 U	8.5 U		8.5 U	
Fluoranthene	280	2800			8 U		7.9 U	7.9 U		8 U	
Fluorene	280	2800			8.2 U		8.2 U	8.2 U		8.2 U	
Hexachlorobenzene	1	100			7.4 U		7.4 U	7.4 U		7.4 U	
Hexachlorobutadiene	0.4	40			7.1 U		7.1 U	7.1 U		7.1 U	
Hexachlorocyclopentadiene	50	500			6.2 U		6.2 U	6.2 U		6.2 U	
Hexachloroethane	2.5	250			7.4 U		7.4 U	7.4 U		7.4 U	
Indeno(1,2,3-c,d)pyrene	0.05	5			7.4 U		7.4 U	7.4 U		7.4 U	
Isophorone	37	3700			10.8 U		10.8 U	10.8 U		10.8 U	
n-Nitrosodi-n-propylamine	0.005	0.5			8.5 U		8.5 U	8.5 U		8.5 U	
n-Nitrosodiphenylamine	7.1	710			9.7 U		9.6 U	9.6 U		9.7 U	
Naphthalene	14**	140			8 U		7.9 U	7.9 U		8 U	
Nitrobenzene	3.5	35			8 U		7.9 U	7.9 U		8 U	
Pentachlorophenol	1	100			19 U		18.9 U	18.9 U		19 U	
Phenanthrene	210	2100			8 U		7.9 U	7.9 U		8 U	
Phenol	10	100			19 U		18.9 UJ	18.9 U		19 U	
Pyrene	210	2100			8.2 U		8.2 U	8.2 U		8.2 U	

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC Groundwater Cleanup Target Levels (GCTLs) reported in µg/L
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated method and/or calibration blank.
Values Bolded are analytes not detected by the Lab but are above the GCTL
Values Shaded Pale Yellow are analytes not detected by the Lab but are above the NADC
Values Bolded and Shaded Pale Yellow are analytes not detected by the Lab but are above both GCTL and NADC
Values Bold and Pale Blue are hits exceeding the GCTL
Values Shaded Grey are hits that exceed the NADC
Values Bold and Shaded Grey are hits that exceed both GCTL and NADC
NA - Not Available at time of rule adoption

Table 3-4
Qroundwater Quality Parameter Summary
May 2008 through March 2009
NAS Jacksonville

Well ID	Top of Casing Elevation (ft MSL)	Total Depth (TOC-ft)	Date	Depth to Water (TOC-ft)	Groundwater Elevation (ft)	pH*	ORP*	DO* (mg/L)	Temp °C	Nitrite (ug/L)	Nitrate (ug/L)	Fe2+ (ug/L)	Sulfide (ug/L)	Sulfate (ug/L)	Alkalinity (ug/L)	TOC (ug/L)	Arsenic III (ug/L)	Arsenic V (ug/L)	Turbidity (NTU)
JAX47-937-MW-01S	25.71	15	6/10/2008 and 5/28/2008	7.59	18.12	5.01	NM	0.34	23.32	NM	26.8 J	360 U	6 J	116,000	9000 J	7600 J	34	10	2.39
			9/25/2008	3.96	21.75	5.20	-12.7	1.10	24.97	NM	100 UJ	9510	5.8 U	47900 B	24000 JB	12000 J	400	36	1.21
			12/11/2008	6.59	19.12	4.68	85.6	0.85	22.06	NM	100 U	5850.00	5.8 U	81000 B	27,000	8600 J	300	39	1.35
			3/12/2009	6.8	18.91	4.78	20.9	0.38	21.69	NM	100 U	6670	5.8 U	307,000	22,000	18,000	150	12	4.09
JAX47-937-MW-02S	25.38	14	5/28/2008	7.14	18.24	5.62	NM	6.30	23.74								3,400	130	6.76
			9/26/2008	3.73	21.65	5.68	81.8	1.03	26.6								11,000	560	6.76
			12/10/2008	5.18	20.20	5.43	64.9	0.94	22.06								7,100	420	6.34
			3/12/2009	6.23	19.15	5.24	-40.2	0.24	22.2								3,900	160	5.29
JAX47-937-MW-03S	24.41	13	5/28/2008	6.1	18.31	4.95	NM	3.50	25.00								4,900	4,400	47.3
			9/26/2008	2.72	21.69	5.62	75.1	0.84	28.06								23,000	5,800	1.27
			12/17/2008	5.25	19.16	5.24	-11.7	1.09	21.64								4,500	560	4.92
			3/16/2009	5.28	19.13	5.17	-4.9	0.93	19.68								5,300	900	16.7
JAX47-937-MW-04S	24.54	13	6/2/2008	6.34	18.2	4.21	NM	0.25	26.58	NM	100 U	7,210	3,000	92200 B	20,000	35,000			2.95
			9/21/2008	3.25	21.29	4.65	-110.9	-0.12	29.76	NM	1170 J	4,570	69	89100 JB	50000 JB	21000 J			1.13
			12/11/2008	5.33	19.21	3.65	51.7	0.74	22.8	NM	100 U	4,130	5.8 U	243000 B	13000 J	18,000			2.27
			3/12/2009	5.33	19.21	3.81	-35.2	0.05	23.67	NM	27.4 B	7,490.00	5.8 U	302,000	9000 J	21,000			4.01
JAX47-MW-10S	23.58	14.5	6/19/2008	5.96	17.62	5.56	NM	0.94	25.69										17.5
			10/2/2008	3.4	20.18	6.17	150.50	0.76	26.00										5.92
			12/19/2008	5.23	18.35	5.80	181.8	0.65	22.63										5.80
			3/12/2009	5.29	18.29	5.83	213.0	0.62	20.11										8.27
JAX47-MW-11S	23.97	14.5	5/29/2008 and 6/10/2008	6.69	17.28	4.38	NM	0.40	24.59	NM	544	972	5.8 U	13600	12000 J	13,000			1.38
			10/1/2008	3.55	20.42	5.26	229.7	3.80	25.90	NM	1340	360 U	5.8 U	9,980	22,000	14000 U			9.31
			12/15/2008	5.71	18.26	4.47	202.7	0.64	23.71	NM	1560	905	5.8 U	24100 B	8000 J	12,000			3.95
			3/18/2009	5.94	18.03	4.20	199.9	0.55	22.11	NM	1760	724	5.8 U	24,200	15000 J	8200 J			14.9
JAX47-MW-12S	24.4	14.5	5/27/2008	7.29	17.11	4.41	NM	0.53	24.01										3.61
			10/1/2008	4.03	20.37	6.34	135.1	2.43	27.34										1.21
			12/18/2008	6.28	18.12	4.68	240.7	0.56	24.03										1.40
			3/20/2009	6.67	17.73	4.41	367.0	0.44	21.43										4.71
JAX47-MW-13S	24.67	14.5	6/2/2008	6.9	17.77	4.82	NM	3.15	27.60		1690	314 J	5.8 U	52200 B	9000 J	6600 J			2.94
			9/30/2008	3.71	20.96	8.00	34.9	5.62	27.26		9480 J	103 J		33,300	390,000	14000 U			0.90
			12/15/2008	5.94	18.73	5.71	134.0	0.32	24.52		1330	360 U	5.8 U	44900 B	42,000	5000 J			1.47
			3/16/2009	6.26	18.41	5.15	208.7	0.40	24.21		1200	360 U		43,300	19000 J	9100 J			2.76
JAX47-MW-14S	24.45	13	6/2/2008	6.16	18.29	6.63	NM	4.20	22.46								5.0 U	5.0 U	45.0
			9/29/2008	2.94	21.51	6.23	23.3	0.32	25.04								0.3 U	0.28 U	0.91
			12/17/2008	5.16	19.29	6.73	130.3	1.73	20.31								0.3 U	0.28 U	3.91
			3/17/2009	5.25	19.20	6.77	129.9	4.03	18.91								0.3 U	0.3 U	7.21
JAX47-MW-15S	24.32	13	6/2/2008	6.35	17.97	5.50	NM	9.56	24.00								5.0 U	5.0 U	30.3
			9/29/2008	2.90	21.42	5.95	1.6	0.16	26.53								0.3 U	0.28 U	3.65
			12/17/2008	5.30	19.02	5.58	-71.7	0.40	22.64								0.3 U	0.28 U	9.56
			3/17/2009	5.35	18.97	5.35	-38.5	0.29	20.26								0.3 U	0.3 U	32.9
JAX47-MW-25S	25.05	14	5/29/2008 and 6/10/2008	6.89	18.16	4.78	NM	0.77	24.29		945			33,200		7000 J			4.81
			9/30/2008	3.60	21.45	6.77	20.0	0.99	26.24		165 J			4,680		14000 U			9.23
			12/16/2008	5.80	19.25	5.19	-76.2	0.38	23.46		1,050			25,200		4400 J			6.70
			3/19/2009	6.03	19.02	4.81	-65.4	0.52	21.67		1,200			21,200		3400 U			10.1
JAX47-MW-26S	24.64	13	5/28/2008	6.91	17.73	4.44	NM	5.76	23.50										4.17
			10/2/2008	3.73	20.91	6.29	153.1	2.57	25.70										1.83
			12/19/2008	5.78	18.86	4.93	264.0	49.80	22.65										5.11
			3/13/2009	5.81	18.83	4.8	309.7	4.7	20.81										9.74
JAX47-MW-30S	23.57	13	5/28/2008	6.82	16.75	6.00	NM	4.10	23.23										31.1
			10/2/2008	3.68	19.89	6.83	112.5	3.00	26.21										7.23
			12/19/2008	5.69	17.88	6.40	153.0	3.50	22.90										12.3
			3/19/2009	5.82	17.75	6.40	217.6	3.82	21.30										41.7

Table 3-4
Qroundwater Quality Parameter Summary
May 2008 through March 2009
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Well ID	Top of Casing Elevation (ft MSL)	Total Depth (TOC-ft)	Date	Depth to Water (TOC-ft)	Groundwater Elevation (ft)	pH*	ORP*	DO* (mg/L)	Temp °C	Nitrite (ug/L)	Nitrate (ug/L)	Fe2+ (ug/L)	Sulfide (ug/L)	Sulfate (ug/L)	Alkalinity (ug/L)	TOC (ug/L)	Arsenic III (ug/L)	Arsenic V (ug/L)	Turbidity (NTU)
JAX47-MW-32S	24.3	13	5/29/2008 and 6/10/2008	6.81	17.49	4.77	NM	0.99	21.97	NM	134	360 U	5.8 U	11500	6000 J	3400 U			2.59
			10/1/2008	3.43	20.87	5.36	175.1	0.66	24.66	NM	439	360 U	5.8 U	13,800	24,000	14000 U			3.70
			12/16/2008	5.71	18.59	4.76	204.0	0.49	22.36	NM	221	360 U	5.8 U	11,400	11000 J	3400 U			2.07
			3/19/2009	5.9	18.40	4.76	190.2	0.62	20.37	NM	284	360 U	5.8 U	11,200	11000 J	3400 U			4.48
JAX47-MW-33S	24.1	13	5/27/2008	6.68	17.42	4.78	NM	1.62	23.47										0.32
			10/1/2008	3.48	20.62	5.91	162.8	2.4	27.03										3.91
			12/18/2008	5.75	18.35	5.03	249.7	0.44	23.36										0.62
			3/20/2009	5.96	18.14	4.77	319.1	0.48	20.8										1.71
JAX47-MW-34S	24.24	13	5/29/2008 and 6/10/2008	6.79	17.45	5.13	NM	0.9	24.18	NM	104	360 U	27 J	18600	11000 J	3400 U			4.57
			9/25/2008	2.98	21.26	6.37	114.4	2.88	26.13	NM	1110 J	106 J	5.8 U	32,500	140000 JB	17000 J			5.85
			12/16/2008	5.81	18.43	5.6	144.3	0.8	22.85	NM	897	360 U	5.8 U	24,200	33,000	3800 J			7.95
			3/19/2009	6.05	18.19	5.2	256.1	0.92	21.36	NM	907	360 U	5.8 U	22,000	21,000	3400 U			4.78
JAX47-MW-35S	23.48	13	5/28/2008	5.71	17.77	5.44	NM	7.15	23.17								5.0 U	5.0 U	20.0
			9/29/2008	2.44	21.04	5.24	65.8	0.22	26.23								0.3 U	0.28 U	19.5
			12/17/2008	4.81	18.67	5.55	186.5	1.06	21.07								0.3 U	0.28 U	20.5
			3/18/2009	4.98	18.50	5.46	209.9	1.13	19.76								0.3 U	0.3 U	20.4
JAX47-MW-36S	24.12	13	5/27/2008	6.38	17.74	4.89	NM	0.43	22.34										13.7
			9/30/2008	3.27	20.85	5.94	42.3	0.91	25.61										0.88
			12/18/2008	5.58	18.54	5.62	28.6	0.5	21.49										3.07
			3/13/2009	5.61	18.51	5.37	41.9	0.36	19.63										5.60
JAX47-MW-37S	23.54	13	6/2/2008	5.78	17.76	4.96	NM	2.47	22.43	NM	100 U	766	5.8 U	15800	12000 J	6600 J	5.0 U	5.0 U	13.4
			9/25/2008	2.1	21.44	6.23	-90.3	0.65	24.05	NM	100 U	766	5.8 U	15800	12000 J	30,000	180	0.56 U	2.96
			12/16/2008	4.84	18.70	5.53	-53.7	0.48	22.69	NM	100 UJ	678	5.8 U	2030	120000 JB	9000 J	16	33	11.9
			3/16/2009	4.99	18.55	5.36	47.8	0.51	19.75	NM	100 U	897	5.8 U	11500	42,000	14,000	6	0.3 U	2.91
JAX47-MW-38S	23.79	13	5/27/2008	5.81	17.98	4.64	NM	0.43	21.89										3.65
			9/30/2008	2.83	20.96	6.4	137.4	0.55	25.68										0.76
			12/18/2008	5.01	18.78	5.88	156	0.28	22.41										1.71
			3/16/2009	5.15	18.64	5.17	200.4	0.32	20.65										3.57
JAX47-MW-39S	23.36	13	6/2/2008	5.34	18.02	6.27	NM	4.56	29.05	NM	5010	360 U	5.8 U	13000	52,000	4200 J	5.0 U	5.0 U	47.0
			9/24/2008	1.65	21.71	6.13	116.2	1.17	31.37	NM	4250	360 U	5.8 U	21600	63,000	3700 J	0.3 U	1 J	2.20
			12/15/2008	4.39	18.97	6.79	144	3.92	25.58	NM	5720 J	360 U	5.8 U	8590 B	79,000	4500 J	0.3 U	0.28 U	14.3
			3/17/2009	4.56	18.80	6.91	195.8	4.92	23.74	NM	2890 B	360 U	5.8 U	4980	110,000	6700 J	0.3 U	0.3 U	7.87
JAX47-MW-40S	24.31	13	6/2/2008	6.53	17.78	6.37	NM	6.4	23.61	NM	4200	360 U	5.8 U	18800	110,000	5000 J	5.0 U	5.0 U	32.0
			9/24/2008	2.8	21.51	6.27	116	0.69	26.25	NM	5570 J	360 U	5.8 U	33000	210,000	8100 J	0.3 U	41	3.21
			12/15/2008	5.59	18.72	6.05	126.7	0.45	23.53	NM	6800 J	360 U	5.8 U	17100 B	89,000	3400 U	0.3 U	13	5.37
			3/17/2009	5.8	18.51	5.86	202.6	0.73	21.35	NM	6300 J	360 U	5.8 U	17900	66,000	5000 J	0.3 U	22 J	9.17
JAX47-MW-41S	23.68	13	5/27/2008	6.02	17.66	5.05	NM	1.16	23.4								5.0 U	5.0 U	7.55
			9/26/2008	2.75	20.93	5.88	84.6	0.82	26.23								0.3 U	5.7 J	1.02
			12/17/2008	5.3	18.38	4.85	179.2	0.7	22.99								0.3 U	0.28 U	1.57
			3/18/2009	5.52	18.16	4.52	324	0.63	20.27								0.3 U	0.3 U	3.41
JAX47-MW-42S	23.92	13	5/29/2008 and 6/10/2008	6.53	17.39	5.17	NM	1.75	25.42	NM	3050	360 U	12 J	37100	23000	6700 J			4.00
			9/25/2008	2.88	21.04	5.97	117.6	1.34	27.35	NM	7020 J	96 J	12 J	48200 B	64000 JB	11000 J			6.34
			12/16/2008	5.64	18.28	5.32	181.4	0.67	22.83	NM	2060	360 U	5.8 U	36100	27,000	5200 J			8.94
			3/18/2009	5.85	18.07	5.1	253.4	0.51	21.76	NM	1730	99 J	5.8 U	37300	27,000	4800 J			9.07
JAX47-MW-43S	23.75	13	5/27/2008	6.56	17.19	4.52	NM	0.53	23.76										0.39
			10/2/2008	3.53	20.22	6.55	138.9	3.2	26.62										1.53
			12/18/2008	5.68	18.07	5.18	145	0.39	23.64										0.92
			3/20/2009	5.9	17.85	4.87	160.8	0.59	20.64										1.29

NM - not measured
J - analyte detected below reporting limit
B - analyte also detected in blank
U - analyte not detected above method detection limit

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PSC 47 Groundwater Sampling	Station ID		JAX47-MW01S	JAX47-MW02S	JAX47-MW03S	JAX47-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S	JAX47-MW30S
	Sample ID		064MW01SQ4	064MW02SQ4	064MW03SQ4	064MW04SQ4	064MW10SQ4	064MW11SQ4	064MW12SQ4	064MW13SQ4	064MW14SQ4	064MW15SQ4	064MW25SQ4	064MW26SQ4	064MW30SQ4
	Sample Date		12/11/2008	12/10/2008	12/17/2008	12/11/2008	12/19/2008	12/15/2008	12/18/2008	12/15/2008	12/17/2008	12/17/2008	12/16/2008	12/19/2008	12/19/2008
	Units in ug/l														
Parameter	**GCTL[1]**	**NADC**													
1632AM															
Arsenic-III	NA	NA	300	7100	0.3 U						0.3 U	0.3 U			
Arsenic-V	NA	NA	39	420	0.28 U						0.28 U	0.28 U			
A3500D															
Ferrous Iron	NA	NA	5850			4130		905		360 U			510		
E310.1															
Alkalinity, total (as CaCO3)	NA	NA	27000			13000 J		8000 J		42000			12000 J		
RSK-175															
Ethane	NA	NA	1.8 U			1.8 U		1.8 U		1.8 U			1.8 U		
Ethene	NA	NA	1.3 U			1.3 U		1.3 U		1.3 U			1.3 U		
Methane	NA	NA	640 B			3250 B		39.4 B		14.1 B			19.1 B		
SM4500S-D															
Sulfide	NA	NA	5.8 U			5.8 U		5.8 U		5.8 U			5.8 U		
A5310C															
Total organic carbon	NA	NA	8600 J			18000		12000		5000 J			4400 J		
SW300.1															
nitrogen, nitrate (as n)	10000	100000	100 U			100 U		1560		1330			1050		
Sulfate (as SO4)	250000	2500000	81000 B			243000 B		24100 B		44900 B			25200		
SW6010B															
Arsenic	10	100	**341 B**	**8540 B**	**8980***	**10.1 B**	3.61 J	6.15 J	3.31 U	**21.3**	3.84 J	4.16 J	3.31 U	3.31 U	3.31 U
Iron-Dissolved	300	3000	**13900 B**			**30100 B**		**861**		16.6 J			**513 B**		
Manganese-Dissolved	50	500	**75.6 B**			**285 B**		11.4		4.03 J			8.37 B		
SW8081															
Aldrin	0.002	0.2	**0.024 U**	**0.047 U**	**0.024 U**	**0.24 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**
alpha bhc (alpha hexachlorocyclohexane)	0.006	0.6	**0.0085 U**	**0.86**	**1.1**	**0.085 U**	**0.0085 U**	**4 JB**	**0.014**	**2.5 JB**	**0.0085 U**	**0.0085 U**	**0.094**	**0.0085 U**	**0.0085 U**
alpha endosulfan	42	420	0.047 U	0.047 U	0.047 U	0.47 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.042 J	0.047 U
alpha-chlordane	NA	NA	0.016 J	0.047 U	0.047 U	0.26 J	0.047 U	0.047 U	0.047 U	1.7 J	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
beta bhc (beta hexachlorocyclohexane)	0.02	2	**0.047 U**	**1.3 J**	**2.3 J**	**0.47 U**	**0.047 U**	**2.4**	**0.97**	**0.66**	**0.047 U**	**0.047 U**	**2.4**	**0.04 J**	**0.047 U**
beta endosulfan	42	420	0.047 U	0.047 U	0.047 U	0.47 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
chlordane	2	200	0.47 U	0.47 U	0.47 U	**4.7 U**	0.47 U	0.47 U	0.47 U	**5.1**	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
delta bhc (delta hexachlorocyclohexane)	2.1	21	0.047 U	1.1	1.4	0.47 U	0.047 U	**4.2**	0.047 U	**2.7**	0.047 U	0.047 U	0.43	0.047 U	0.047 U
Dieldrin	0.002	0.2	**0.0077 U**	**0.61**	**0.8 J**	**0.076 U**	**0.0076 U**	**0.0077 U**	**0.17**	**0.31**	**0.0076 U**	**0.0077 U**	**0.0077 U**	**0.0046 J**	**0.0076 U**
endosulfan sulfate	42	420	0.047 U	0.047 U	0.047 U	0.47 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
endrin	2	20	0.047 U	0.047 U	0.047 U	0.47 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
endrin aldehyde	NA	NA	0.047 UJ	0.047 U	0.047 U	0.47 UJ	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
endrin ketone	NA	NA	0.047 U	0.047 U	0.44	0.81 J	0.047 U	0.047 U	0.037 J	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
gamma bhc (lindane)	0.2	20	0.047 U	**2**	**2.1**	**0.47 U**	0.047 U	**6.8**	0.015 J	**1.6**	0.047 U	0.047 U	**0.25**	0.047 U	0.047 U
gamma-chlordane	NA	NA	0.047 U	0.047 U	0.047 U	0.47 U	0.047 U	0.047 U	0.047 U	1.2	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
heptachlor	0.4	40	0.047 UJ	0.047 U	0.047 U	**0.47 UJ**	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
heptachlor epoxide	0.2	20	0.047 U	0.047 U	0.047 U	**0.47 U**	0.047 U	0.047 U	0.14	0.054 J	0.047 U	0.047 U	0.07 J	0.02 J	0.047 U
methoxychlor	40	400	0.047 U	0.047 U	0.047 U	0.47 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
p,p'-DDD	0.1	10	0.047 U	**14**	**14**	**0.47 U**	0.047 U	0.047 U	0.047 U	**1**	0.007 J	0.047 U	0.047 U	0.047 U	0.047 U
p,p'-DDE	0.1	10	0.047 U	**0.22**	**0.23**	**0.47 U**	0.047 U	0.047 U	0.047 U	0.047 U	0.0048 J	0.047 U	0.047 U	0.047 U	0.047 U
p,p'-DDT	0.1	10	0.047 U	**0.15 J**	**0.22**	**0.47 U**	0.047 U	0.047 U	0.047 U	**0.36**	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
toxaphene	3	300	0.51 UJ	0.51 U	0.51 U	**5.1 UJ**	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U

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PSC 47 Groundwater Sampling	Station ID		JAX47-MW01S	JAX47-MW02S	JAX47-MW03S	JAX47-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S	JAX47-MW30S
	Sample ID		064MW01SQ4	064MW02SQ4	064MW03SQ4	064MW04SQ4	064MW10SQ4	064MW11SQ4	064MW12SQ4	064MW13SQ4	064MW14SQ4	064MW15SQ4	064MW25SQ4	064MW26SQ4	064MW30SQ4
	Sample Date		12/11/2008	12/10/2008	12/17/2008	12/11/2008	12/19/2008	12/15/2008	12/18/2008	12/15/2008	12/17/2008	12/17/2008	12/16/2008	12/19/2008	12/19/2008
	Units in ug/l														
Parameter	**GCTL[1]**	**NADC**													
SW8260B															
1,1,1-Trichloroethane	200	2000	1 U			10 U		1 U		1 U			1 U		
1,1,2,2-Tetrachloroethane	0.2	20	**1.1 U**			**11.1 U**		**1.1 U**		**1.1 U**			**1.1 U**		
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000	2.4 U			23.7 U		2.4 U		2.4 U			2.4 U		
1,1,2-Trichloroethane	5	500	1.7 U			**17.1 U**		1.7 U		1.7 U			1.7 U		
1,1-Dichloroethane	70**	700	1 U			10 U		1 U		1 U			1 U		
1,1-Dichloroethene	7**	70	1.1 U			**11.1 U**		0.47 J		1.1 U			1.1 U		
1,2,3-trichlorobenzene	70	700	1 U			10 U		1 U		3.1			1 U		
1,2,4-Trichlorobenzene	70	700	1.5 U			15.3 U		1.5 U		8.6			1.5 U		
1,2-Dibromo-3-chloropropane	0.2	20	**6 U**			**60 U**		**6 U**		**6 U**			**6 U**		
1,2-Dibromoethane (Ethylene dibromide)	0.02	2	**1.1 U**			**11.1 U**		**1.1 U**		**1.1 U**			**1.1 U**		
1,2-Dichlorobenzene	600	6000	1.1 U			11.4 U		0.86 J		3.2			1.1 U		
1,2-Dichloroethane	3	300	1.3 U			**13.2 U**		1.3 U		1.3 U			1.3 U		
1,2-Dichloropropane	5	500	1.6 U			**15.9 U**		1.6 U		1.6 U			1.6 U		
1,3-Dichlorobenzene	210	2100	1 U			10 U		1 U		2.4			1 U		
1,4-Dichlorobenzene	75	7500	1 U			10 U		2.3		4.8			0.47 J		
2-Hexanone	280	2800	5.1 U			51 U		5.1 U		5.1 U			5.1 U		
Acetone	6300	63000	18 U			180 U		18 U		18 U			18 U		
Benzene	1	100	**2**			**5.6 J**		**1.2**		0.49 J			1 U		
Bromochloromethane	91	910	2.2 U			22.2 U		2.2 U		2.2 U			2.2 U		
Bromodichloromethane	0.6	60	**1.3 U**			**13.2 U**		**1.3 U**		**1.3 U**			**1.3 U**		
Bromoform	4.4	440	1.9 U			**18.6 U**		1.9 U		1.9 U			1.9 U		
Bromomethane	9.8	98	1.4 U			**14.4 U**		1.4 U		1.4 U			1.4 U		
Carbon disulfide	700	7000	1.1 U			11.4 U		1.1 U		1.1 U			1.1 U		
Carbon tetrachloride	3	300	1.5 U			**15.3 U**		1.5 U		1.5 U			1.5 U		
Chlorobenzene	100	1000	0.72 J			10 U		9.7		1 U			0.25 J		
Chloroethane	12	1200	2.8 U			**28.5 U**		2.8 U		2.8 U			2.8 U		
Chloroform	70	700	1 U			10 U		1 U		1 U			1 U		
Chloromethane	2.7	270	1.4 U			**14.4 U**		1.4 U		1.4 U			1.4 U		
cis-1,2-Dichloroethene	70	700	**107**			**292**		2.1		1 U			1 U		
cis-1,3-Dichloropropene	NA	NA	1 U			10 U		1 U		1 U			1 U		
cyclohexane	NA	NA	1 U			10 U		26.4		1 U			1 U		
Dibromochloromethane	0.4	40	**1 U**			**10 U**		**1 U**		**1 U**			**1 U**		
Dichlorodifluoromethane	1400	14000	1.7 U			16.8 U		1.7 U		1.7 U			1.7 U		
Ethylbenzene	30	300	1.3			**123**		13.6		1 U			1 U		
Isopropylbenzene (Cumene)	0.8	8	0.53 J			**10 U**		**4.7**		**1 U**			**1 U**		
methyl acetate	3000	30000	7.2 U			72 U		7.2 U		7.2 U			7.2 U		
Methyl ethyl ketone (2-butanone)	4200	42000	6.6 U			66 U		6.6 U		6.6 U			6.6 U		
Methyl isobutyl ketone (4-methyl-2-pentanone)	560	5600	5 U			50 U		5 U		5 U			5 U		
methylcyclohexane	NA	NA	1.9 U			19.2 U		9.9		1.9 U			1.9 U		
Methylene chloride	5	500	1.4 U			**13.5 U**		1.4 U		1.4 U			1.4 U		
Styrene	100	1000	1 U			10 U		1 U		1 U			1 U		
tert-butyl methyl ether	20	200	1 U			10 U		1 U		1 U			1 U		
Tetrachloroethene (PCE)	3	300	0.9 J			**93.7**		1.7 U		1.7 U			1.7 U		
Toluene	40	400	1 U			**55.4 JB**		1 U		1 U			1 U		
trans-1,2-Dichloroethene	100	1000	5.3			10.2 J		1.2 U		1.2 U			1.2 U		

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	Sample ID		064MW01SQ4	064MW02SQ4	064MW03SQ4	064MW04SQ4	064MW10SQ4	064MW11SQ4	064MW12SQ4	064MW13SQ4	064MW14SQ4	064MW15SQ4	064MW25SQ4	064MW26SQ4	064MW30SQ4
	Sample Date		12/11/2008	12/10/2008	12/17/2008	12/11/2008	12/19/2008	12/15/2008	12/18/2008	12/15/2008	12/17/2008	12/17/2008	12/16/2008	12/19/2008	12/19/2008
	Units in ug/l														
Parameter	**GCTL[1]**	**NADC**													
trans-1,3-Dichloropropene	NA	NA	1.2 U			11.7 U		1.2 U		1.2 U			1.2 U		
Trichloroethene (TCE)	3	300	1.5			**6.2 J**		**5.4**		1.1 U			1.1 U		
Trichlorofluoromethane	2100	21000	1.4 U			14.4 U		1.4 U		1.4 U			1.4 U		
Vinyl chloride	1	100	**1.4**			**3.5 J**		**1.4 U**		**1.4 U**			**1.4 U**		
Xylenes, total	20	200	0.84 JB			**3390 JB**		9.4		0.58 J			3 U		
SW8270C															
1,2,4,5-tetrachlorobenzene	2.1	21	**6.2 U**			**6.2 U**		**6.2 U**		**6.2 U**			**6.2 U**		
2,2'-Oxybis(1-chloro)propane	10	100	9.3 U			9.4 U		9.4 U		9.3 U			9.4 U		
2,4,5-Trichlorophenol	1	10	**9.6 U**			**9.7 U**		**9.7 U**		**9.6 U**			**9.7 U**		
2,4,6-Trichlorophenol	3.2	320	**10.2 U**			**10.2 U**		**10.2 U**		**10.2 U**			**10.2 U**		
2,4-Dichlorophenol	0.3	3	**8.8 U**			**8.8 U**		**8.8 U**		**8.8 U**			**8.8 U**		
2,4-Dimethylphenol	140	1400	6.5 U			12.1		6.5 U		6.5 U			6.5 U		
2,4-Dinitrophenol	14	140	**18.9 U**			**19 U**		**19 U**		**18.9 U**			**19 U**		
2,4-Dinitrotoluene	0.05	5	**7.9 U**			**8 U**		**8 U**		**7.9 U**			**8 U**		
2,6-Dinitrotoluene	0.05	5	**7.9 U**			**8 U**		**8 U**		**7.9 U**			**8 U**		
2-Chloronaphthalene	560	5600	7.9 U			8 U		8 U		7.9 U			8 U		
2-Chlorophenol	35	350	8.2 U			8.2 U		8.2 U		8.2 U			8.2 U		
2-Methylnaphthalene	28	280	3.2 J			**36.4**		26.9		7.9 U			8 U		
2-Methylphenol (o-Cresol)	35**	350	7.4 U			7.4 U		7.4 U		7.4 U			7.4 U		
2-Nitroaniline	21	210	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U		
2-Nitrophenol	NA	NA	9.6 U			9.7 U		9.7 U		9.6 U			9.7 U		
3,3'-Dichlorobenzidine	0.08	8	**7.6 U**			**7.7 U**		**7.7 U**		**7.6 U**			**7.7 U**		
3-Nitroaniline	1.7	170	**7.9 U**			**8 U**		**8 U**		**7.9 U**			**8 U**		
4,6-Dinitro-2-methylphenol	NA	NA	18.9 U			19 U		19 U		18.9 U			19 U		
4-Bromophenyl phenyl ether	70	700	6.5 U			6.5 U		6.5 U		6.5 U			6.5 U		
4-Chloro-3-methylphenol	63	630	7.6 U			7.7 U		7.7 U		7.6 U			7.7 U		
4-Chloroaniline	28	280	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U		
4-Chlorophenyl phenyl ether	NA	NA	7.1 U			7.1 U		7.1 U		7.1 U			7.1 U		
4-Methylphenol (p-Cresol)	3.5**	35	**17.3 U**			**17.3 U**		**17.3 U**		**17.3 U**			**17.3 U**		
4-Nitroaniline	1.7	170	**7.9 U**			**8 U**		**8 U**		**7.9 U**			**8 U**		
4-Nitrophenol	56	560	9.4 U			9.5 U		9.5 U		9.4 U			9.5 U		
Acenaphthene	20	200	7.9 U			8 U		8 U		7.9 U			8 U		
Acenaphthylene	210	2100	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U		
Acetophenone	700	7000	11.3 U			11.4 U		11.4 U		11.3 U			11.4 U		
Anthracene	2100	21000	7.9 U			8 U		8 U		7.9 U			8 U		
Atrazine	3	300	**3.8 U**			**3.8 U**		**3.8 U**		**3.8 U**			**3.8 U**		
Benzaldehyde	NA	NA	3.8 U			3.8 U		3.8 U		3.8 U			3.8 U		
Benzo(a)anthracene	0.05	5	**7.4 U**			**7.4 U**		**7.4 U**		**7.4 U**			**7.4 U**		
Benzo(a)pyrene	0.2	20	**7.9 U**			**8 U**		**8 U**		**7.9 U**			**8 U**		
Benzo(b)fluoranthene	0.05	5	**7.4 U**			**7.4 U**		**7.4 U**		**7.4 U**			**7.4 U**		
Benzo(g,h,i)perylene	210	2100	7.4 U			7.4 U		7.4 U		7.4 U			7.4 U		
Benzo(k)fluoranthene	0.5	50	**8.2 U**			**8.2 U**		**8.2 U**		**8.2 U**			**8.2 U**		
Benzyl butyl phthalate	140**	1400	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U		
biphenyl (diphenyl)	0.5	5	**3.8 U**			**3.8 U**		**3.4 J**		**3.8 U**			**3.8 U**		
Bis(2-Chloroethoxy) methane	NA	NA	9.9 U			10 U		10 U		9.9 U			10 U		
bis(2-Chloroethyl) ether (2-Chloroethyl ether)	0.03	3	**8.5 U**			**8.5 U**		**8.5 U**		**8.5 U**			**8.5 U**		

Table 3-5
Groundwater Analytical Results Summary
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PSC 47 Groundwater Sampling	Station ID		JAX47-MW01S	JAX47-MW02S	JAX47-MW03S	JAX47-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S	JAX47-MW30S
	Sample ID		064MW01SQ4	064MW02SQ4	064MW03SQ4	064MW04SQ4	064MW10SQ4	064MW11SQ4	064MW12SQ4	064MW13SQ4	064MW14SQ4	064MW15SQ4	064MW25SQ4	064MW26SQ4	064MW30SQ4
	Sample Date		12/11/2008	12/10/2008	12/17/2008	12/11/2008	12/19/2008	12/15/2008	12/18/2008	12/15/2008	12/17/2008	12/17/2008	12/16/2008	12/19/2008	12/19/2008
	Units in ug/l														
Parameter	**GCTL[1]**	**NADC**													
bis(2-Ethylhexyl) phthalate	6	600	**12.4 U**			**12.5 U**		**12.5 U**		**12.4 U**			**12.5 U**		
caprolactam	NA	NA	3.8 U			3.8 U		3.8 U		3.8 U			3.8 U		
Carbazole	1.8	180	**8.8 U**			**8.8 U**		**8.8 U**		**8.8 U**			**8.8 U**		
Chrysene	4.8	480	**8.2 U**			**8.2 U**		**8.2 U**		**8.2 U**			**8.2 U**		
Di-n-butyl phthalate	700	7000	8.2 U			8.2 U		8.2 U		8.2 U			8.2 U		
Di-n-octylphthalate	140	1400	7.9 U			8 U		8 U		7.9 U			8 U		
Dibenz(a,h)anthracene	0.005	0.5	**7.6 U**			**7.7 U**		**7.7 U**		**7.6 U**			**7.7 U**		
Dibenzofuran	28	280	7.6 U			7.7 U		7.7 U		7.6 U			7.7 U		
Diethyl phthalate	5600	56000	7.9 U			5.2 J		8 U		7.9 U			8 U		
Dimethyl phthalate	70000	700000	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U		
Fluoranthene	280	2800	7.9 U			8 U		8 U		7.9 U			8 U		
Fluorene	280	2800	8.2 U			8.2 U		8.2 U		8.2 U			8.2 U		
Hexachlorobenzene	1	100	**7.4 U**			**7.4 U**		**7.4 U**		**7.4 U**			**7.4 U**		
Hexachlorobutadiene	0.4	40	**7.1 U**			**7.1 U**		**7.1 U**		**7.1 U**			**7.1 U**		
Hexachlorocyclopentadiene	50	500	6.2 U			6.2 U		6.2 U		6.2 U			6.2 U		
Hexachloroethane	2.5	250	**7.4 U**			**7.4 U**		**7.4 U**		**7.4 U**			**7.4 U**		
Indeno(1,2,3-c,d)pyrene	0.05	5	**7.4 U**			**7.4 U**		**7.4 U**		**7.4 U**			**7.4 U**		
Isophorone	37	3700	10.8 U			10.8 U		10.8 U		10.8 U			10.8 U		
n-Nitrosodi-n-propylamine	0.005	0.5	**8.5 U**			**8.5 U**		**8.5 U**		**8.5 U**			**8.5 U**		
n-Nitrosodiphenylamine	7.1	710	**9.6 U**			**9.7 U**		**9.7 U**		**9.6 U**			**9.7 U**		
Naphthalene	14**	140	4.6 J			**50.2**		**78.5**		7.9 U			8 U		
Nitrobenzene	3.5	35	**7.9 U**			**8 U**		**8 U**		**7.9 U**			**8 U**		
Pentachlorophenol	1	100	**18.9 U**			**19 U**		**19 U**		**18.9 U**			**19 U**		
Phenanthrene	210	2100	7.9 U			8 U		8 U		7.9 U			8 U		
Phenol	10	100	**18.9 U**			**19 U**		**19 U**		**18.9 U**			**19 U**		
Pyrene	210	2100	8.2 U			8.2 U		8.2 U		8.2 U			8.2 U		

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC Groundwater Cleanup Target Levels (GCTLs) reported in µg/L
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated method and/or calibration blank.
Values Bolded are analytes not detected by the Lab but are above the GCTL
Values Shaded Pale Yellow are analytes not detected by the Lab but are above the NADC
Values Bolded and Shaded Pale Yellow are analytes not detected by the Lab but are above both GCTL and NADC
Values Bold and Pale Blue are hits exceeding the GCTL
Values Shaded Grey are hits that exceed the NADC
Values Bold and Shaded Grey are hits that exceed both GCTL and NADC
NA - Not Available at time of rule adoption
*Laboratory IDs for samples JAX47-MW03S and JAX47-MW41S were transposed for December 17, 2008 arsenic analysis.

Table 3-5
Groundwater Analytical Results Summary
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PSC 47 Groundwater Sampling	Station ID		JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	Sample ID		064MW32SQ4	064MW33SQ4	064MW34SQ4	064MW35SQ4	064MW36SQ4	064MW37SQ4	064MW38SQ4	064MW39SQ4	064MW40SQ4	064MW41SQ4	064MW42SQ4	064MW43SQ4
	Sample Date		12/16/2008	12/18/2008	12/16/2008	12/17/2008	12/18/2008	12/16/2008	12/18/2008	12/15/2008	12/15/2008	12/17/2008	12/16/2008	12/18/2008
	Units in ug/l													
Parameter	**GCTL[1]**	**NADC**												
1632AM														
Arsenic-III	NA	NA				0.3 U		16		0.3 U	0.3 U	4500		
Arsenic-V	NA	NA				0.28 U		33		0.28 U	13	560		
A3500D														
Ferrous Iron	NA	NA	360 U		360 U			897		360 U	360 U		360 U	
E310.1														
Alkalinity, total (as CaCO3)	NA	NA	11000 J		33000			42000		79000	89000		27000	
RSK-175														
Ethane	NA	NA	1.8 U		1.8 U			1.8 U		1.8 U	1.8 U		1.8 U	
Ethene	NA	NA	1.3 U		1.3 U			1.3 U		1.3 U	1.3 U		1.3 U	
Methane	NA	NA	2.3 B		2.2 B			8.2 B		2.3 B	2.2 B		50.8 B	
SM4500S-D														
Sulfide	NA	NA	5.8 U		5.8 U			5.8 U		5.8 U	5.8 U		5.8 U	
A5310C														
Total organic carbon	NA	NA	3400 U		3800 J			9000 J		4500 J	3400 U		5200 J	
SW300.1														
nitrogen, nitrate (as n)	10000	100000	221		897			100 U		5720 J	6800 J		2060	
Sulfate (as SO4)	250000	2500000	11400		24200			11500		8590 B	17100 B		36100	
SW6010B														
Arsenic	10	100	3.31 U	3.5 B	5.94 J	3.31 U	**980**	**30.2**	5.56 J	3.31 U	**20.9**	3.31 U*	4.68 J	**10.7 B**
Iron-Dissolved	300	3000	12.5 B		11 B			**1350 B**		9.11 J	6.18 J		13.1 B	
Manganese-Dissolved	50	500	19.6 B		4.51 B			5.64 B		0.35 U	0.35 U		7.22 B	
SW8081														
Aldrin	0.002	0.2	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**	**0.024 U**
alpha bhc (alpha hexachlorocyclohexane)	0.006	0.6	**0.0085 U**	**0.25**	**0.016 J**	**0.0085 U**	**1.2**	**0.0085 U**	**0.29**	0.0055 JB	**0.015 JB**	**0.26**	**3**	**6.2**
alpha endosulfan	42	420	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
alpha-chlordane	NA	NA	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.04 J	0.047 U	0.047 U	0.047 U
beta bhc (beta hexachlorocyclohexane)	0.02	2	**0.13**	**0.53**	**5.5**	**0.047 U**	**2**	**0.047 U**	**0.12**	**0.047 U**	**0.047 U**	**0.15**	**1**	**7.3**
beta endosulfan	42	420	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
chlordane	2	200	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
delta bhc (delta hexachlorocyclohexane)	2.1	21	0.071	0.12	0.047 U	0.047 U	0.68	0.047 U	0.18	0.047 U	0.047 U	0.046 J	**4**	**7.6**
Dieldrin	0.002	0.2	**0.013**	**0.38**	**0.13**	**0.0076 U**	**0.0077 U**	**0.0076 U**	**0.0076 U**	**0.0077 U**	**0.0077 U**	**0.0042 J**	**0.0076 U**	**0.0076 U**
endosulfan sulfate	42	420	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
endrin	2	20	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.0045 J	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
endrin aldehyde	NA	NA	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
endrin ketone	NA	NA	0.047 U	0.047	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
gamma bhc (lindane)	0.2	20	0.047 U	**0.24**	0.017 J	0.047 U	**2.7 J**	0.047 U	0.047 U	0.011 J	0.047 U	0.11	**2.7**	**7.5**
gamma-chlordane	NA	NA	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
heptachlor	0.4	40	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
heptachlor epoxide	0.2	20	0.047 U	**0.31**	0.058	0.047 U	0.047 U	0.047 U	0.0047 J	0.047 U	0.013 J	0.036 J	0.047 U	0.047 U
methoxychlor	40	400	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
p,p'-DDD	0.1	10	0.047 U	0.047 U	0.047 U	0.047 U	**9.4 J**	0.021 J	0.092	0.047 U	**1.3**	0.0071 J	0.047 U	0.047 U
p,p'-DDE	0.1	10	0.047 U	0.047 U	0.047 U	0.047 U	0.055	0.047 U	0.0056 J	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
p,p'-DDT	0.1	10	0.047 U	0.047 U	0.063	0.047 U	**4.2**	0.047 U	0.047 U	0.047 U	0.075	0.047 U	0.034 J	0.047 U
toxaphene	3	300	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U

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PSC 47 Groundwater Sampling	Station ID		JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	Sample ID		064MW32SQ4	064MW33SQ4	064MW34SQ4	064MW35SQ4	064MW36SQ4	064MW37SQ4	064MW38SQ4	064MW39SQ4	064MW40SQ4	064MW41SQ4	064MW42SQ4	064MW43SQ4
	Sample Date		12/16/2008	12/18/2008	12/16/2008	12/17/2008	12/18/2008	12/16/2008	12/18/2008	12/15/2008	12/15/2008	12/17/2008	12/16/2008	12/18/2008
	Units in ug/l													
Parameter	**GCTL[1]**	**NADC**												
SW8260B														
1,1,1-Trichloroethane	200	2000	1 U		1 U			1 U		1 U	1 U		1 U	
1,1,2,2-Tetrachloroethane	0.2	20	**1.1 U**		**1.1 U**			**1.1 U**		**1.1 U**	**1.1 U**		**1.1 U**	
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000	2.4 U		2.4 U			2.4 U		2.4 U	2.4 U		2.4 U	
1,1,2-Trichloroethane	5	500	1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
1,1-Dichloroethane	70**	700	1 U		1 U			1 U		1 U	1 U		1 U	
1,1-Dichloroethene	7**	70	1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
1,2,3-trichlorobenzene	70	700	1 U		1 U			1 U		1 U	1 U		1 U	
1,2,4-Trichlorobenzene	70	700	1.5 U		1.5 U			1.5 U		1.5 U	1.5 U		1.4 J	
1,2-Dibromo-3-chloropropane	0.2	20	**6 U**		**6 U**			**6 U**		**6 U**	**6 U**		**6 U**	
1,2-Dibromoethane (Ethylene dibromide)	0.02	2	**1.1 U**		**1.1 U**			**1.1 U**		**1.1 U**	**1.1 U**		**1.1 U**	
1,2-Dichlorobenzene	600	6000	1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1 J	
1,2-Dichloroethane	3	300	1.3 U		1.3 U			1.3 U		1.3 U	1.3 U		1.3 U	
1,2-Dichloropropane	5	500	1.6 U		1.6 U			1.6 U		1.6 U	1.6 U		1.6 U	
1,3-Dichlorobenzene	210	2100	1 U		1 U			1 U		1 U	1 U		0.39 J	
1,4-Dichlorobenzene	75	7500	1 U		1 U			1 U		1 U	1 U		3.9	
2-Hexanone	280	2800	5.1 U		5.1 U			5.1 U		5.1 U	5.1 U		5.1 U	
Acetone	6300	63000	18 U		18 U			18 U		18 U	18 U		18 U	
Benzene	1	100	1 U		1 U			1 U		1 U	1 U		0.66 J	
Bromochloromethane	91	910	2.2 U		2.2 U			2.2 U		2.2 U	2.2 U		2.2 U	
Bromodichloromethane	0.6	60	**1.3 U**		**1.3 U**			**1.3 U**		**1.3 U**	**1.3 U**		**1.3 U**	
Bromoform	4.4	440	1.9 U		1.9 U			1.9 U		1.9 U	1.9 U		1.9 U	
Bromomethane	9.8	98	1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Carbon disulfide	700	7000	1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
Carbon tetrachloride	3	300	1.5 U		1.5 U			1.5 U		1.5 U	1.5 U		1.5 U	
Chlorobenzene	100	1000	1 U		1 U			1 U		1 U	1 U		4.6	
Chloroethane	12	1200	2.8 U		2.8 U			2.8 U		2.8 U	2.8 U		2.8 U	
Chloroform	70	700	1 U		1 U			1 U		1 U	1 U		1 U	
Chloromethane	2.7	270	1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
cis-1,2-Dichloroethene	70	700	1 U		1 U			1 U		1 U	1 U		1 U	
cis-1,3-Dichloropropene	NA	NA	1 U		1 U			1 U		1 U	1 U		1 U	
cyclohexane	NA	NA	1 U		1 U			1 U		1 U	1 U		1 U	
Dibromochloromethane	0.4	40	**1 U**		**1 U**			**1 U**		**1 U**	**1 U**		**1 U**	
Dichlorodifluoromethane	1400	14000	1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
Ethylbenzene	30	300	1 U		1 U			1 U		1 U	1 U		1.2	
Isopropylbenzene (Cumene)	0.8	8	**1 U**		**1 U**			**1 U**		**1 U**	**1 U**		**3.6**	
methyl acetate	3000	30000	7.2 U		7.2 U			7.2 U		7.2 U	7.2 U		7.2 U	
Methyl ethyl ketone (2-butanone)	4200	42000	6.6 U		6.6 U			6.6 U		6.6 U	6.6 U		6.6 U	
Methyl isobutyl ketone (4-methyl-2-pentanone)	560	5600	5 U		5 U			5 U		5 U	5 U		5 U	
methylcyclohexane	NA	NA	1.9 U		1.9 U			1.9 U		1.9 U	1.9 U		3.4	
Methylene chloride	5	500	1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Styrene	100	1000	1 U		1 U			1 U		1 U	1 U		1 U	
tert-butyl methyl ether	20	200	1 U		1 U			1 U		1 U	1 U		1 U	
Tetrachloroethene (PCE)	3	300	1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
Toluene	40	400	1 U		1 U			1 U		1 U	1 U		1 U	
trans-1,2-Dichloroethene	100	1000	1.2 U		1.2 U			1.2 U		1.2 U	1.2 U		1.2 U	

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PSC 47 Groundwater Sampling	Station ID		JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	Sample ID		064MW32SQ4	064MW33SQ4	064MW34SQ4	064MW35SQ4	064MW36SQ4	064MW37SQ4	064MW38SQ4	064MW39SQ4	064MW40SQ4	064MW41SQ4	064MW42SQ4	064MW43SQ4
	Sample Date		12/16/2008	12/18/2008	12/16/2008	12/17/2008	12/18/2008	12/16/2008	12/18/2008	12/15/2008	12/15/2008	12/17/2008	12/16/2008	12/18/2008
	Units in ug/l													
Parameter	**GCTL[1]**	**NADC**												
trans-1,3-Dichloropropene	NA	NA	1.2 U		1.2 U			1.2 U		1.2 U	1.2 U		1.2 U	
Trichloroethene (TCE)	3	300	1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
Trichlorofluoromethane	2100	21000	1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Vinyl chloride	1	100	**1.4 U**		**1.4 U**			**1.4 U**		**1.4 U**	**1.4 U**		**1.4 U**	
Xylenes, total	20	200	3 U		3 U			3 U		3 U	3 U		1.4 J	
SW8270C														
1,2,4,5-tetrachlorobenzene	2.1	21	**6.2 U**		**6.2 U**			**6.2 U**		**6.2 U**	**6.2 U**		**6.2 U**	
2,2'-Oxybis(1-chloro)propane	10	100	9.3 U		9.3 U			9.4 U		9.4 U	9.4 U		9.3 U	
2,4,5-Trichlorophenol	1	10	**9.6 U**		**9.6 U**			**9.7 U**		**9.7 U**	**9.7 U**		**9.6 U**	
2,4,6-Trichlorophenol	3.2	320	**10.2 U**		**10.2 U**			**10.2 U**		**10.2 U**	**10.2 U**		**10.2 U**	
2,4-Dichlorophenol	0.3	3	**8.8 U**		**8.8 U**			**8.8 U**		**8.8 U**	**8.8 U**		**8.8 U**	
2,4-Dimethylphenol	140	1400	6.5 U		6.5 U			6.5 U		6.5 U	6.5 U		6.5 U	
2,4-Dinitrophenol	14	140	**18.9 U**		**18.9 U**			**19 U**		**19 U**	**19 U**		**18.9 U**	
2,4-Dinitrotoluene	0.05	5	**7.9 U**		**7.9 U**			**8 U**		**8 U**	**8 U**		**7.9 U**	
2,6-Dinitrotoluene	0.05	5	**7.9 U**		**7.9 U**			**8 U**		**8 U**	**8 U**		**7.9 U**	
2-Chloronaphthalene	560	5600	7.9 U		7.9 U			8 U		8 U	8 U		7.9 U	
2-Chlorophenol	35	350	8.2 U		8.2 U			8.2 U		8.2 U	8.2 U		8.2 U	
2-Methylnaphthalene	28	280	7.9 U		7.9 U			8 U		8 U	8 U		23.6	
2-Methylphenol (o-Cresol)	35**	350	7.4 U		7.4 U			7.4 U		7.4 U	7.4 U		7.4 U	
2-Nitroaniline	21	210	8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
2-Nitrophenol	NA	NA	9.6 U		9.6 U			9.7 U		9.7 U	9.7 U		9.6 U	
3,3'-Dichlorobenzidine	0.08	8	**7.6 U**		**7.6 U**			**7.7 U**		**7.7 U**	**7.7 U**		**7.6 U**	
3-Nitroaniline	1.7	170	**7.9 U**		**7.9 U**			**8 U**		**8 U**	**8 U**		**7.9 U**	
4,6-Dinitro-2-methylphenol	NA	NA	18.9 U		18.9 U			19 U		19 U	19 U		18.9 U	
4-Bromophenyl phenyl ether	70	700	6.5 U		6.5 U			6.5 U		6.5 U	6.5 U		6.5 U	
4-Chloro-3-methylphenol	63	630	7.6 U		7.6 U			7.7 U		7.7 U	7.7 U		7.6 U	
4-Chloroaniline	28	280	8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
4-Chlorophenyl phenyl ether	NA	NA	7.1 U		7.1 U			7.1 U		7.1 U	7.1 U		7.1 U	
4-Methylphenol (p-Cresol)	3.5**	35	**17.3 U**		**17.3 U**			**17.3 U**		**17.3 U**	**17.3 U**		**17.3 U**	
4-Nitroaniline	1.7	170	**7.9 U**		**7.9 U**			**8 U**		**8 U**	**8 U**		**7.9 U**	
4-Nitrophenol	56	560	9.4 U		9.4 U			9.5 U		9.5 U	9.5 U		9.4 U	
Acenaphthene	20	200	7.9 U		7.9 U			8 U		8 U	8 U		7.9 U	
Acenaphthylene	210	2100	8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
Acetophenone	700	7000	11.3 U		11.3 U			11.4 U		11.4 U	11.4 U		11.3 U	
Anthracene	2100	21000	7.9 U		7.9 U			8 U		8 U	8 U		7.9 U	
Atrazine	3	300	**3.8 U**		**3.8 U**			**3.8 U**		**3.8 U**	**3.8 U**		**3.8 U**	
Benzaldehyde	NA	NA	3.8 U		3.8 U			3.8 U		3.8 U	3.8 U		3.8 U	
Benzo(a)anthracene	0.05	5	**7.4 U**		**7.4 U**			**7.4 U**		**7.4 U**	**7.4 U**		**7.4 U**	
Benzo(a)pyrene	0.2	20	**7.9 U**		**7.9 U**			**8 U**		**8 U**	**8 U**		**7.9 U**	
Benzo(b)fluoranthene	0.05	5	**7.4 U**		**7.4 U**			**7.4 U**		**7.4 U**	**7.4 U**		**7.4 U**	
Benzo(g,h,i)perylene	210	2100	7.4 U		7.4 U			7.4 U		7.4 U	7.4 U		7.4 U	
Benzo(k)fluoranthene	0.5	50	**8.2 U**		**8.2 U**			**8.2 U**		**8.2 U**	**8.2 U**		**8.2 U**	
Benzyl butyl phthalate	140**	1400	8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
biphenyl (diphenyl)	0.5	5	**3.8 U**		**3.8 U**			**3.8 U**		**3.8 U**	**3.8 U**		**3.8 U**	
Bis(2-Chloroethoxy) methane	NA	NA	9.9 U		9.9 U			10 U		10 U	10 U		9.9 U	
bis(2-Chloroethyl) ether (2-Chloroethyl ether)	0.03	3	**8.5 U**		**8.5 U**			**8.5 U**		**8.5 U**	**8.5 U**		**8.5 U**	

Table 3-5
Groundwater Analytical Results Summary
December 2008
NAS Jacksonville

PSC 47 Groundwater Sampling	Station ID		JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	Sample ID		064MW32SQ4	064MW33SQ4	064MW34SQ4	064MW35SQ4	064MW36SQ4	064MW37SQ4	064MW38SQ4	064MW39SQ4	064MW40SQ4	064MW41SQ4	064MW42SQ4	064MW43SQ4
	Sample Date		12/16/2008	12/18/2008	12/16/2008	12/17/2008	12/18/2008	12/16/2008	12/18/2008	12/15/2008	12/15/2008	12/17/2008	12/16/2008	12/18/2008
	Units in ug/l													
Parameter	**GCTL[1]**	**NADC**												
bis(2-Ethylhexyl) phthalate	6	600	**12.4 U**		**12.4 U**			**12.5 U**		**12.5 U**	**12.5 U**		**12.4 U**	
caprolactam	NA	NA	3.8 U		3.8 U			3.8 U		3.8 U	3.8 U		3.8 U	
Carbazole	1.8	180	**8.8 U**		**8.8 U**			**8.8 U**		**8.8 U**	**8.8 U**		**8.8 U**	
Chrysene	4.8	480	**8.2 U**		**8.2 U**			**8.2 U**		**8.2 U**	**8.2 U**		**8.2 U**	
Di-n-butyl phthalate	700	7000	8.2 U		8.2 U			8.2 U		8.2 U	8.2 U		8.2 U	
Di-n-octylphthalate	140	1400	7.9 U		7.9 U			8 U		8 U	8 U		7.9 U	
Dibenz(a,h)anthracene	0.005	0.5	**7.6 U**		**7.6 U**			**7.7 U**		**7.7 U**	**7.7 U**		**7.6 U**	
Dibenzofuran	28	280	7.6 U		7.6 U			7.7 U		7.7 U	7.7 U		7.6 U	
Diethyl phthalate	5600	56000	7.9 U		7.9 U			8 U		8 U	8 U		7.9 U	
Dimethyl phthalate	70000	700000	8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
Fluoranthene	280	2800	7.9 U		7.9 U			8 U		8 U	8 U		7.9 U	
Fluorene	280	2800	8.2 U		8.2 U			8.2 U		8.2 U	8.2 U		8.2 U	
Hexachlorobenzene	1	100	**7.4 U**		**7.4 U**			**7.4 U**		**7.4 U**	**7.4 U**		**7.4 U**	
Hexachlorobutadiene	0.4	40	**7.1 U**		**7.1 U**			**7.1 U**		**7.1 U**	**7.1 U**		**7.1 U**	
Hexachlorocyclopentadiene	50	500	6.2 U		6.2 U			6.2 U		6.2 U	6.2 U		6.2 U	
Hexachloroethane	2.5	250	**7.4 U**		**7.4 U**			**7.4 U**		**7.4 U**	**7.4 U**		**7.4 U**	
Indeno(1,2,3-c,d)pyrene	0.05	5	**7.4 U**		**7.4 U**			**7.4 U**		**7.4 U**	**7.4 U**		**7.4 U**	
Isophorone	37	3700	10.8 U		10.8 U			10.8 U		10.8 U	10.8 U		10.8 U	
n-Nitrosodi-n-propylamine	0.005	0.5	**8.5 U**		**8.5 U**			**8.5 U**		**8.5 U**	**8.5 U**		**8.5 U**	
n-Nitrosodiphenylamine	7.1	710	**9.6 U**		**9.6 U**			**9.7 U**		**9.7 U**	**9.7 U**		**9.6 U**	
Naphthalene	14**	140	7.9 U		7.9 U			8 U		8 U	8 U		**47.5**	
Nitrobenzene	3.5	35	**7.9 U**		**7.9 U**			**8 U**		**8 U**	**8 U**		**7.9 U**	
Pentachlorophenol	1	100	**18.9 U**		**18.9 U**			**19 U**		**19 U**	**19 U**		**18.9 U**	
Phenanthrene	210	2100	7.9 U		7.9 U			8 U		8 U	8 U		7.9 U	
Phenol	10	100	**18.9 U**		**18.9 U**			**19 U**		**19 U**	**19 U**		**18.9 U**	
Pyrene	210	2100	8.2 U		8.2 U			8.2 U		8.2 U	8.2 U		8.2 U	

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC Groundwater Cleanup Target Levels (GCTLs) reported in µg/L
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated method and/or calibration blank.
Values Bolded are analytes not detected by the Lab but are above the GCTL
Values Shaded Pale Yellow are analytes not detected by the Lab but are above the NADC
Values Bolded and Shaded Pale Yellow are analytes not detected by the Lab but are above both GCTL and NADC
Values Bold and Pale Blue are hits exceeding the GCTL
Values Shaded Grey are hits that exceed the NADC
Values Bold and Shaded Grey are hits that exceed both GCTL and NADC
NA - Not Available at time of rule adoption
*Laboratory IDs for samples JAX47-MW03S and JAX47-MW41S were transposed for December 17, 2008 arsenic analysis.

Table 3-6
Groundwater Analytical Data Summary
March 2009
NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		JAX47-937-MW01S	JAX47-937-MW02S	JAX47-937-MW03S	JAX47-937-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S
	SampleID		064MW01SQ1	064MW02SQ1	064MW03SQ1	064MW04SQ1	064MW10SQ1	064MW11SQ1	064MW12SQ1	064MW13SQ1	064MW14SQ1	064MW15SQ1	064MW25SQ1	064MW26SQ1
	Sample Date		3/12/2009	3/12/2009	3/16/2009	3/12/2009	3/12/2009	3/18/2009	3/20/2009	3/16/2009	3/17/2009	3/17/2009	3/19/2009	3/13/2009
	Units in ug/l													
Parameter	**GCTL[1]**	**NADC**												
1632AM														
Arsenic-III	NA	NA	150	3900	5300						0.3 U	0.3 U		
Arsenic-V	NA	NA	12	160	900						0.3 U	0.3 U		
A3500D														
Ferrous Iron	NA	NA	6670			7490		724		360 U			460	
A5310C														
Total organic carbon	NA	NA	18000			21000		8200 J		9100 J			3400 U	
E310.1														
Alkalinity, total (as CaCO3)	NA	NA	22000			9000 J		15000 J		19000 J			1600 U	
RSK-175														
Ethane	NA	NA	1.8 U			1.8 U		0.26 J		1.8 U			1.8 U	
Ethene	NA	NA	1.3 U			1.3 U		1.3 U		1.3 U			1.3 U	
Methane	NA	NA	812 B			1420 B		148 B		15.3 B			4.6 B	
SM4500-SO3														
Sulfide	NA	NA	5.8 U			5.8 U								
SM4500S-D														
Sulfide	NA	NA						5.8 U		5.8 U			5.8 U	
SW300.1														
nitrogen, nitrate (as n)	10000	100000	100 U			27.4 B		1760		1200			1200	
Sulfate (as SO4)	250000	2500000	**307000**			**302000**		24200		43300			21200	
SW6010B														
Arsenic	10	100	**232**	**4520**	**4870**	7.26 J	4.81 J	5.31 J	3.31 U	**11.1 J**	3.88 J	3.31 U	3.31 U	3.31 U
Iron	300	3000	**13100**			**25700**		**677 B**		63.3 B			**375**	
Manganese	50	500	**398**			**159**		12.4		8.54 B			11.6	
SW8081A														
Aldrin	0.002	0.2	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**
alpha bhc (alpha hexachlorocyclohexane)	0.006	0.6	**0.0091 U**	**0.0091 U**	**0.63**	**0.0091 U**	**0.0091 U**	**3.3**	**0.0066 J**	**2.3**	**0.009 U**	**0.0091 U**	**0.031**	**0.0091 U**
alpha endosulfan	42	420	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.24	0.05 U	0.05 U	0.05 U	0.11	0.057 J
alpha-chlordane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1.1 J	0.05 U	0.05 U	0.05 U	0.05 U
beta bhc (beta hexachlorocyclohexane)	0.02	2	**0.05 U**	**0.05 U**	**0.05 U**	**0.05 U**	**0.05 U**	**2.1**	**0.88**	**0.41**	**0.05 U**	**0.05 U**	**1.7**	**0.039 J**
beta endosulfan	42	420	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
chlordane	2	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**3.4**	0.5 U	0.5 U	0.5 U	0.5 U
delta bhc (delta hexachlorocyclohexane)	2.1	21	0.05 U	0.05 U	0.74	0.05 U	0.05 U	**3.2**	0.05 U	1.8	0.05 U	0.05 U	0.062	0.05 U
Dieldrin	0.002	0.2	**0.0082 U**	**0.0082 U**	**0.29**	**0.0082 U**	**0.0082 U**	**0.0082 U**	**0.12**	**0.12**	**0.0081 U**	**0.0082 U**	**0.0082 U**	**0.012**
endosulfan sulfate	42	420	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
endrin	2	20	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
endrin aldehyde	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
endrin ketone	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.054 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma bhc (lindane)	0.2	20	0.05 U	0.05 U	**1.3**	0.05 U	0.0045 J	**5.1**	0.0076 J	**1.8**	0.05 U	0.05 U	0.066	0.05 U
gamma-chlordane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.61	0.05 U	0.05 U	0.05 U	0.05 U
heptachlor	0.4	40	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
heptachlor epoxide	0.2	20	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.12 J	0.05 U	0.05 U	0.05 U	0.048 J	0.032 J
methoxychlor	40	400	0.05 U	0.05 U	0.05 U	0.05 U	0.011 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
p,p'-DDD	0.1	10	0.05 U	0.05 U	**11 JB**	0.05 U	0.05 U	0.05 U	0.05 U	**0.91 JB**	0.013 J	0.05 U	0.05 U	0.05 U
p,p'-DDE	0.1	10	0.05 U	0.05 U	**0.11**	0.05 U	0.05 U	0.05 U	0.05 U	0.036 J	0.01 J	0.05 U	0.05 U	0.05 U
p,p'-DDT	0.1	10	0.05 U	0.05 U	0.093 J	0.05 U	0.011 J	0.05 U	0.05 U	**0.32**	0.05 U	0.05 U	0.05 U	0.05 U

Table 3-6
Groundwater Analytical Data Summary
March 2009
NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		JAX47-937-MW01S	JAX47-937-MW02S	JAX47-937-MW03S	JAX47-937-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S
	SampleID		064MW01SQ1	064MW02SQ1	064MW03SQ1	064MW04SQ1	064MW10SQ1	064MW11SQ1	064MW12SQ1	064MW13SQ1	064MW14SQ1	064MW15SQ1	064MW25SQ1	064MW26SQ1
	Sample Date		3/12/2009	3/12/2009	3/16/2009	3/12/2009	3/12/2009	3/18/2009	3/20/2009	3/16/2009	3/17/2009	3/17/2009	3/19/2009	3/13/2009
	Units in ug/l													
Parameter	**GCTL[1]**	**NADC**												
toxaphene	3	300	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.54 U	0.55 U	0.55 U	0.55 U
SW8260B														
1,1,1-Trichloroethane	200	2000	1 U			1 U		1 U		1 U			1 U	
1,1,2,2-Tetrachloroethane	0.2	20	**1.1 U**			**1.1 U**		**1.1 U**		**1.1 U**			**1.1 U**	
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000	2.4 U			2.4 U		2.4 U		2.4 U			2.4 U	
1,1,2-Trichloroethane	5	500	1.7 U			1.7 U		1.7 U		1.7 U			1.7 U	
1,1-Dichloroethane	70**	700	1 U			1 U		1 U		1 U			1 U	
1,1-Dichloroethene	7**	70	1.1 U			1.1 U		0.45 J		1.1 U			1.1 U	
1,2,3-trichlorobenzene	70	700	1 U			1 U		1 U		4.7			1 U	
1,2,4-Trichlorobenzene	70	700	1.5 U			1.5 U		0.51 J		13.9			1.5 U	
1,2-Dibromo-3-chloropropane	0.2	20	**6 U**			**6 U**		**6 U**		**6 U**			**6 U**	
1,2-Dibromoethane (Ethylene dibromide)	0.02	2	**1.1 U**			**1.1 U**		**1.1 U**		**1.1 U**			**1.1 U**	
1,2-Dichlorobenzene	600	6000	1.1 U			1.1 U		0.97 J		2.9			1.1 U	
1,2-Dichloroethane	3	300	1.3 U			1.3 U		1.3 U		1.3 U			1.3 U	
1,2-Dichloropropane	5	500	1.6 U			1.6 U		1.6 U		1.6 U			1.6 U	
1,3-Dichlorobenzene	210	2100	1 U			1 U		1 U		2.8			1 U	
1,4-Dichlorobenzene	75	7500	1 U			1 U		2.7		4.5			1 U	
2-Hexanone	280	2800	5.1 U			5.1 U		5.1 U		5.1 U			5.1 U	
Acetone	6300	63000	18 U			18 U		18 U		18 U			18 U	
Benzene	1	100	**3.1**			**3.2**		**1.4**		0.54 J			1 U	
Bromochloromethane	91	910	2.2 U			2.2 U		2.2 U		2.2 U			2.2 U	
Bromodichloromethane	0.6	60	**1.3 U**			**1.3 U**		**1.3 U**		**1.3 U**			**1.3 U**	
Bromoform	4.4	440	1.9 U			1.9 U		1.9 U		1.9 U			1.9 U	
Bromomethane	9.8	98	1.4 U			1.4 U		1.4 U		1.4 U			1.4 U	
Carbon disulfide	700	7000	1.1 U			1.1 U		1.1 U		1.1 U			1.1 U	
Carbon tetrachloride	3	300	1.5 U			1.5 U		1.5 U		1.5 U			1.5 U	
Chlorobenzene	100	1000	0.98 J			0.32 J		11		2.9			1 U	
Chloroethane	12	1200	2.8 U			2.8 U		2.8 U		2.8 U			2.8 U	
Chloroform	70	700	1 U			1 U		1 U		0.58 J			1 U	
Chloromethane	2.7	270	1.4 U			1.4 U		1.4 U		1.4 U			1.4 U	
cis-1,2-Dichloroethene	70	700	**128**			**194**		2		1 U			1 U	
cis-1,3-Dichloropropene	NA	NA	1 U			1 U		1 U		1 U			1 U	
cyclohexane	NA	NA	1 U			1 U		28.2		1 U			1 U	
Dibromochloromethane	0.4	40	**1 U**			**1 U**		**1 U**		**1 U**			**1 U**	
Dichlorodifluoromethane	1400	14000	1.7 U			1.7 U		1.7 U		1.7 U			1.7 U	
Ethylbenzene	30	300	16.4			**68.3**		12.7		1 U			1 U	
Isopropylbenzene (Cumene)	0.8	8	**1.2**			**3**		**5.7**		**1 U**			**1 U**	
methyl acetate	3000	30000	7.2 U			7.2 U		7.2 U		7.2 U			7.2 U	
Methyl ethyl ketone (2-butanone)	4200	42000	6.6 U			6.6 U		6.6 U		6.6 U			6.6 U	
Methyl isobutyl ketone (4-methyl-2-pentanone)	560	5600	5 U			5 U		5 U		5 U			5 U	
methylcyclohexane	NA	NA	1.9 U			1.9 U		12.3		1.9 U			1.9 U	
Methylene chloride	5	500	1.4 U			1.4 U		1.4 U		1.4 U			1.4 U	
Styrene	100	1000	1 U			1 U		1 U		1 U			1 U	
tert-butyl methyl ether	20	200	1 U			1 U		1 U		1 U			1 U	
Tetrachloroethene (PCE)	3	300	1.4 J			**67.1**		1.7 U		1.7 U			1.7 U	
Toluene	40	400	6.1			17.6		1 U		1 U			1 U	

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PSC 47 Groundwater Sampling	StationID		JAX47-937-MW01S	JAX47-937-MW02S	JAX47-937-MW03S	JAX47-937-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S
	SampleID		064MW01SQ1	064MW02SQ1	064MW03SQ1	064MW04SQ1	064MW10SQ1	064MW11SQ1	064MW12SQ1	064MW13SQ1	064MW14SQ1	064MW15SQ1	064MW25SQ1	064MW26SQ1
	Sample Date		3/12/2009	3/12/2009	3/16/2009	3/12/2009	3/12/2009	3/18/2009	3/20/2009	3/16/2009	3/17/2009	3/17/2009	3/19/2009	3/13/2009
	Units in ug/l													
Parameter	**GCTL[1]**	**NADC**												
trans-1,2-Dichloroethene	100	1000	0.8 J			1.7		1.2 U		1.2 U			1.2 U	
trans-1,3-Dichloropropene	NA	NA	1.2 U			1.2 U		1.2 U		1.2 U			1.2 U	
Trichloroethene (TCE)	3	300	1.4			2.6		**4.6**		1.1 U			1.1 U	
Trichlorofluoromethane	2100	21000	1.4 U			1.4 U		1.4 U		1.4 U			1.4 U	
Vinyl chloride	1	100	**1.2 J**			**2.1**		**1.4 U**		**1.4 U**			**1.4 U**	
Xylenes, total	20	200	**234**			**1320**		10		0.93 J			3 U	
SW8270C														
1,2,4,5-tetrachlorobenzene	2.1	21	**6.7 U**			**6.7 U**		**6.7 U**		**6.7 U**			**6.7 U**	
2,2'-Oxybis(1-chloro)propane	10	100	10 UJ			10 UJ		10 UJ		10 UJ			10 UJ	
2,4,5-Trichlorophenol	1	10	**10.3 U**			**10.3 U**		**10.3 U**		**10.3 U**			**10.3 U**	
2,4,6-Trichlorophenol	3.2	320	**10.9 U**			**10.9 U**		**10.9 U**		**10.9 U**			**10.9 U**	
2,4-Dichlorophenol	0.3	3	**9.4 U**			**9.4 U**		**9.4 U**		**9.4 U**			**9.4 U**	
2,4-Dimethylphenol	140	1400	2.4 J			5.7 J		7 U		7 U			7 U	
2,4-Dinitrophenol	14	140	**20.2 UJ**			**20.2 UJ**		**20.2 UJ**		**20.2 UJ**			**20.2 UJ**	
2,4-Dinitrotoluene	0.05	5	**8.5 U**			**8.5 U**		**8.5 U**		**8.5 U**			**8.5 U**	
2,6-Dinitrotoluene	0.05	5	**8.5 U**			**8.5 U**		**8.5 U**		**8.5 U**			**8.5 U**	
2-Chloronaphthalene	560	5600	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U	
2-Chlorophenol	35	350	8.8 U			8.8 U		8.8 U		8.8 U			8.8 U	
2-Methylnaphthalene	28	280	11.4			**36.6**		**48.7**		13.4			8.5 U	
2-Methylphenol (o-Cresol)	35**	350	7.9 U			7.9 U		7.9 U		7.9 U			7.9 U	
2-Nitroaniline	21	210	9.1 U			9.1 U		9.1 U		9.1 U			9.1 U	
2-Nitrophenol	NA	NA	10.3 U			10.3 U		10.3 U		10.3 U			10.3 U	
3,3'-Dichlorobenzidine	0.08	8	**8.2 U**			**8.2 U**		**8.2 U**		**8.2 U**			**8.2 U**	
3-Nitroaniline	1.7	170	**8.5 U**			**8.5 U**		**8.5 U**		**8.5 U**			**8.5 U**	
4,6-Dinitro-2-methylphenol	NA	NA	20.2 UJ			20.2 UJ		20.2 UJ		20.2 UJ			20.2 UJ	
4-Bromophenyl phenyl ether	70	700	7 U			7 U		7 U		7 U			7 U	
4-Chloro-3-methylphenol	63	630	8.2 U			8.2 U		8.2 U		8.2 U			8.2 U	
4-Chloroaniline	28	280	9.1 U			9.1 U		9.1 U		9.1 U			9.1 U	
4-Chlorophenyl phenyl ether	NA	NA	7.6 U			7.6 U		7.6 U		7.6 U			7.6 U	
4-Methylphenol (p-Cresol)	3.5**	35	**18.5 U**			**18.5 U**		**18.5 U**		**18.5 U**			**18.5 U**	
4-Nitroaniline	1.7	170	**8.5 U**			**8.5 U**		**8.5 U**		**8.5 U**			**8.5 U**	
4-Nitrophenol	56	560	10.1 U			10.1 U		10.1 U		10.1 U			10.1 U	
Acenaphthene	20	200	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U	
Acenaphthylene	210	2100	9.1 U			9.1 U		9.1 U		9.1 U			9.1 U	
Acetophenone	700	7000	12.1 U			12.1 U		12.1 U		12.1 U			12.1 U	
Anthracene	2100	21000	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U	
Atrazine	3	300	**4 U**			**4 U**		**4 U**		**4 U**			**4 U**	
Benzaldehyde	NA	NA	4 U			4 U		0.94 J		0.64 J			4 U	
Benzo(a)anthracene	0.05	5	**7.9 U**			**7.9 U**		**7.9 U**		**7.9 U**			**7.9 U**	
Benzo(a)pyrene	0.2	20	**8.5 U**			**8.5 U**		**8.5 U**		**8.5 U**			**8.5 U**	
Benzo(b)fluoranthene	0.05	5	**7.9 U**			**7.9 U**		**7.9 U**		**7.9 U**			**7.9 U**	
Benzo(g,h,i)perylene	210	2100	7.9 U			7.9 U		7.9 U		7.9 U			7.9 U	
Benzo(k)fluoranthene	0.5	50	**8.8 U**			**8.8 U**		**8.8 U**		**8.8 U**			**8.8 U**	
Benzyl butyl phthalate	140**	1400	9.1 U			9.1 U		9.1 U		9.1 U			9.1 U	
biphenyl (diphenyl)	0.5	5	**1.1 J**			**2.4 J**		**6.2**		**4 U**			**4 U**	
Bis(2-Chloroethoxy) methane	NA	NA	10.6 U			10.6 U		10.6 U		10.6 U			10.6 U	

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PSC 47 Groundwater Sampling	StationID		JAX47-937-MW01S	JAX47-937-MW02S	JAX47-937-MW03S	JAX47-937-MW04S	JAX47-MW10S	JAX47-MW11S	JAX47-MW12S	JAX47-MW13S	JAX47-MW14S	JAX47-MW15S	JAX47-MW25S	JAX47-MW26S
	SampleID		064MW01SQ1	064MW02SQ1	064MW03SQ1	064MW04SQ1	064MW10SQ1	064MW11SQ1	064MW12SQ1	064MW13SQ1	064MW14SQ1	064MW15SQ1	064MW25SQ1	064MW26SQ1
	Sample Date		3/12/2009	3/12/2009	3/16/2009	3/12/2009	3/12/2009	3/18/2009	3/20/2009	3/16/2009	3/17/2009	3/17/2009	3/19/2009	3/13/2009
	Units in ug/l													
Parameter	**GCTL[1]**	**NADC**												
bis(2-Chloroethyl) ether (2-Chloroethyl ether)	0.03	3	**9.1 U**			**9.1 U**		**9.1 U**		**9.1 U**			**9.1 U**	
bis(2-Ethylhexyl) phthalate	6	600	**13.3 U**			**13.3 U**		**13.3 U**		**13.3 U**			**13.3 U**	
caprolactam	NA	NA	4 U			4 U		4 U		4 U			4 U	
Carbazole	1.8	180	**9.4 U**			**9.4 U**		**9.4 U**		**9.4 U**			**9.4 U**	
Chrysene	4.8	480	**8.8 U**			**8.8 U**		**8.8 U**		**8.8 U**			**8.8 U**	
Di-n-butyl phthalate	700	7000	8.8 U			8.8 U		8.8 U		8.8 U			8.8 U	
Di-n-octylphthalate	140	1400	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U	
Dibenz(a,h)anthracene	0.005	0.5	**8.2 U**			**8.2 U**		**8.2 U**		**8.2 U**			**8.2 U**	
Dibenzofuran	28	280	8.2 U			8.2 U		8.2 U		8.2 U			8.2 U	
Diethyl phthalate	5600	56000	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U	
Dimethyl phthalate	70000	700000	9.1 U			9.1 U		9.1 U		9.1 U			9.1 U	
Fluoranthene	280	2800	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U	
Fluorene	280	2800	8.8 U			8.8 U		8.8 U		8.8 U			8.8 U	
Hexachlorobenzene	1	100	**7.9 U**			**7.9 U**		**7.9 U**		**7.9 U**			**7.9 U**	
Hexachlorobutadiene	0.4	40	**7.6 U**			**7.6 U**		**7.6 U**		**7.6 U**			**7.6 U**	
Hexachlorocyclopentadiene	50	500	6.7 U			6.7 U		6.7 U		6.7 U			6.7 U	
Hexachloroethane	2.5	250	**7.9 U**			**7.9 U**		**7.9 U**		**7.9 U**			**7.9 U**	
Indeno(1,2,3-c,d)pyrene	0.05	5	**7.9 U**			**7.9 U**		**7.9 U**		**7.9 U**			**7.9 U**	
Isophorone	37	3700	11.5 U			11.5 U		11.5 U		11.5 U			11.5 U	
n-Nitrosodi-n-propylamine	0.005	0.5	**9.1 U**			**9.1 U**		**9.1 U**		**9.1 U**			**9.1 U**	
n-Nitrosodiphenylamine	7.1	710	**10.3 U**			**10.3 U**		**10.3 U**		**10.3 U**			**10.3 U**	
Naphthalene	14**	140	**21**			**43.5**		**166**		7 J			8.5 U	
Nitrobenzene	3.5	35	**8.5 U**			**8.5 U**		**8.5 U**		**8.5 U**			**8.5 U**	
Pentachlorophenol	1	100	**20.2 U**			**20.2 U**		**20.2 U**		**20.2 U**			**20.2 U**	
Phenanthrene	210	2100	8.5 U			8.5 U		8.5 U		8.5 U			8.5 U	
Phenol	10	100	**20.2 UJ**			**20.2 UJ**		**20.2 UJ**		**20.2 UJ**			**20.2 UJ**	
Pyrene	210	2100	8.8 U			8.8 U		8.8 U		8.8 U			8.8 U	

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC Groundwater Cleanup Target Levels (**GCTLs**) reported in µg/L
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated method and/or calibration blank.
Values Bolded are analytes not detected by the Lab but are above the **GCTL**
Values Shaded Pale Yellow are analytes not detected by the Lab but are above the **NADC**
Values Bolded and Shaded Pale Yellow are analytes not detected by the Lab but are above both **GCTL** and **NADC**
Values Bold and Pale Blue are hits exceeding the **GCTL**
Values Shaded Grey are hits that exceed the **NADC**
Values Bold and Shaded Grey are hits that exceed both **GCTL** and **NADC**
NA - Not Available at time of rule adoption
** = As provided in Chapter 62-302, F.A.C

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PSC 47 Groundwater Sampling	StationID		JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	SampleID		064MW30SQ1	064MW32SQ1	064MW33SQ1	064MW34SQ1	064MW35SQ1	064MW36SQ1	064MW37SQ1	064MW38SQ1	064MW39SQ1	064MW40SQ1	064MW41SQ1	064MW42SQ1	064MW43SQ1
	Sample Date		3/19/2009	3/19/2009	3/20/2009	3/19/2009	3/18/2009	3/13/2009	3/16/2009	3/16/2009	3/17/2009	3/17/2009	3/18/2009	3/18/2009	3/20/2009
	Units in ug/l														
Parameter	**GCTL[1]**	**NADC**													
1632AM															
Arsenic-III	NA	NA					0.3 U		6		0.3 U	0.3 U	0.3 U		
Arsenic-V	NA	NA					0.3 U		0.3 U		0.3 U	22 J	0.3 U		
A3500D															
Ferrous Iron	NA	NA		360 U		360 U			987		360 U	360 U		99 J	
A5310C															
Total organic carbon	NA	NA		3400 U		3400 U			14000		6700 J	5000 J		4800 J	
E310.1															
Alkalinity, total (as CaCO3)	NA	NA		11000 J		21000			25000		110000	66000		27000	
RSK-175															
Ethane	NA	NA		1.8 U		1.8 U			1.8 U		1.8 U	1.8 U		1.8 U	
Ethene	NA	NA		1.3 U		1.3 U			1.3 U		1.3 U	1.3 U		1.3 U	
Methane	NA	NA		2.5 B		2.5 B			6 B		2.3 B	2.5 B		66.8 B	
SM4500-SO3															
Sulfide	NA	NA													
SM4500S-D															
Sulfide	NA	NA		5.8 U		5.8 U			5.8 U		5.8 U	5.8 U		5.8 U	
SW300.1															
nitrogen, nitrate (as n)	10000	100000		284		907			100 U		2890 B	6300 J		1730	
Sulfate (as SO4)	250000	2500000		11200		22000			12300 B		4980	17900		37300	
SW6010B															
Arsenic	10	100	5.18 J	3.31 U	3.31 U	3.31 U	3.31 U	**689**	8.36 J	3.76 J	6.03 J	**10.8 J**	3.31 U	3.52 J	3.99 J
Iron	300	3000		11.6 J		20.6 J			**1070 B**		8.31 B	19.2 B		30.9 B	
Manganese	50	500		21		7.56 J			6.32 B		1.45 B	4.02 B		8.33 J	
SW8081A															
Aldrin	0.002	0.2	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**	**0.025 U**
alpha bhc (alpha hexachlorocyclohexane)	0.006	0.6	**0.0091 U**	**0.0091 U**	**0.17**	**0.0091 U**	**0.0091 U**	**0.72**	**0.0091 U**	**0.045**	**0.0091 U**	**0.0091 U**	**0.48**	**1.6**	**9.1 J**
alpha endosulfan	42	420	0.05 U	0.0047 J	0.64	0.14	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.028 J	0.082	0.016 J
alpha-chlordane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0087 J	0.05 U	0.05 U	0.05 U
beta bhc (beta hexachlorocyclohexane)	0.02	2	0.016 J	**0.052**	**0.4**	**4.1**	**0.05 U**	**0.62**	**0.05 U**	0.019 J	**0.05 U**	**0.05 U**	**0.15**	**0.96**	**8.4**
beta endosulfan	42	420	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
chlordane	2	200	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
delta bhc (delta hexachlorocyclohexane)	2.1	21	0.05 U	0.02 J	0.076	0.0085 J	0.05 U	0.43	0.05 U	0.021 J	0.05 U	0.05 U	0.1	**2.6**	**10 J**
Dieldrin	0.002	0.2	**0.0082 U**	**0.0076 J**	**0.26**	**0.077**	**0.0039 J**	**0.0082 U**	**0.0082 U**	**0.0082 U**	**0.0082 U**	**0.0082 U**	**0.0061 J**	**0.0082 U**	**0.0082 U**
endosulfan sulfate	42	420	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
endrin	2	20	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
endrin aldehyde	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
endrin ketone	NA	NA	0.05 U	0.05 U	0.049 J	0.14 J	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
gamma bhc (lindane)	0.2	20	0.05 U	0.05 U	0.15	0.05 U	0.05 U	**1.9**	0.05 U	0.012 J	0.05 U	0.05 U	**0.29**	**1.6**	**10**
gamma-chlordane	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.0082 J	0.0076 J	0.038 J	0.05 U
heptachlor	0.4	40	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
heptachlor epoxide	0.2	20	0.05 U	0.05 U	**0.46**	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.031 J	0.05 U	0.05 U
methoxychlor	40	400	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
p,p'-DDD	0.1	10	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**10**	0.024 JB	0.032 JB	0.05 U	**0.8**	0.05 U	0.05 U	0.05 U
p,p'-DDE	0.1	10	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.051	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
p,p'-DDT	0.1	10	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	**2.6**	0.0016 J	0.0044 J	0.05 U	0.048 J	0.05 U	0.012 J	0.05 U

Table 3-6
Groundwater Analytical Data Summary
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NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	SampleID		064MW30SQ1	064MW32SQ1	064MW33SQ1	064MW34SQ1	064MW35SQ1	064MW36SQ1	064MW37SQ1	064MW38SQ1	064MW39SQ1	064MW40SQ1	064MW41SQ1	064MW42SQ1	064MW43SQ1
	Sample Date		3/19/2009	3/19/2009	3/20/2009	3/19/2009	3/18/2009	3/13/2009	3/16/2009	3/16/2009	3/17/2009	3/17/2009	3/18/2009	3/18/2009	3/20/2009
	Units in ug/l														
Parameter	**GCTL[1]**	**NADC**													
toxaphene	3	300	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U
SW8260B															
1,1,1-Trichloroethane	200	2000		1 U		1 U			1 U		1 U	1 U		1 U	
1,1,2,2-Tetrachloroethane	0.2	20		**1.1 U**		**1.1 U**			**1.1 U**		**1.1 U**	**1.1 U**		**1.1 U**	
1,1,2-trichloro-1,2,2-trifluoroethane	210000	2100000		2.4 U		2.4 U			2.4 U		2.4 U	2.4 U		2.4 U	
1,1,2-Trichloroethane	5	500		1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
1,1-Dichloroethane	70**	700		1 U		1 U			1 U		1 U	1 U		1 U	
1,1-Dichloroethene	7**	70		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
1,2,3-trichlorobenzene	70	700		1 U		1 U			1 U		1 U	1 U		1 U	
1,2,4-Trichlorobenzene	70	700		1.5 U		1.5 U			1.5 U		1.5 U	1.5 U		1.2 J	
1,2-Dibromo-3-chloropropane	0.2	20		**6 U**		**6 U**			**6 U**		**6 U**	**6 U**		**6 U**	
1,2-Dibromoethane (Ethylene dibromide)	0.02	2		**1.1 U**		**1.1 U**			**1.1 U**		**1.1 U**	**1.1 U**		**1.1 U**	
1,2-Dichlorobenzene	600	6000		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1	
1,2-Dichloroethane	3	300		1.3 U		1.3 U			1.3 U		1.3 U	1.3 U		1.3 U	
1,2-Dichloropropane	5	500		1.6 U		1.6 U			1.6 U		1.6 U	1.6 U		1.6 U	
1,3-Dichlorobenzene	210	2100		1 U		1 U			1 U		1 U	1 U		0.4 J	
1,4-Dichlorobenzene	75	7500		1 U		1 U			1 U		1 U	1 U		3.5	
2-Hexanone	280	2800		5.1 U		5.1 U			5.1 U		5.1 U	5.1 U		5.1 U	
Acetone	6300	63000		18 U		18 U			18 U		18 U	18 U		18 U	
Benzene	1	100		1 U		1 U			1 U		1 U	1 U		0.7 J	
Bromochloromethane	91	910		2.2 U		2.2 U			2.2 U		2.2 U	2.2 U		2.2 U	
Bromodichloromethane	0.6	60		**1.3 U**		**1.3 U**			**1.3 U**		**1.3 U**	**1.3 U**		**1.3 U**	
Bromoform	4.4	440		1.9 U		1.9 U			1.9 U		1.9 U	1.9 U		1.9 U	
Bromomethane	9.8	98		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Carbon disulfide	700	7000		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
Carbon tetrachloride	3	300		1.5 U		1.5 U			1.5 U		1.5 U	1.5 U		1.5 U	
Chlorobenzene	100	1000		1 U		1 U			1 U		1 U	1 U		4.7	
Chloroethane	12	1200		2.8 U		2.8 U			2.8 U		2.8 U	2.8 U		2.8 U	
Chloroform	70	700		1 U		1 U			1 U		1 U	1 U		1 U	
Chloromethane	2.7	270		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
cis-1,2-Dichloroethene	70	700		1 U		1 U			1 U		1 U	1 U		1 U	
cis-1,3-Dichloropropene	NA	NA		1 U		1 U			1 U		1 U	1 U		1 U	
cyclohexane	NA	NA		1 U		1 U			1 U		1 U	1 U		1 U	
Dibromochloromethane	0.4	40		**1 U**		**1 U**			**1 U**		**1 U**	**1 U**		**1 U**	
Dichlorodifluoromethane	1400	14000		1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
Ethylbenzene	30	300		1 U		1 U			1 U		1 U	1 U		0.53 J	
Isopropylbenzene (Cumene)	0.8	8		**1 U**		**1 U**			**1 U**		**1 U**	**1 U**		**3.6**	
methyl acetate	3000	30000		7.2 U		7.2 U			7.2 U		7.2 U	7.2 U		7.2 U	
Methyl ethyl ketone (2-butanone)	4200	42000		6.6 U		6.6 U			6.6 U		6.6 U	6.6 U		6.6 U	
Methyl isobutyl ketone (4-methyl-2-pentanone)	560	5600		5 U		5 U			5 U		5 U	5 U		5 U	
methylcyclohexane	NA	NA		1.9 U		1.9 U			1.9 U		1.9 U	1.9 U		4	
Methylene chloride	5	500		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Styrene	100	1000		1 U		1 U			1 U		1 U	1 U		1 U	
tert-butyl methyl ether	20	200		1 U		1 U			1 U		1 U	1 U		1 U	
Tetrachloroethene (PCE)	3	300		1.7 U		1.7 U			1.7 U		1.7 U	1.7 U		1.7 U	
Toluene	40	400		1 U		1 U			1 U		1 U	1 U		1 U	

Table 3-6
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PSC 47 Groundwater Sampling	StationID		JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	SampleID		064MW30SQ1	064MW32SQ1	064MW33SQ1	064MW34SQ1	064MW35SQ1	064MW36SQ1	064MW37SQ1	064MW38SQ1	064MW39SQ1	064MW40SQ1	064MW41SQ1	064MW42SQ1	064MW43SQ1
	Sample Date		3/19/2009	3/19/2009	3/20/2009	3/19/2009	3/18/2009	3/13/2009	3/16/2009	3/16/2009	3/17/2009	3/17/2009	3/18/2009	3/18/2009	3/20/2009
	Units in ug/l														
Parameter	**GCTL[1]**	**NADC**													
trans-1,2-Dichloroethene	100	1000		1.2 U		1.2 U			1.2 U		1.2 U	1.2 U		1.2 U	
trans-1,3-Dichloropropene	NA	NA		1.2 U		1.2 U			1.2 U		1.2 U	1.2 U		1.2 U	
Trichloroethene (TCE)	3	300		1.1 U		1.1 U			1.1 U		1.1 U	1.1 U		1.1 U	
Trichlorofluoromethane	2100	21000		1.4 U		1.4 U			1.4 U		1.4 U	1.4 U		1.4 U	
Vinyl chloride	1	100		**1.4 U**		**1.4 U**			**1.4 U**		**1.4 U**	**1.4 U**		**1.4 U**	
Xylenes, total	20	200		3 U		3 U			3 U		3 U	3 U		1.5 J	
SW8270C															
1,2,4,5-tetrachlorobenzene	2.1	21		**6.7 U**		**6.7 U**			**6.7 U**		**6.7 U**	**6.7 U**		**6.7 U**	
2,2'-Oxybis(1-chloro)propane	10	100		10 UJ		10 UJ			10 UJ		10 UJ	10 UJ		10 UJ	
2,4,5-Trichlorophenol	1	10		**10.3 U**		**10.3 U**			**10.3 U**		**10.3 U**	**10.3 U**		**10.3 U**	
2,4,6-Trichlorophenol	3.2	320		**10.9 U**		**10.9 U**			**10.9 U**		**10.9 U**	**10.9 U**		**10.9 U**	
2,4-Dichlorophenol	0.3	3		**9.4 U**		**9.4 U**			**9.4 U**		**9.4 U**	**9.4 U**		**9.4 U**	
2,4-Dimethylphenol	140	1400		7 U		7 U			7 U		7 U	7 U		7 U	
2,4-Dinitrophenol	14	140		**20.2 UJ**		**20.2 UJ**			**20.2 UJ**		**20.2 UJ**	**20.2 UJ**		**20.2 UJ**	
2,4-Dinitrotoluene	0.05	5		**8.5 U**		**8.5 U**			**8.5 U**		**8.5 U**	**8.5 U**		**8.5 U**	
2,6-Dinitrotoluene	0.05	5		**8.5 U**		**8.5 U**			**8.5 U**		**8.5 U**	**8.5 U**		**8.5 U**	
2-Chloronaphthalene	560	5600		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
2-Chlorophenol	35	350		8.8 U		8.8 U			8.8 U		8.8 U	8.8 U		8.8 U	
2-Methylnaphthalene	28	280		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		25.8	
2-Methylphenol (o-Cresol)	35**	350		7.9 U		7.9 U			7.9 U		7.9 U	7.9 U		7.9 U	
2-Nitroaniline	21	210		9.1 U		9.1 U			9.1 U		9.1 U	9.1 U		9.1 U	
2-Nitrophenol	NA	NA		10.3 U		10.3 U			10.3 U		10.3 U	10.3 U		10.3 U	
3,3'-Dichlorobenzidine	0.08	8		**8.2 U**		**8.2 U**			**8.2 U**		**8.2 U**	**8.2 U**		**8.2 U**	
3-Nitroaniline	1.7	170		**8.5 U**		**8.5 U**			**8.5 U**		**8.5 U**	**8.5 U**		**8.5 U**	
4,6-Dinitro-2-methylphenol	NA	NA		20.2 UJ		20.2 UJ			20.2 UJ		20.2 UJ	20.2 UJ		20.2 UJ	
4-Bromophenyl phenyl ether	70	700		7 U		7 U			7 U		7 U	7 U		7 U	
4-Chloro-3-methylphenol	63	630		8.2 U		8.2 U			8.2 U		8.2 U	8.2 U		8.2 U	
4-Chloroaniline	28	280		9.1 U		9.1 U			9.1 U		9.1 U	9.1 U		9.1 U	
4-Chlorophenyl phenyl ether	NA	NA		7.6 U		7.6 U			7.6 U		7.6 U	7.6 U		7.6 U	
4-Methylphenol (p-Cresol)	3.5**	35		**18.5 U**		**18.5 U**			**18.5 U**		**18.5 U**	**18.5 U**		**18.5 U**	
4-Nitroaniline	1.7	170		**8.5 U**		**8.5 U**			**8.5 U**		**8.5 U**	**8.5 U**		**8.5 U**	
4-Nitrophenol	56	560		10.1 U		10.1 U			10.1 U		10.1 U	10.1 U		10.1 U	
Acenaphthene	20	200		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
Acenaphthylene	210	2100		9.1 U		9.1 U			9.1 U		9.1 U	9.1 U		9.1 U	
Acetophenone	700	7000		12.1 U		12.1 U			12.1 U		12.1 U	12.1 U		12.1 U	
Anthracene	2100	21000		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
Atrazine	3	300		**4 U**		**4 U**			**4 U**		**4 U**	**4 U**		**4 U**	
Benzaldehyde	NA	NA		4 U		4 U			4 U		4 U	4 U		4 U	
Benzo(a)anthracene	0.05	5		**7.9 U**		**7.9 U**			**7.9 U**		**7.9 U**	**7.9 U**		**7.9 U**	
Benzo(a)pyrene	0.2	20		**8.5 U**		**8.5 U**			**8.5 U**		**8.5 U**	**8.5 U**		**8.5 U**	
Benzo(b)fluoranthene	0.05	5		**7.9 U**		**7.9 U**			**7.9 U**		**7.9 U**	**7.9 U**		**7.9 U**	
Benzo(g,h,i)perylene	210	2100		7.9 U		7.9 U			7.9 U		7.9 U	7.9 U		7.9 U	
Benzo(k)fluoranthene	0.5	50		**8.8 U**		**8.8 U**			**8.8 U**		**8.8 U**	**8.8 U**		**8.8 U**	
Benzyl butyl phthalate	140**	1400		9.1 U		9.1 U			9.1 U		9.1 U	9.1 U		9.1 U	
biphenyl (diphenyl)	0.5	5		**4 U**		**4 U**			**4 U**		**4 U**	**4 U**		**6.8**	
Bis(2-Chloroethoxy) methane	NA	NA		10.6 U		10.6 U			10.6 U		10.6 U	10.6 U		10.6 U	

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NAS Jacksonville

PSC 47 Groundwater Sampling	StationID		JAX47-MW30S	JAX47-MW32S	JAX47-MW33S	JAX47-MW34S	JAX47-MW35S	JAX47-MW36S	JAX47-MW37S	JAX47-MW38S	JAX47-MW39S	JAX47-MW40S	JAX47-MW41S	JAX47-MW42S	JAX47-MW43S
	SampleID		064MW30SQ1	064MW32SQ1	064MW33SQ1	064MW34SQ1	064MW35SQ1	064MW36SQ1	064MW37SQ1	064MW38SQ1	064MW39SQ1	064MW40SQ1	064MW41SQ1	064MW42SQ1	064MW43SQ1
	Sample Date		3/19/2009	3/19/2009	3/20/2009	3/19/2009	3/18/2009	3/13/2009	3/16/2009	3/16/2009	3/17/2009	3/17/2009	3/18/2009	3/18/2009	3/20/2009
	Units in ug/l														
Parameter	**GCTL[1]**	**NADC**													
bis(2-Chloroethyl) ether (2-Chloroethyl ether)	0.03	3		**9.1 U**		**9.1 U**			**9.1 U**		**9.1 U**	**9.1 U**		**9.1 U**	
bis(2-Ethylhexyl) phthalate	6	600		**13.3 U**		**13.3 U**			**13.3 U**		**13.3 U**	**13.3 U**		**13.3 U**	
caprolactam	NA	NA		4 U		4 U			4 U		4 U	4 U		4 U	
Carbazole	1.8	180		**9.4 U**		**9.4 U**			**9.4 U**		**9.4 U**	**9.4 U**		**9.4 U**	
Chrysene	4.8	480		**8.8 U**		**8.8 U**			**8.8 U**		**8.8 U**	**8.8 U**		**8.8 U**	
Di-n-butyl phthalate	700	7000		8.8 U		8.8 U			8.8 U		8.8 U	8.8 U		8.8 U	
Di-n-octylphthalate	140	1400		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
Dibenz(a,h)anthracene	0.005	0.5		**8.2 U**		**8.2 U**			**8.2 U**		**8.2 U**	**8.2 U**		**8.2 U**	
Dibenzofuran	28	280		8.2 U		8.2 U			8.2 U		8.2 U	8.2 U		8.2 U	
Diethyl phthalate	5600	56000		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
Dimethyl phthalate	70000	700000		9.1 U		9.1 U			9.1 U		9.1 U	9.1 U		9.1 U	
Fluoranthene	280	2800		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
Fluorene	280	2800		8.8 U		8.8 U			8.8 U		8.8 U	8.8 U		8.8 U	
Hexachlorobenzene	1	100		**7.9 U**		**7.9 U**			**7.9 U**		**7.9 U**	**7.9 U**		**7.9 U**	
Hexachlorobutadiene	0.4	40		**7.6 U**		**7.6 U**			**7.6 U**		**7.6 U**	**7.6 U**		**7.6 U**	
Hexachlorocyclopentadiene	50	500		6.7 U		6.7 U			6.7 U		6.7 U	6.7 U		6.7 U	
Hexachloroethane	2.5	250		**7.9 U**		**7.9 U**			**7.9 U**		**7.9 U**	**7.9 U**		**7.9 U**	
Indeno(1,2,3-c,d)pyrene	0.05	5		**7.9 U**		**7.9 U**			**7.9 U**		**7.9 U**	**7.9 U**		**7.9 U**	
Isophorone	37	3700		11.5 U		11.5 U			11.5 U		11.5 U	11.5 U		11.5 U	
n-Nitrosodi-n-propylamine	0.005	0.5		**9.1 U**		**9.1 U**			**9.1 U**		**9.1 U**	**9.1 U**		**9.1 U**	
n-Nitrosodiphenylamine	7.1	710		**10.3 U**		**10.3 U**			**10.3 U**		**10.3 U**	**10.3 U**		**10.3 U**	
Naphthalene	14**	140		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		**47.1**	
Nitrobenzene	3.5	35		**8.5 U**		**8.5 U**			**8.5 U**		**8.5 U**	**8.5 U**		**8.5 U**	
Pentachlorophenol	1	100		**20.2 U**		**20.2 U**			**20.2 U**		**20.2 U**	**20.2 U**		**20.2 U**	
Phenanthrene	210	2100		8.5 U		8.5 U			8.5 U		8.5 U	8.5 U		8.5 U	
Phenol	10	100		**20.2 UJ**		**20.2 UJ**			**20.2 UJ**		**20.2 UJ**	**20.2 UJ**		**20.2 UJ**	
Pyrene	210	2100		8.8 U		8.8 U			8.8 U		8.8 U	8.8 U		8.8 U	

Notes:
All concentrations reported in micrograms per liter (ug/L).
GCTL - Groundwater Cleanup Target Level
NADC - Natural Attenuation Default Concentration
1 = Ch 62-777 FAC Groundwater Cleanup Target Levels (**GCTLs**) reported in µg/L
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
UJ- Value non-detected estimated.
JB- Estimate value..The analyte was detected in the associated method and/or calibration blank.
Values Bolded are analytes not detected by the Lab but are above the **GCTL**
Values Shaded Pale Yellow are analytes not detected by the Lab but are above the **NADC**
Values Bolded and Shaded Pale Yellow are analytes not detected by the Lab but are above both **GCTL** and **NADC**
Values Bold and Pale Blue are hits exceeding the **GCTL**
Values Shaded Grey are hits that exceed the **NADC**
Values Bold and Shaded Grey are hits that exceed both **GCTL** and **NADC**
NA - Not Available at time of rule adoption
** = As provided in Chapter 62-302, F.A.C

Table 3-7
Arsenic and pH Summary
May 2008 through March 2009
PSC 47, NAS Jacksonville

	StationID		MW01S				MW02S				MW03S				MW04S			
	Sample Date		5/28/08	9/25/08	12/11/08	3/12/09	5/28/08	9/26/08	12/12/08	3/12/09	5/28/08	9/26/08	12/17/08	3/16/09	6/2/08	9/29/08	12/11/08	3/12/09
Parameter	**GCTL[1]**	**NADC**																
Arsenic-III	NA	NA	34	400	300	150	3400	11000	7100	3900	4900	23000	4500	5300				
Arsenic-V	NA	NA	9.7	36	39	12	130	560	420	160	4400	5800	560	900				
Arsenic	10	100	**39.9**	**460 B**	**341 B**	**232**	**3280**	**11700**	**8540 B**	**4520**	**8150**	**13200 B**	**8980**	**4870**	6.23 J	**14.5 B**	**10.1 B**	7.26 J
pH	NA	NA	5.01	5.20	4.68	4.78	5.62	5.68	5.43	5.24	4.95	5.62	5.24	5.17	4.21	4.65	3.65	3.81

	StationID		MW-12S				MW-13S				JAX47-MW34S				JAX47-MW36S			
	Sample Date		5/27/08	10/1/08	12/18/08	3/20/09	6/2/08	9/30/08	12/15/08	3/16/09	5/29/08	9/25/08	12/16/08	3/19/09	5/27/08	9/30/08	12/18/08	3/13/09
Parameter	**GCTL[1]**	**NADC**																
Arsenic-III	NA	NA																
Arsenic-V	NA	NA																
Arsenic	10	100	4.3 U	**24.6 B**	3.31 U	3.31 U	4.3 U	**55.9**	**21.3**	**11.1 J**	4.3 U	**16 B**	5.94 J	3.31 U	4.3 U	**930**	**980**	**689**
pH	NA	NA	4.41	6.34	4.68	4.41	4.82	8.00	5.71	5.15	5.13	6.37	5.6	5.2	4.89	5.94	5.62	5.37

	StationID		JAX47-MW37S				JAX47-MW40S				JAX47-MW41S				JAX47-MW42S			
	Sample Date		6/2/08	9/25/08	12/16/08	3/16/09	6/2/08	9/24/08	12/15/08	3/17/09	5/27/08	9/26/08	12/17/08	3/18/09	5/29/08	9/25/08	12/16/08	3/18/09
Parameter	**GCTL**	**NADC**																
Arsenic-III	NA	NA	5.0 U	180	16	6	5.0 U	0.3 U	0.3 U	0.3 U	5.0 U	0.3 U	0.3 U	0.3 U				
Arsenic-V	NA	NA	5.0 U	0.56 U	33	0.3 U	5.0 U	41	13	22 J	5.0 U	5.7 J	0.28 U	0.3 U				
Arsenic	10	100	4.3 U	**203 JB**	**30.2**	8.36 J	4.3 U	**53.4 B**	**20.9**	**10.8 J**	4.3 U	**14 B**	3.31 U	3.31 U	4.3 U	**15.1 B**	4.68 J	3.52 J
pH	NA	NA	4.96	6.23	5.53	5.36	6.37	6.27	6.05	5.86	5.05	5.88	4.85	4.52	5.17	5.97	5.32	5.1

	StationID		JAX47-MW43S			
	Sample Date		5/27/08	10/2/08	12/18/08	3/20/09
Parameter	**GCTL**	**NADC**				
Arsenic-III	NA	NA				
Arsenic-V	NA	NA				
Arsenic	10	100	4.99 J	**34**	**10.7 B**	3.99 J
pH	NA	NA	4.52	6.55	5.18	4.87

All concentrations reported in micrograms per liter (ug/L); pH in standard units

GCTL - Groundwater Cleanup Target Level; **NADC** - Natural Attenuation Default Concentration
U - The analyte was analyzed for , but not detected.
J - Result is estimated
B- Analyte was detected in the Laboratory Blank
Values Bold and Pale Blue are hits exceeding the **GCTL**
Values Bold and Shaded Grey are hits that exceed both **GCTL** and **NADC**