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STUDY AREA 3 CLOSURE REPORT WITH TRANSMITTAL LETTER NTC ORLANDO FL  
4/21/2000  
TETRA TECH



**TETRA TECH NUS, INC.**

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0400-A047

April 21, 2000

Ms. Barbara Nwokike (Code 1873) (IRP RPM)  
P.O. Box 190010  
2155 Eagle Drive  
North Charleston, SC 29419-9010

Reference: CLEAN Contract No. N62467-94-D-0888  
Contract Task Order No. 0024

Subject: Closure Report for Study Area 3

Dear Ms. Nwokike:

Enclosed is the final Closure Report for Study Area 3. The document includes changes received from the Orlando Partnering Team at the March meeting. Please note the signature block (on page 5) to be signed and dated by Wayne Hansel.

If you have any questions regarding the report, please contact me at (865) 220-4730.

Sincerely,

*Allan Jenkins for SBM*

Steven B. McCoy, P.E.  
Task Order Manager

SBM:ckf

Enclosure

c: Mr. Rick Allen, Harding Lawson  
Mr. Michael J. Campbell, Tetra Tech NUS  
Mr. David Grabka, FDEP  
Mr. Wayne Hansel, SOUTHDIV (2 copies)  
Mr. Allan Jenkins, Tetra Tech NUS  
Ms. Nancy Rodriguez, EPA  
Mr. Steve Tsangaris, CH2M Hill  
Mr. Mark Perry/File, Tetra Tech NUS (unbound)  
Ms. Debbie Wroblewski, Tetra Tech NUS (cover letter only)  
File/Edb

**CLOSURE REPORT**

**STUDY AREA 3**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

**Contract No. N62467-94-D-0888**

**Contract Task Order 0024**

**Prepared by:**

**Tetra Tech NUS, Inc.  
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**Prepared for:**

**Department of the Navy, Southern Division  
Naval Facilities Engineering Command  
2155 Eagle Drive  
North Charleston, South Carolina 29419**

**April 2000**

## **Introduction**

During an environmental site screening investigation of Study Area (SA) 3 completed in September 1997, the solvent tetrachloroethene (PCE) was detected in groundwater at concentrations exceeding acceptable levels. As a result of the contamination, remedial actions for SA 3 were selected by the Orlando Partnering Team (OPT) to protect the public and the environment. The OPT, which was assembled to address environmental issues at the Naval Training Center (NTC), Orlando consists of representatives from the Navy and its contractors, the Florida Department of Environmental Protection (FDEP), and the U.S. Environmental Protection Agency (USEPA). The remedial actions consisted of a combination of groundwater monitoring and institutional controls. The groundwater monitoring objectives were achieved in the fall of 1999, and no additional monitoring activities or other remedial actions are required. This closure report for SA 3 summarizes the site background, the site screening investigation, and the final remedial decision, and documents the results of the groundwater monitoring program.

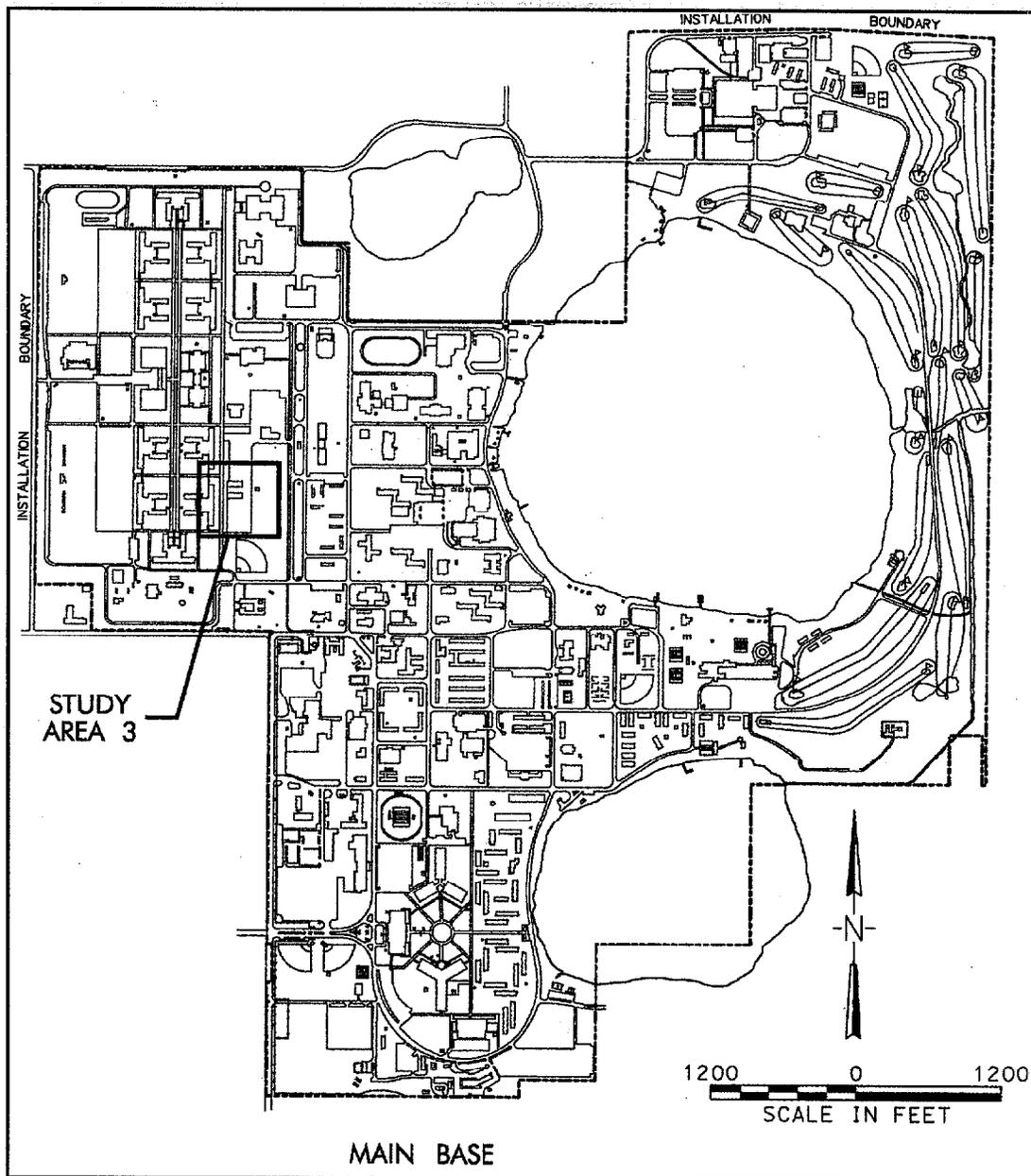
## **Site Background**

SA 3 is located in the northwestern part of the Main Base of the NTC, Orlando (Figure 1). Beginning in 1940, the base was known as the Orlando Army Air Base and was operated under the command of the U.S. Army Air Corps. Between 1947 and 1968, the U.S. Air Force commanded the facilities at Orlando and the base was renamed the Orlando Air Force Base. NTC, Orlando was closed in April 1999 as part of the Defense Base Realignment and Closure Act of 1990.

SA 3 is the former Hazardous Materials Storage Area that includes Buildings 73, 2816, and 2817 (Figure 2). Building 73 is a fenced containment area for hazardous materials. Buildings 2816 and 2817 are quonset hut-type storage buildings, formerly associated with training activities for the Tactical Air Command Matador Missile program. These buildings are also reported to have been used for spray painting and temporary storage of hazardous materials. It was alleged that solvents used in the maintenance of flight simulators were disposed of at SA 3.

## **Investigation Summary**

Site screening was conducted at SA 3 to address concerns that solvents and other materials used at the site may have contaminated site soils or groundwater. The results of the investigation were presented in a report entitled *Base Realignment and Closure, Environmental Site Screening Report, Study Area 3*, dated June 1997 (ABB-ES, 1997). The screening report and other documents relating to SA 3 are available at the Orange County Public Library.



**Figure 1. Location of Study Area 3 at the Naval Training Center, Orlando**

The site screening investigation started in the fall of 1994 and concluded with groundwater sampling conducted in the summer of 1997. The solvent PCE was detected in wells OLD-03-01 and OLD-03-04 at concentrations of 9  $\mu\text{g/L}$  and 12  $\mu\text{g/L}$ , respectively, exceeding the FDEP criterion of 3  $\mu\text{g/L}$  and the USEPA criterion of 5  $\mu\text{g/L}$ . Additional sampling conducted in 1996 and 1997 confirmed the presence of PCE exceedances in the two wells.

Groundwater at SA 3 flows toward the east. Contaminants were not detected at levels of concern outside a limited area in the vicinity of OLD-03-01 and OLD-03-04.

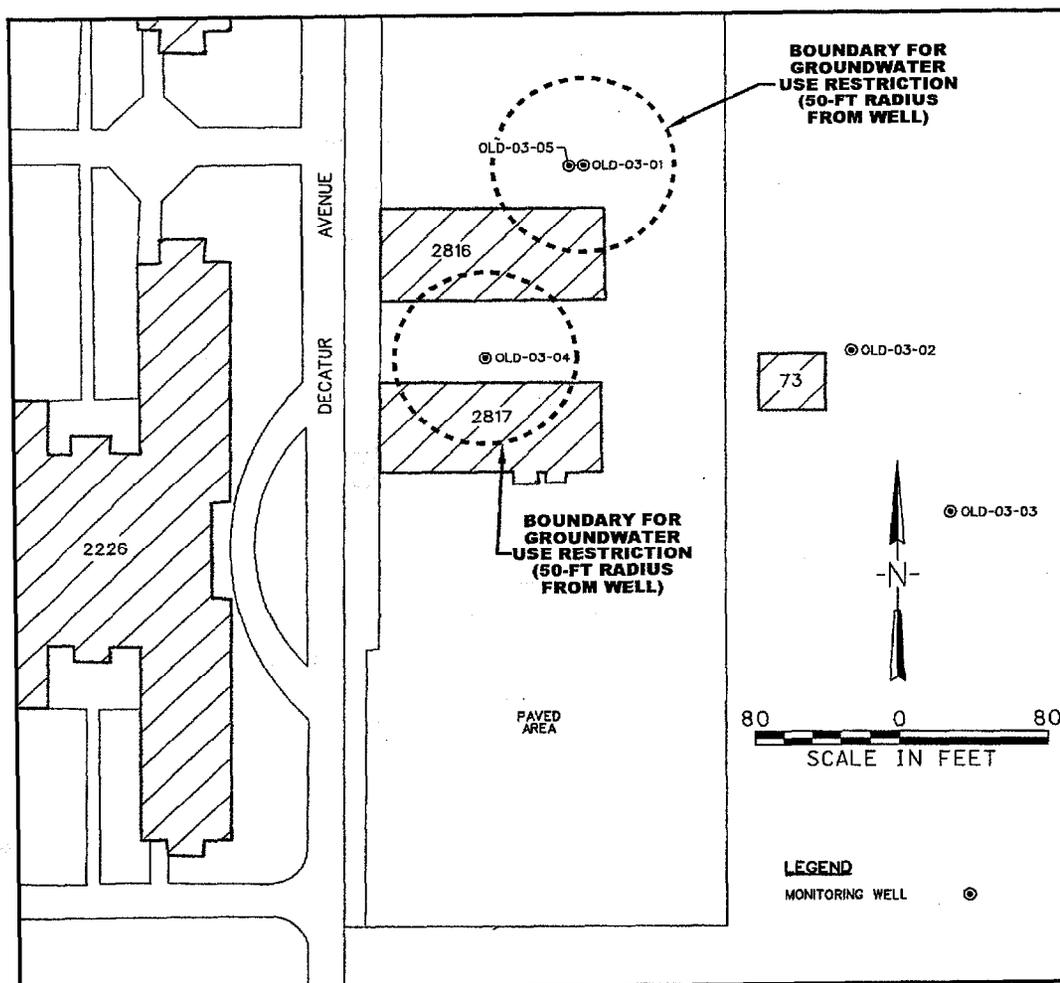


Figure 2. Study Area 3 Site Plan

**Final Decision on Remedial Action**

A combined approach to remediating SA 3 was selected by the OPT. This plan was presented in a fact sheet and a decision document (ABB-ES, 1998), and consisted of groundwater monitoring and institutional controls. These actions are described below.

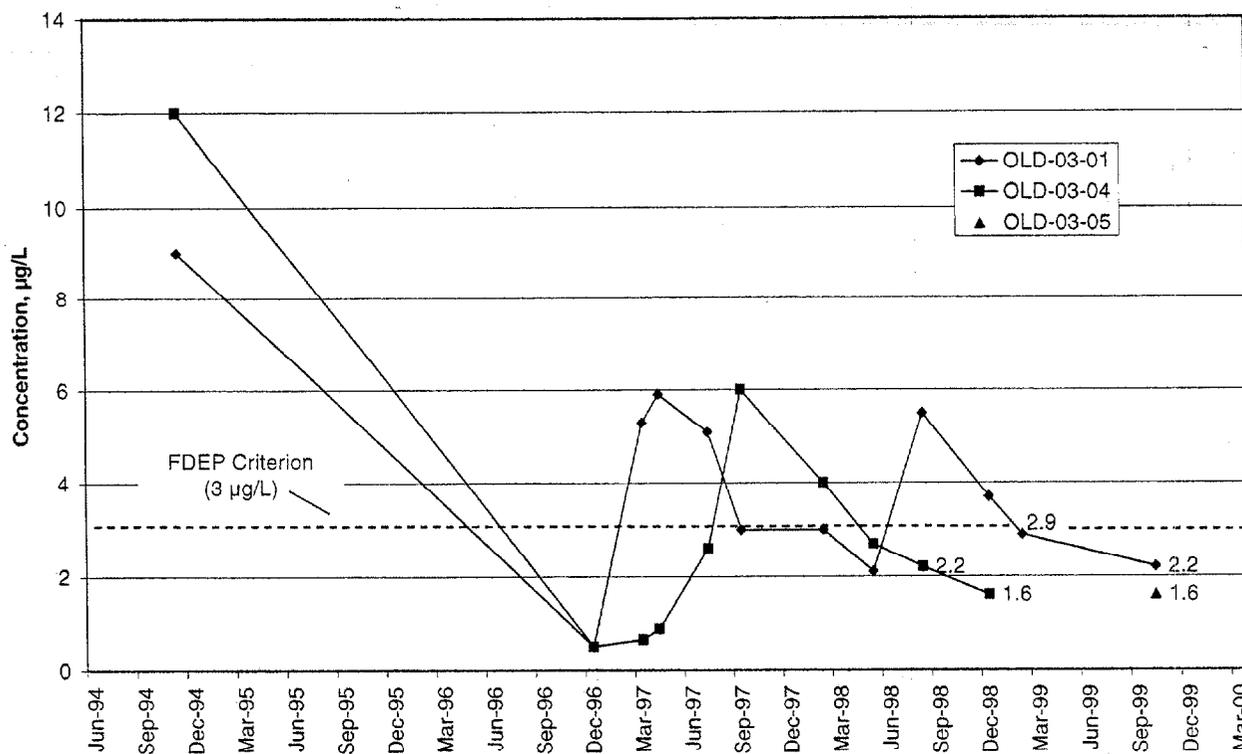
**Groundwater Monitoring.** The OPT decided that quarterly monitoring of the two contaminated wells, OLD-03-01 and OLD-03-04, would be conducted for a period of one year. If the PCE concentrations decreased to acceptable levels (3 µg/L) for two consecutive sampling episodes during this period, then future sampling would not be conducted. At the end of the first year, the progress in the site cleanup would be reviewed and the OPT would determine if further monitoring or other remedial actions were warranted, or if the site met regulatory requirements and qualified for "no further action."

**Institutional Controls.** Institutional controls were implemented at SA 3 to protect human health and the environment from exposure to the PCE-contaminated groundwater and to ensure the integrity of the monitoring process. Because of the limited area of PCE contamination in the surficial aquifer, a temporary use restriction was placed on the groundwater within 50-ft radii of wells OLD-03-01 and OLD-03-04. Use of the groundwater within the restriction boundaries was prohibited for all purposes, including drinking and irrigation. In addition, the installation of new wells for any purpose other than for remediation or assessing groundwater quality was prohibited.

The property was transferred by deed in October 1999. Institutional controls granting FDEP third party beneficiary rights to enforce the temporary groundwater use restriction were incorporated into the deed.

**Results of the Monitoring Program**

The monitoring program began in May 1998. Figure 3 presents the PCE concentrations in groundwater beginning with the site screening in November 1994 through the final samples collected in the monitoring program in October 1999. The table in the attachment presents the analytical detections observed during this period.



**Figure 3. Tetrachloroethene Concentrations in Groundwater at Study Area 3**

Sampling of OLD-03-4 was discontinued after the December 1998 monitoring event after PCE concentrations in the well decreased below the regulatory criteria (3 µg/L) for the third consecutive quarter. Monitoring well OLD-03-01 was found to be dry during several attempts to sample the well in the summer of 1999, and a deeper well OLD-03-05 was installed a few feet away in July 1999 to continue monitoring at that location. A few months later, groundwater levels in OLD-03-01 had recovered and the well was sampled in October 1999 (Tetra Tech NUS, 1999). As shown in Figure 3, the samples from both wells in October 1999 were less than the 3 µg/L. This represents the second consecutive sampling event during which the PCE concentrations were below the FDEP criterion.

The monitoring wells at SA 3 were abandoned in accordance with State of Florida guidance in March 2000.

### **Conclusions**

The objectives of the groundwater monitoring program have been achieved with the concentrations of PCE decreasing to levels below regulatory criteria in consecutive sampling events, and no further action is required at SA 3. The Navy will take the steps necessary to remove the institutional controls (temporary groundwater restrictions) at SA 3. The OPT concurs with these conclusions.

### **Signature**

\_\_\_\_\_  
Wayne Hansel, P.E.  
Base Realignment and Closure Environmental Coordinator

\_\_\_\_\_  
Date

**References**

ABB-ES (ABB Environmental Services, Inc.), 1997. *Base Realignment and Closure, Environmental Site Screening Report, Study Area 3*. Naval Training Center, Orlando, Florida, Unit Identification Code N65928, Navy CLEAN District 1, Contract No. N62467-89-D-0317/107, June.

ABB-ES, 1998. *Decision Document, Study Area 3*. Naval Training Center, Orlando, Florida, Unit Identification Code N65928, Navy CLEAN District 1, Contract No. N62467-89-D-0317/107, February.

Tetra Tech NUS, 1999. *Groundwater Sampling at Study Area 3*. Document No. R4712993. December.

**ATTACHMENT**

**HISTORICAL DETECTIONS IN GROUNDWATER**

HISTORICAL DETECTIONS IN GROUNDWATER  
STUDY AREA 3

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

WELL DESIGNATION	Regulatory Criteria		OLD-03-01											
	Florida GCTL	Primary MCL	03G00101	03G00103	03G00104	03G00105	03G00106	03G00107	03G00108	03G00109	03G00110	03G00111	03G00112	03G00113
SAMPLE ID			10-Nov-94	30-Dec-96	4-Mar-97	10-Apr-97	1-Jul-97	29-Sep-97	2-Feb-98	19-May-98	26-Aug-98	17-Dec-98	23-Feb-99	26-Oct-99
SAMPLE DATE														
<b>Volatile Organics, µg/L</b>														
Benzene	1	5		1										
Ethylbenzene	30	700		6										
Isopropylbenzene	0.8	ND		2									NA	NA
Methylene chloride	5	5			0.23 J						0.19 J			
Naphthalene	20	ND		15									NA	NA
n-Propylbenzene	ND	ND		4									NA	NA
Tetrachloroethene	3	5	9		5.3	5.9	5.1	3	3	2.1	5.5	3.7	2.9	2.2
Trichlorofluoromethane	2,100	ND											NA	NA
Toluene	40	1,000		4										
1,1,1-Trichloroethane	200	200	8					0.12 J			0.11 J			
1,3,5-Trimethylbenzene	10	ND		14									NA	NA
Xylenes (total)	20	10,000		7										
<b>Semivolatile Organics, µg/L</b>														
bis(2-ethylhexyl)phthalate	6	ND	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Pesticides/PCBs, µg/L</b>														
Aroclor-1260	0.5	0.5		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Inorganics, µg/L</b>														
Aluminum	200	ND	90.1 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,000	2,000		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	ND	ND	28800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	100	100		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1,000	ND		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	ND	8 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	15		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	ND	ND	1860 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	ND	3.2 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	100	100	11.9 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	ND	ND	1130 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	160,000	ND	2200 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	49	ND	2.8 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	5,000	ND	3.2 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

HISTORICAL DETECTIONS IN GROUNDWATER  
STUDY AREA 3

NAVAL TRAINING CENTER  
ORLANDO, FLORIDA

WELL DESIGNATION	Regulatory Criteria		OLD-03-04										OLD-03-05
	Florida GCTL	Primary MCL	03G00401	03G00403	03G00404	03G00405	03G00406	03G00407	03G00408	03G00409	03G00410	03G00411	03G00513
SAMPLE ID			03G00401	03G00403	03G00404	03G00405	03G00406	03G00407	03G00408	03G00409	03G00410	03G00411	03G00513
SAMPLE DATE			10-Nov-94	30-Dec-96	4-Mar-97	10-Apr-97	1-Jul-97	29-Sep-97	2-Feb-98	19-May-98	26-Aug-98	17-Dec-98	6-Oct-99
<b>Volatile Organics, µg/L</b>													
Benzene	1	5											
Ethylbenzene	30	700											
Isopropylbenzene	0.8	ND											NA
Methylene chloride	5	5											
Naphthalene	20	ND											NA
n-Propylbenzene	ND	ND											NA
Tetrachloroethene	3	5	12		0.65	0.88	2.6	6	4	2.7	2.2	1.6 J	1.6
Trichlorofluoromethane	2,100	ND				0.2 J							NA
Toluene	40	1,000											0.18 J
1,1,1-Trichloroethane	200	200											
1,3,5-Trimethylbenzene	10	ND											NA
Xylenes (total)	20	10,000											
<b>Semivolatile Organics, µg/L</b>													
bis(2-ethylhexyl)phthalate	6	ND	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Pesticides/PCBs, µg/L</b>													
Aroclor-1260	0.5	0.5		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>Inorganics, ug/L</b>													
Aluminum	200	ND	292	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	2,000	2,000	0.79 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	ND	ND	26100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	100	100	2.4 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1,000	ND	15 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	300	ND	69.6 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	15	15		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	ND	ND	2390 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	50	ND	1.6 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	100	100		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	ND	ND	2140 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	160,000	ND	3040 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	49	ND	3.9 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	5,000	ND	2.1 B	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**HISTORICAL DETECTIONS IN GROUNDWATER  
STUDY AREA 3**

**NAVAL TRAINING CENTER  
ORLANDO, FLORIDA**

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NOTES:

ND = Not determined

NA = Not analyzed

ID = Identifier

GCTL = Florida Department of Environmental Protection, Groundwater Cleanup Target Levels, May 1999.

MCL= Federal Maximum Contaminant Levels, Primary Drinking Water Regulations and Health Advisories, October 1996.

"B" qualifier indicates reported concentration is between the instrument detection limit (IDL) and the contract required detection limit (CRDL).

"J" qualifier indicates reported concentration is an estimated quantity.

µg/L = micrograms per liter.

Empty cells indicate non-detects.

Values in shaded cells are equal to or exceed the regulatory criteria.