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PHASE 2 SAMPLING AND ANALYSIS REPORT ADDENDUM FOR BUILDING 289 BASE  
REALIGNMENT AND CLOSURE NAS CECIL FIELD FL  
7/1/2000  
TETRA TECH NUS INC

**Sampling and Analysis Report  
Addendum  
for  
Building 289  
Base Realignment and Closure**

**Naval Air Station Cecil Field  
Jacksonville, Florida**



**Southern Division  
Naval Facilities Engineering Command  
Contract Number N62467-94-D-0888  
Contract Task Order 0078**

July 2000

**SAMPLING AND ANALYSIS REPORT ADDENDUM  
FOR  
BUILDING 289  
BASE REALIGNMENT AND CLOSURE**

**NAVAL AIR STATION CECIL FIELD  
JACKSONVILLE, FLORIDA**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT N62467-89-D-0088**

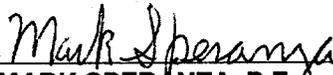
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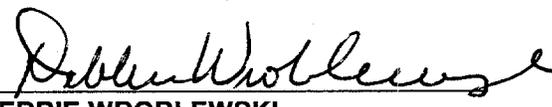
**CONTRACT NUMBER N62467-94-D-0888  
CONTRACT TASK ORDER 0078**

**JULY 2000**

**PREPARED UNDER THE SUPERVISION OF:**

  
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The professional opinions rendered in this decision document identified as Sampling and Analysis Report Addendum for Building 289, Naval Air Station Cecil Field, Jacksonville, Florida were developed in accordance with commonly accepted procedures consistent with applicable standards of practice. Decision documents are based on information obtained from others and under the supervision of the signing engineer. If conditions are determined to exist differently than those described in this document, then the undersigned professional engineer should be notified to evaluate the effects of any additional information on this project described in this report.

Mark Speranza

Mark Speranza, P.E.  
Professional Engineer No. PE0050304

Date: 7/27/00

Mark Speranza

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GLOSSARY

ABB-ES            ABB Environmental Services, Inc

BCT                BRAC cleanup team  
BRAC                Base Realignment and Closure

ELCR                excess lifetime cancer risk

FDEP                Florida Department of Environmental Protection

HQ                  hazard quotient  
HI                  hazard index

GGC                groundwater guidance concentrations

NAS                Naval Air Station

PRE                preliminary risk evaluation

RBC                Risk-Based Concentrations

SAO                sampling and analysis outline

USEPA              U.S. Environmental Protection Agency

## 1.0 INTRODUCTION

ABB Environmental Services, Inc. (ABB-ES), under contract to the Southern Division, Naval Facilities Engineering Command, has completed the Phase II Sampling and Analysis program for Building 289 at Naval Air Station (NAS) Cecil Field. This report summarizes the related field operations, observations, and findings undertaken in partial fulfillment of the requirements of the NAS Cecil Field Base Realignment and Closure (BRAC) program.

Building 289 is a radio receiver station located along Perimeter Road, southeast of the intersection of Runways 36R and 9R. Potential environmental concerns identified for the facility involve the presence of a septic system on the north side of the building. The BRAC cleanup team (BCT) regards septic tank and leachfield systems as potential pathways for contaminants to enter the groundwater, if improperly used. A Sampling and Analysis Outline (SAO) for the assessment of groundwater was prepared by ABB-ES and approved by the BCT (ABB-ES, 1996). The results of the Phase II Sampling and Analysis program developed in the SAO are discussed below.

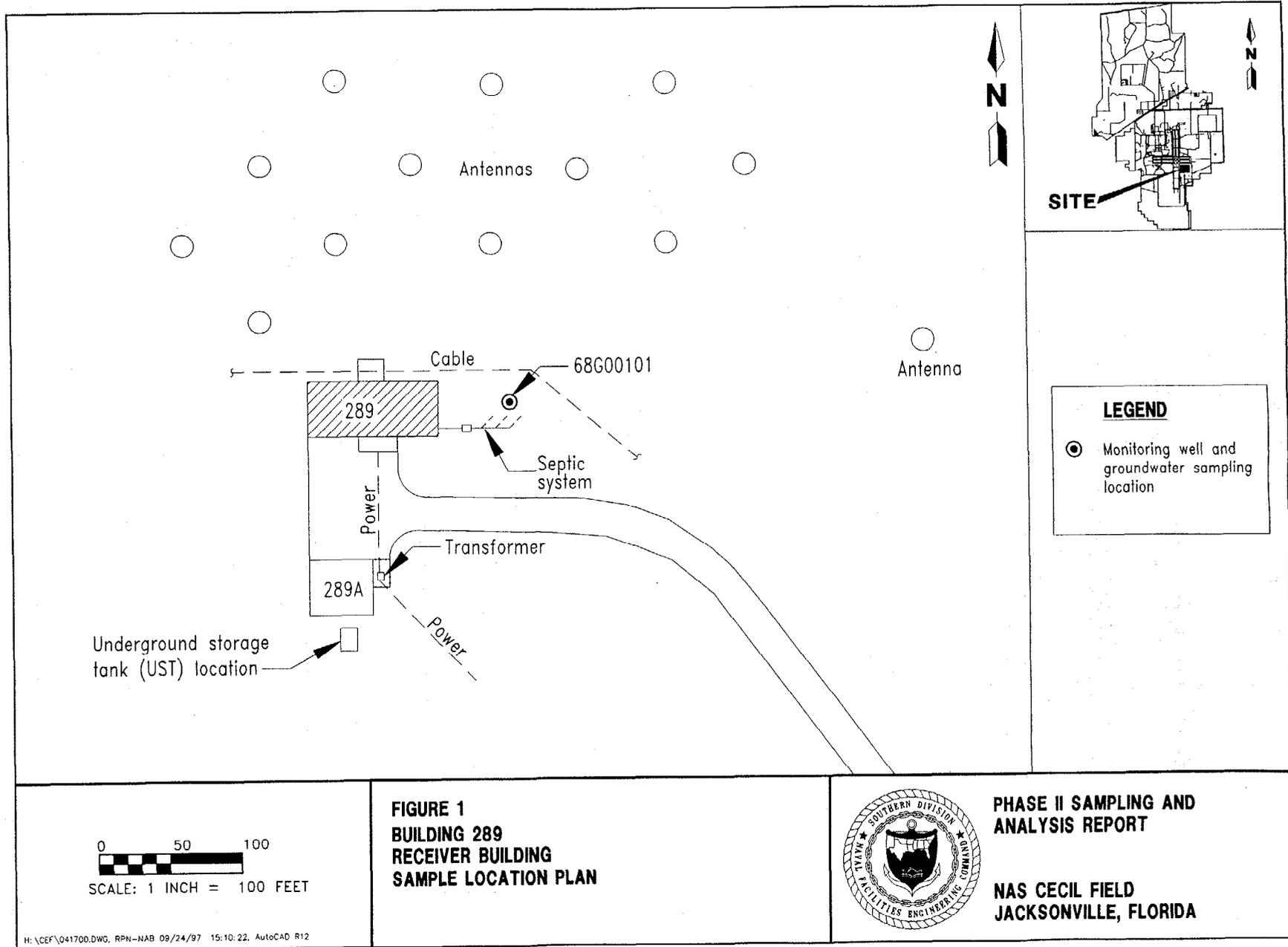
## 2.0 PHASE II INVESTIGATION

Field activities were undertaken in general conformance with the Project Operations Plan (ABB-ES, 1994a). The Phase II investigation included the installation of one groundwater monitoring well to a depth of 13 feet below land surface, downgradient (northeast) of the septic system. A general site plan indicating the location of the monitoring well is presented on Figure 1. The soil boring log is included in Appendix A. One groundwater sample was collected and analyzed for the full Contract Laboratory program suite of target compound list organics and target analyte list inorganics.

## 3.0 PRELIMINARY RISK EVALUATION (PRE)

A PRE was conducted to assess potential risks to human and ecological receptors posed by contaminants in groundwater. Primary exposure pathways were evaluated to determine which potentially contribute to human health and ecological risks. The evaluation was conducted in general conformance with methodology provided in the U.S. Environmental Protection Agency (USEPA) Region IV Memorandum "Amended Guidance on Preliminary Risk Evaluations (PREs) for the Purpose of Reaching a Finding of Suitability to Lease (FOSL)" (USEPA, 1994a), USEPA Region IV Bulletin on Ecological Risk Assessment (USEPA, 1995), and minutes of meetings with the USEPA and the Florida Department of Environmental Protection (FDEP) concerning PREs (ABB-ES, 1995). Site background information and rationale for sample collection and analysis are detailed in the Environmental Baseline Survey Report (ABB-ES, 1994b) and the SAO (ABB-ES, 1996).

3.1 PUBLIC HEALTH PRE. All detected analytes were compared to readily available risk-based screening values to assess the likelihood of adverse human health effects associated with potential exposure to groundwater. Risk-based screening values were obtained from USEPA Region III Risk-Based Concentrations (RBCs), (USEPA, 1996), Federal Maximum Contaminant Levels, (USEPA, 1994), and



FDEP Groundwater Guidance Concentrations (GGC) (FDEP, 1994). Most screening values published in the references listed above are based on toxicity constants and standard human exposure scenarios, and correspond to fixed levels of risk. The designated level of risk for noncarcinogenic chemicals is based on a hazard quotient (HQ) of 1. The level of risk for carcinogenic chemicals is based on an excess lifetime cancer risk (ELCR) of  $1 \times 10^{-6}$ . Cancer and noncancer risks associated with industrial and residential land use are estimated by dividing the maximum detected analyte concentration by the corresponding USEPA Region III RBC value at the designated level of risk (HQ of 1 or ELCR of  $1 \times 10^{-6}$ ). For noncarcinogens, the HQs are summed to determine the cumulative noncancer risk or hazard index (HI).

Thirteen analytes, including one volatile organic compound and 12 inorganic analytes, were detected in the groundwater sample collected in the study area. A comparison among concentrations of detected analytes in groundwater, RBCs for tap water, and FDEP groundwater guidance concentrations is presented in Appendix A. Aluminum, iron, and thallium were detected at concentrations exceeding FDEP guidance concentrations. The FDEP GGC for thallium is a primary water quality standard. The detected thallium concentration also exceeds its RBC for tap water. The RBC for thallium sulfate was used as a surrogate RBC for thallium. The FDEP GGC for aluminum and iron are secondary water quality standards. In addition, the detected concentrations of aluminum and iron are below their respective RBCs for tap water.

The cumulative noncancer risk or hazard index (HI) calculated for all detected analytes is 2.2, based upon RBCs for tap water. Thallium is the primary noncarcinogenic contributor to the HI. No carcinogenic analytes were detected; therefore, an ELCR was not calculated.

There is some uncertainty concerning the detections of thallium in groundwater above the State and Federal MCLs. Thallium has been observed, below the laboratory detection level, at similar concentrations (2 to 6  $\mu\text{g}/\ell$ ) at many sites throughout NAS Cecil Field, including upgradient groundwater samples at OUs 3 and 6. The detection of thallium may be from its presence as a naturally occurring element or from interelemental interference with iron or other cations during the analysis for thallium. Due to the widespread occurrence of thallium at similar concentrations and the potential for interelemental interference, it does not appear that thallium is site related.

**3.2 ECOLOGICAL PRE.** Potential exposure pathways and ecological habitat associated with Building 289 were characterized by ABB-ES ecological risk assessors in June 1996. Building 289 is located in a relatively undeveloped area of the base. The building is surrounded by mowed grass. Groundwater flow is estimated to be to the southeast and may discharge into a drainageway located approximately 500 feet to the southeast (U.S. Geological Survey, 1996). However, no complete exposure pathways to groundwater were observed within the immediate study area. Therefore, no further ecological risk evaluation was conducted.

#### **4.0 CONCLUSIONS AND RECOMMENDATIONS**

A cumulative HI of 2.2 was calculated for all detected analytes in groundwater. Thallium is the only analyte that was detected at a concentration in excess of

its RBC. The maximum detected thallium concentration also exceeds its Federal and State drinking water standard. The noncarcinogenic HI is primarily attributable to thallium, using the thallium sulfate RBC as a surrogate. The reference dose used to calculate the thallium sulfate RBC is based on a nonobservable adverse effect level. However, due to the widespread occurrence of thallium (a naturally occurring element) at NAS Cecil Field and the potential for interelemental interference during analysis, it does not appear that thallium is site related.

No exposure pathways to human or ecological receptors have been identified for groundwater in the study area. No risk to human health is anticipated in the event of a future residential land-use exposure scenario. Therefore, based upon the findings of this evaluation, reclassification of the color code for Building 289 from Gray to Light Green is recommended.

#### REFERENCES

- ABB Environmental Services, Inc. (ABB-ES). 1994a. *Project Operations Plan for Cecil Field and Health and Safety Plan*. Prepared for Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), North Charleston, South Carolina (December).
- ABB-ES. 1994b. *Base Realignment and Closure Environmental Baseline Survey Report, Naval Air Station, Cecil Field, Jacksonville, Florida*. Prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina (November).
- ABB-ES. 1995. Minutes of September 25, 1995, conference call to discuss preliminary risk evaluations.
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- Florida Department of Environmental Protection. 1994. *Groundwater Guidance Concentrations*. Bureau of Drinking Water and Groundwater Resources, Tallahassee, Florida (June).
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- USEPA. 1995. *Region IV Waste Management Division Preliminary Risk Evaluation, Ecological Risk Assessment, Supplemental Guidance to RAGS*. Region IV Bulletin No. 1 (November).
- USEPA. 1996. *Region III Risk-Based Screening Table, Region III, Technical Guidance Manual*. Risk Assessment. EPA/903/R-93-001 (May).

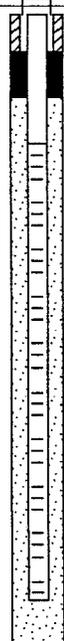
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United States Geological Survey (USGS). 1996. Groundwater Flow in the Surficial Aquifer System and Potential Movement of Contaminants From Selected Waste-Disposal Sites at Cecil Field Naval Air Station, Jacksonville, Florida.

**APPENDIX A**

**SOIL BORING LOGS AND TABLE**

<b>Project:</b> NAS Cecil Field BRAC		<b>Well ID:</b> CEF-289-1S	<b>Boring ID:</b> CEF-289-1S
<b>Client:</b> SOUTHDIIVNAVFACENCOM	<b>Contractor:</b> Alliance Environmental, Inc.		<b>Job No.:</b> 08520-85
<b>Northing/Easting:</b> 2138240.834/381385.974		<b>Date started:</b> 12-11-95	<b>Compltd:</b> 12-11-95
<b>Method:</b> Auger	<b>Casing dia.:</b> 2 in.	<b>Screened Int.:</b> 3 - 13 Ft.	<b>Protection level:</b> D
<b>TOC elev.:</b> 80.41 Ft.	<b>Type of OVM:</b> PID	<b>Total dpth:</b> 14.0Ft.	<b>Dpth to ∇:</b> 4.0 Ft.
<b>ABB Rep.:</b> R. Holloway	<b>Well development date:</b> 1-10-98		<b>Site:</b> 88 - 289 Radio Receiver St.

Depth Ft.	Laboratory Sample ID.	Sample Recovery	Headspace (ppm)	Soil/Rock Description and comments	Lithologic symbol	Soil class.	Blows/6-in.	Well diag.
8.0				SILTY SAND (SM): 100%, very dark gray, quartz, fine- to very fine-grained, subrounded to subangular, well sorted.		SM	posthole	
3.0			posthole					
0			11,8,8,8					
5								
15								
20								
25								
30								

**Table A-1  
BRAC Preliminary Risk Evaluation Table for Analytes Detected  
in Groundwater**

Sampling and Analysis Report, Building 289  
Base Realignment and Closure  
Zone H, Undeveloped Eastern Area Group VII  
NAS Cecil Field, Jacksonville, Florida

Analyte	Sample		Screening Values		Calculated Risk Values	
	68G00101	68G00101D	FDEPGCC	RBC(T)	ELCR	HQ
<b><u>Volatile Organic Compounds</u></b>						
Acetone	6	10	700 st	3,700 n		0.0
<b><u>Inorganic Analytes</u></b>						
Aluminum	789	897	200 s	37,000 n		0.0
Barium	23.8	23.3	2,000 p	2,600 n		0.0
Calcium	27,000	26,700				
Cobalt	1	1.2		2,200 n		0.0
Iron	2,450	2,580	300 s*	11,000 n		0.2
Magnesium	6,320	6,290				
Manganese	31.3	31.5	50 s	840 n		0.0
Potassium	572	601				
Sodium	6,730	7,150	160,000 p			
Thallium	5.6	2.2	2 p	2.9 n		
Vanadium	1.9	2.2	49 st	260 n		1.9
Zinc	7.7	3.4	5,000 s	11,000 n		0.0
<b>Sum</b>						<b>2.2</b>

Notes: All analytes are reported in micrograms per liter.  
Sample suffixes indicate the following: F = filtered sample, DL = laboratory diluted sample, RE = laboratory reextracted, D = field duplicate.  
There is no RBC for thallium; the RBC for thallium sulfate was used as a surrogate.

BRAC = Base Realignment and Closure (Act).  
NAS = Naval Air Station.  
FDEPGGC = FDEP Groundwater Guidance Concentration, June 1994.  
RBC(T) = Risk-based concentration (tap water), USEPA Region III, May 1996.  
ELCR = calculated excess lifetime cancer risk;  $ELCR = \text{detected concentration} / RBC(T) * 10E-06$ .  
HQ = calculated hazard quotient for noncarcinogenic analytes;  $HQ = \text{detected concentration} / RBC(T)$ .  
st = systematic toxicant.  
n = noncarcinogenic risk.  
s = secondary standard (related to taste, odor, color, or other nonaesthetic effects).  
\* = values that exceed FDEPGGC.  
p = primary standard (MCL).