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NAS CECIL FIELD, FL
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ACTION MEMORANDUM FOR OLD GOLF COURSE REVISION 1 NAS CECIL FIELD FL
7/25/2000
TETRA TECH NUS INC

ACTION MEMORANDUM

DATE: July 25, 2000

SUBJECT: Action Memorandum for Old Golf Course at Naval Air Station (NAS) Cecil Field, Jacksonville, Florida.
(FL-517-002-2474)

PREPARED BY: Tetra Tech NUS, Inc.
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PREPARED FOR: Southern Division
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THRU: Scott Glass
BRAC Environmental Coordinator (BEC)

TO: NAS Cecil Field Administrative Record.

1.0 PURPOSE

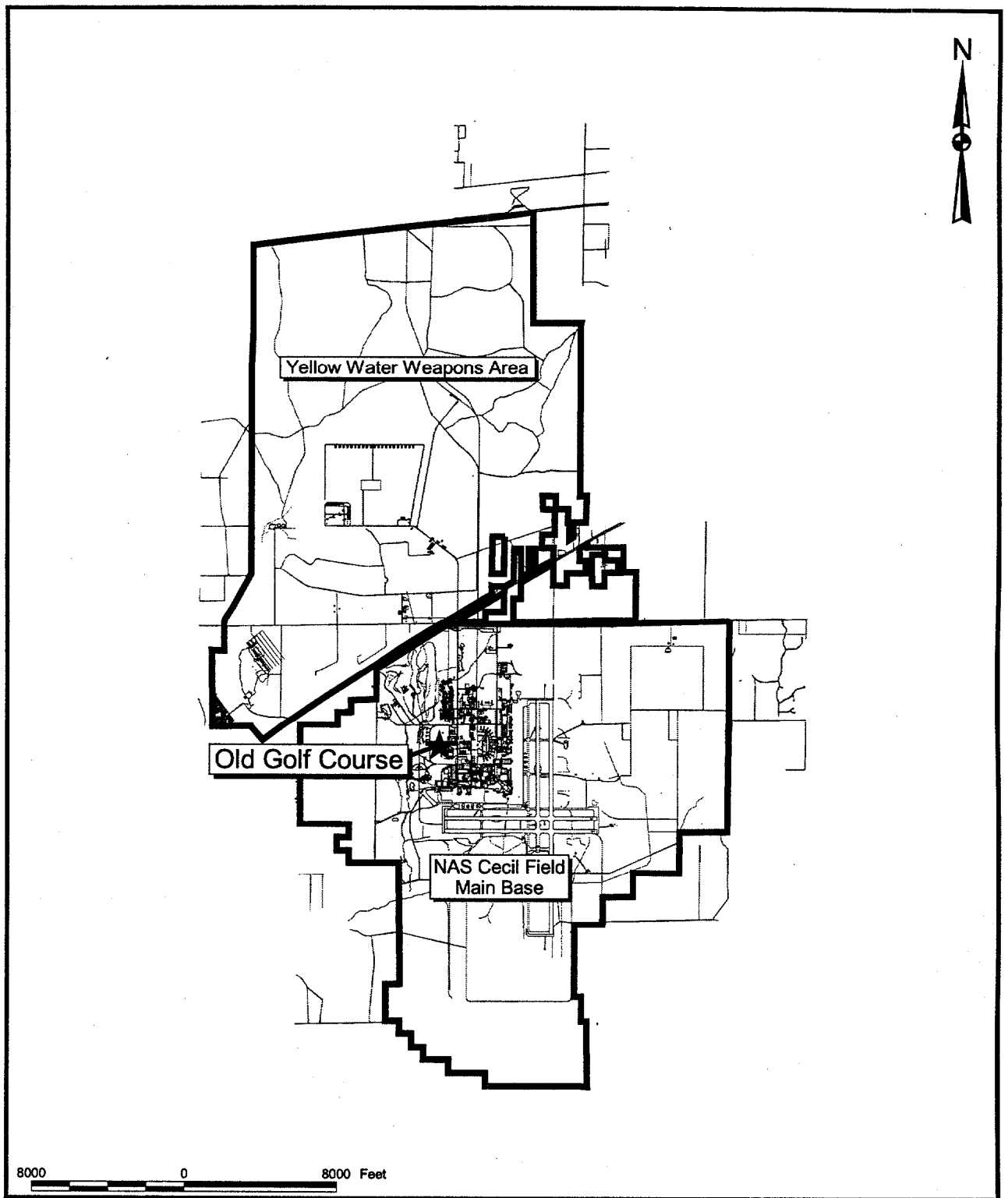
The purpose of this Action Memorandum for the Old Golf Course (OGC) is to discuss the investigations performed, to identify the need for a removal action, and to present the proposed removal action to be conducted. This removal action will be performed in accordance with the National Contingency Plan (NCP), 40 CFR 300.415.

This Action Memorandum has been prepared by Tetra Tech NUS, Inc. (TtNUS) for the Department of the Navy Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). The work was conducted under the Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Contract Number N62467-94-D-0888, Contract Task Order (CTO) 0078.

2.0 SITE CONDITIONS AND BACKGROUND

2.1 Site Description

The OGC occupied the area bound by New World Avenue (former "D" Avenue) on the east, Lake Newman Street (former 6th Street) on the north, Lake Fretwell Street (former 4th Street) on the south, and Residence Avenue (former "G" Avenue on the west (Figure 2-1). The eastern third of the area is



DRAWN BY MJJ	DATE 08May00	GENERAL LOCATION MAP OLD GOLF COURSE NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-1 / REV 0

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occupied by Building 331 (Bachelor Officer Quarters), Building 800 (Memorial Chapel), and Building 808 (Dispensary/Dental Clinic) (Figure 2-2). The OGC was identified from historic aerial photographs. The east portion was reworked for the buildings and parking lots. The balance of the site was not significantly changed and is overgrown with vegetation. The area currently is a commercial and undeveloped setting, and the reuse plan identifies this area as office and park.

2.2 Site History

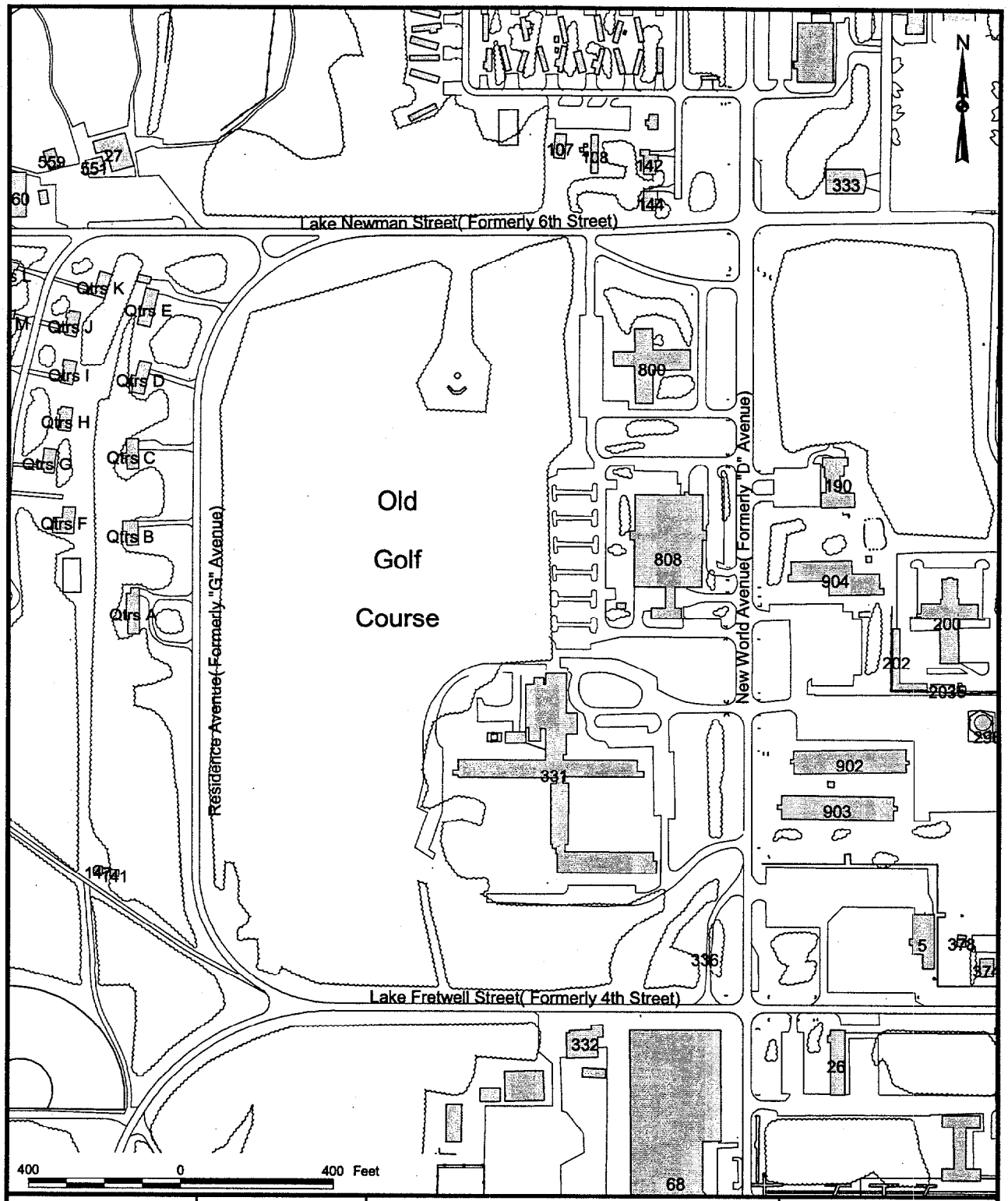
No specific historic information is available about the OGC. Based on historic aerial photographs, it appears to have been constructed in early 1940s and was operated until 1946 when the current golf course was constructed (ABB-ES, 1994). Building 331 was constructed in 1957, Building 800 was constructed in 1965, and Building 808 was constructed in 1976. The railroad spur that served Building 68 passed through the southeast corner of the OGC, south of Building 331. The railroad tracks were removed in 1986.

Because of the extensive construction and ground disturbance on the east side, only the western portion of the OGC was investigated.

2.3 Previous Investigations

This area was identified as Main Base Area 3 (MB3) during the Environmental Baseline Survey (EBS) (ABB Environmental Services, Inc. [ABB-ES], 1994). MB3 and Buildings 331, 800, and 808 were initially evaluated during the EBS and identified as requiring additional evaluation. A Phase II Sampling and Analysis program was conducted by ABB-ES for MB3. The results of the investigation were presented in the Sampling and Analysis Outline and Report (SAOR) for MB3 (HLA, 1998). No SARs were required for Buildings 331, 800, and 808 based on the activities in the buildings. The investigation at MB3 included the collection of one soil sample and that sample contained 4, 4'-DDE and 4, 4-DDT at concentrations below the Florida Department of Environmental Protection (FDEP) cleanup criteria. The SAOR recommended no further action at MB3 (HLA, 1998). During later investigations of Cecil Field, the BRAC Cleanup Team (BCT) reconsidered the subject of the OGC and determined that additional investigation was required at the former locations of the tee boxes and greens.

The tank at Building 800 (Tank 800) and the tank at Building 808 (Tank G808) were investigated in separate studies (ABB, 1997a; ABB, 1997b). No further action was recommended for Tank 800. No further action was recommended for Tank G808 until the tank was removed.



DRAWN BY MJJ	DATE 08May00	SITE LAYOUT MAP OLD GOLF COURSE NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHEDULE-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-2 / REV 0

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The OGC was investigated by TtNUS from November 1999 through May 2000. Four sampling events were conducted to delineate arsenic contamination in the surface soils. Sample locations are shown in Figure 2-3, and the analytical results are provided in Appendix A. Table 2-1 provides a summary of the positive analytical results for the samples collected, including the frequency and range of detection and the location of the maximum detection. No groundwater investigation was determined to be necessary, because all arsenic concentrations were less than the FDEP leachability to groundwater criteria.

2.4 Regulatory Agencies

NAS Cecil Field is on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) National Priorities List (NPL). Therefore, the Navy is the lead agency and the United States Environmental Protection Agency (U.S. EPA) and the FDEP are oversight agencies. U.S. EPA and FDEP have concurred on the removal determination. The Navy, U.S. EPA, FDEP, and Navy Contractors make up the BRAC Cleanup Team (BCT). Members of the BCT have been provided the authorization to expedite cleanups at NAS Cecil Field.

A Restoration Advisory Board (RAB) has been established, and remedial actions of this nature are presented to the board and the public for comment and input. The remedial action at the OGC has been identified as a time-critical removal action and will follow the appropriate measures with regards to public input and regulatory requirements.

3.0 ENDANGERMENT DETERMINATION

The removal action objective for the OGC is to prevent migration of contaminated soils. Due to current and future activities at the site there is a potential exposure to nearby human populations.

Actual or threatened releases of contaminants at the OGC, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

4.0 PROPOSED ACTIONS AND ESTIMATED COSTS

4.1 Proposed Action

The proposed remedial action is designed to address soil in the area of the OGC. Investigations were conducted to delineate the extent of arsenic contamination identified in the surface soils at the OGC.

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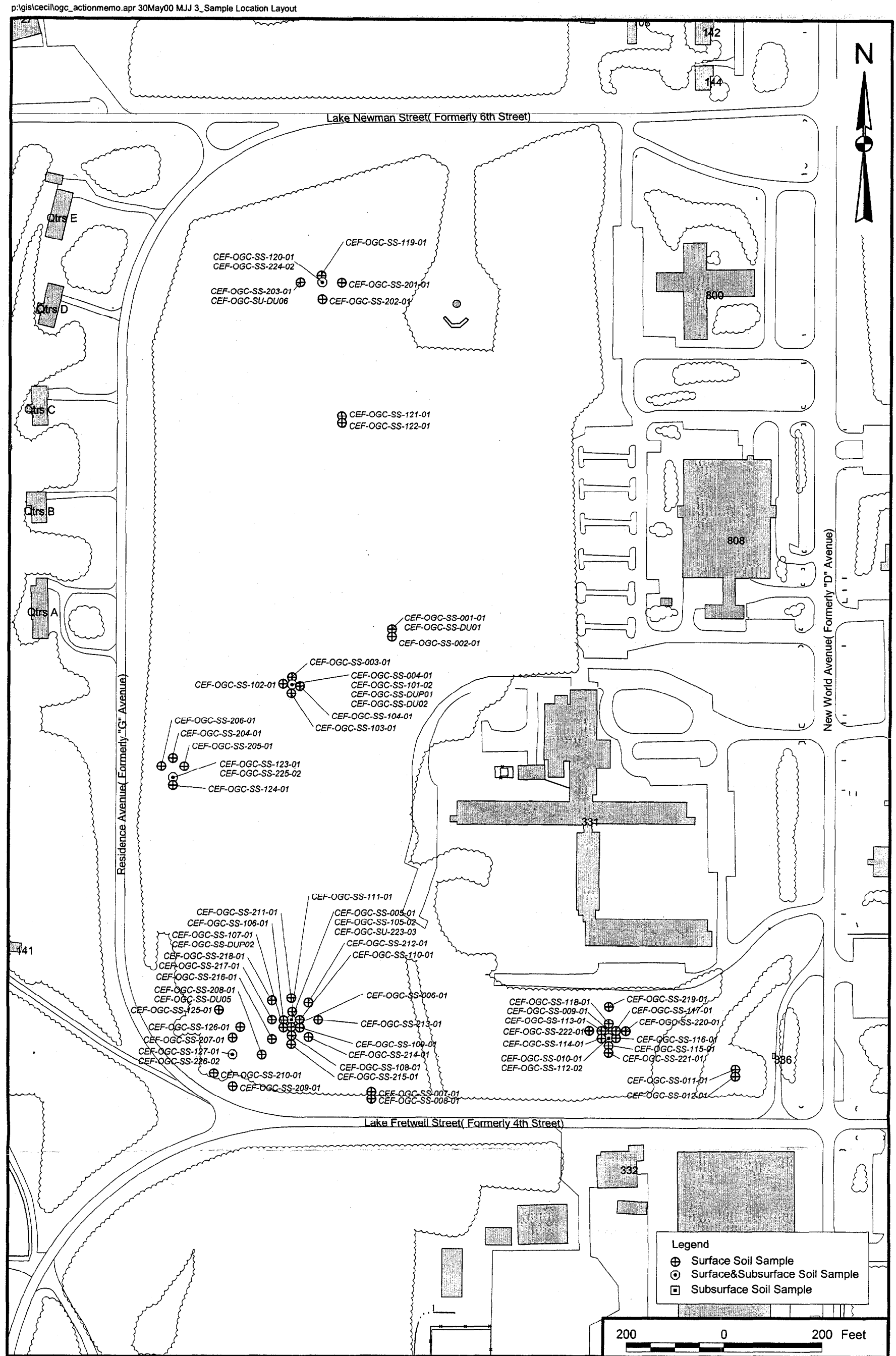

DRAWN BY	DATE			CONTRACT NUMBER 0039	
MJJ	15May00				
CHECKED BY	DATE			APPROVED BY	DATE
COST/SCHEDULE-AREA				APPROVED BY	DATE
SCALE AS NOTED				DRAWING NO. FIGURE 2-3	REV 0

SOIL SAMPLE LOCATIONS MAP
OLD GOLF COURSE
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

REVISION 1
JULY 2000

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TABLE 2-1

SOIL ANALYTICAL RESULTS SUMMARY
OLD GOLF COURSE
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Parameter	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Average of Positive Detections
Pesticides/PCBs (ug/kg)				
4,4'-DDD	7/12	1.1 - 23.4	CEF-OGC-SS-010-01	5.1929
4,4'-DDE	9/12	1.6 - 172	CEF-OGC-SS-009-01	40.7833
4,4'-DDT	9/12	1.6 - 160	CEF-OGC-SS-009-01	34.7611
Alpha-Chlordane	5/12	2.6 - 564	CEF-OGC-SS-009-01	149.82
Gamma-Chlordane	5/12	2 - 310	CEF-OGC-SS-009-01	81.36
Heptachlor Epoxide	2/12	13.4 - 44.8	CEF-OGC-SS-009-01	29.1
Inorganics (mg/kg)				
Arsenic	31/71	0.76 - 23.3	CEF-OGC-SS-216-01	5.5245

As documented in BCT meeting minutes number 1186 on May 23, 2000, the soils at this site shall be remediated for residential uses. This remedial action consists of the excavation and off-site disposal of approximately 297 cubic yards (cy) of soil which exceed the established statistical pickup value to achieve the Inorganic Background Data Set (IBDS) level (HLA, 1998). The IBDS includes the results of samples collected throughout the base. The remediation goal for any containment should never be less than the IBDS values. However, if an FDEP criterion is greater than the IBDS value, the FDEP criterion is regarded as the remediation goal.

The remedial design to be implemented to mitigate the public health threat posed by direct human contact and inhalation of airborne particles is provided in Appendix B. The remedial action and disposal of the soil will be conducted in a manner that complies with all state, local, and Federal regulations including established QA/QC protocols provided in the U.S. EPA Region IV SOP/QAM (US EPA, 1996).

4.2 Applicable or Relevant and Appropriate Requirements (ARARs)

The proposed response action to excavate soils that exceed the established pickup level to achieve the IBDS concentration when compared to the site-wide upper confidence level (UCL) will comply with the State ARARs.

4.3 Estimated Cost

The estimated cost of implementation of this alternative is $48,000.

5.0 EXPECTED CHANGE IN THE SITUATION SHOULD THE RESPONSE ACTION BE DELAYED OR NOT TAKEN.

Concentrations of arsenic in soils at the OGC have been identified as exceeding the IBDS value. The BCT agreed that those soils exceeding the IBDS pickup level should be excavated and disposed of off-site to achieve the future land use scenario. Delayed action will increase the risk to public health by leaving in place contamination that exceeds the site-wide statistical evaluation pickup values, thus increasing the duration potential receptors are exposed to these elevated concentrations.

6.0 RECOMMENDATIONS

This action memorandum presents the selected removal action (Appendix B) for the OGC at NAS Cecil Field, developed in accordance with CERCLA as amended and consistent with the NCP. This decision to excavate and dispose soils off-site in a time-critical manner is based on information to be provided in the administrative record for this site.

Conditions at the OGC meet the NCP section 300.415(b)(2) criteria for a removal, and it is recommended that this removal action be conducted. The total cost of this remedial action to comply with residential land use standards is estimated to be $48,000.

REFERENCES

ABB Environmental Services, Inc. (ABB-ES), 1994. Base Realignment and Closure Environmental Baseline Survey Report Naval Air Station (NAS) Cecil Field, November.

ABB-ES 1997a, Confirmatory Sampling Report Building 800, Tank 800, Base Realignment and Closure, October.

ABB-ES 1997b, Confirmatory Sampling Report Building 808, Tank G808, Base Realignment and Closure, December.

Florida Department of Environmental Protection (FDEP), 1999. Contaminant Target Levels Rule, Soil, Groundwater and Surface Water Target Cleanup Levels, Florida Administrative Code (F.A.C.) Chapter 62-777, August.

Harding Lawson Associates (HLA), 1998. Inorganic Background Data Set.

HLA, 1998, Sampling and Analysis Outline and Report Main Base Area 3, Base Realignment and Closure, November.

Tetra Tech NUS, Inc. (TtNUS), 1998. Base-Wide Generic Work Plan at NAS Cecil Field, Jacksonville, Florida. Prepared for SOUTHNAVFACENCOM, North Charleston, South Carolina, October.

U.S. Environmental Protection Agency, Region IV, (U.S. EPA), 1996. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Athens, Georgia.

APPENDIX A

ANALYTICAL RESULTS

Old Golf Course
Summary of Positive Detections - Soil Data

order	001	002	003	004	005	006	007	008
location	CEF-OGC-SS-001	CEF-OGC-SS-001	CEF-OGC-SS-002	CEF-OGC-SS-003	CEF-OGC-SS-004	CEF-OGC-SS-004	CEF-OGC-SS-005	CEF-OGC-SS-006
nsample	CEF-OGC-SS-001-01	CEF-OGC-SS-001-01-D	CEF-OGC-SS-002-01	CEF-OGC-SS-003-01	CEF-OGC-SS-004-01	CEF-OGC-SS-004-01-D	CEF-OGC-SS-005-01	CEF-OGC-SS-006-01
sample	CEF-OGC-SS-001-01	CEF-OGC-SS-DU01	CEF-OGC-SS-002-01	CEF-OGC-SS-003-01	CEF-OGC-SS-004-01	CEF-OGC-SS-DU02	CEF-OGC-SS-005-01	CEF-OGC-SS-006-01
sample_dat	11/18/99	11/18/99	11/18/99	11/18/99	11/18/99	11/18/99	11/18/99	11/18/99
depth	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']
sort	**c_001**	**c_002**	**c_003**	**c_004**	**c_005**	**c_006**	**c_007**	**c_008**
Pesticides/PCBs (ug/kg)								
4,4'-DDD	1.6 J	1.6 J	2.8 J	3.7 U	1.6 J	1.1 J	3.6 U	2.4 J
4,4'-DDE	2 J	1.8 J	5.8	3.7 U	2.7 J	2.4 J	3.6 U	4.7
4,4'-DDT	3.3 J	2.9 J	6.5 J	3.7 U	2.5 J	2.2 J	3.6 U	4.9 J
ALPHA-CHLORDANE	3.8 U	3.7 U	3.7 U	3.7 U	3.6	3.6	3.6 U	2.9 J
GAMMA-CHLORDANE	3.8 U	3.7 U	3.7 U	3.7 U	2.7 J	2.3 J	3.6 U	2.7 J
HEPTACHLOR EPOXIDE	1.9 U	1.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Inorganics (mg/kg)								
ARSENIC	1.6 U	1.3 U	1.6 U	0.55 U	4.6	1 U	13.6	3.2 U

Old Golf Course
Summary of Positive Detections - Soil Data

order	009	010	011	012	013	014	015	016
location	CEF-OGC-SS-007	CEF-OGC-SS-008	CEF-OGC-SS-009	CEF-OGC-SS-010	CEF-OGC-SS-011	CEF-OGC-SS-012	CEF-OGC-SS-004	CEF-OGC-SS-004
nsample	CEF-OGC-SS-007-01	CEF-OGC-SS-008-01	CEF-OGC-SS-009-01	CEF-OGC-SS-010-01	CEF-OGC-SS-011-01	CEF-OGC-SS-012-01	CEF-OGC-SS-101-02	CEF-OGC-SS-101-02-D
sample	CEF-OGC-SS-007-01	CEF-OGC-SS-008-01	CEF-OGC-SS-009-01	CEF-OGC-SS-010-01	CEF-OGC-SS-011-01	CEF-OGC-SS-012-01	CEF-OGC-SS-101-02	CEF-OGC-SS-DUP01
sample_dat	11/18/99	11/18/99	11/18/99	11/18/99	11/18/99	11/18/99	01/31/00	01/31/00
depth	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[1.00 - 2.00']	[1.00 - 2.00']
sort	c_009	c_010	c_011	c_012	c_013	c_014	c_015	c_016
Pesticides/PCBs (ug/kg)								
4,4'-DDD	3.5	1.3 J	71 U	23.4 J	3.6 U	3.6 U		
4,4'-DDE	24.9	4.6	172	149	1.6 J	3.6 U		
4,4'-DDT	19.2 J	3.2 J	160	112 J	1.6 J	3.6 U		
ALPHA-CHLORDANE	2.6 J	3.5 U	564	176	3.6 U	3.6 U		
GAMMA-CHLORDANE	2 J	3.5 U	310	89.6	3.6 U	3.6 U		
HEPTACHLOR EPOXIDE	1.8 U	1.7 U	44.8	13.4 J	1.8 U	1.8 U		
Inorganics (mg/kg)								
ARSENIC	1.2 U	0.66 U	11.8	3.5	0.54 U	0.38 U	0.38 U	0.4 U

Old Golf Course
Summary of Positive Detections - Soil Data

order	017	018	019	020	021	022	023	024
location	CEF-OGC-SS-102	CEF-OGC-SS-103	CEF-OGC-SS-104	CEF-OGC-SS-005	CEF-OGC-SS-106	CEF-OGC-SS-107	CEF-OGC-SS-107	CEF-OGC-SS-108
nsample	CEF-OGC-SS-102-01	CEF-OGC-SS-103-01	CEF-OGC-SS-104-01	CEF-OGC-SS-105-02	CEF-OGC-SS-106-01	CEF-OGC-SS-107-01	CEF-OGC-SS-107-01-D	CEF-OGC-SS-108-01
sample	CEF-OGC-SS-102-01	CEF-OGC-SS-103-01	CEF-OGC-SS-104-01	CEF-OGC-SS-105-02	CEF-OGC-SS-106-01	CEF-OGC-SS-107-01	CEF-OGC-SS-DUP02	CEF-OGC-SS-108-01
sample_dat	01/31/00	01/31/00	01/31/00	02/01/00	02/01/00	02/01/00	02/01/00	02/01/00
depth	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[1.00 - 2.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']
sort	**c_017**	**c_018**	**c_019**	**c_020**	**c_021**	**c_022**	**c_023**	**c_024**
Pesticides/PCBs (ug/kg)								
4,4'-DDD								
4,4'-DDE								
4,4'-DDT								
ALPHA-CHLORDANE								
GAMMA-CHLORDANE								
HEPTACHLOR EPOXIDE								
Inorganics (mg/kg)								
ARSENIC	1.5	2	0.93	11.9	5.6	20.3	7	2.2

Old Golf Course
Summary of Positive Detections - Soil Data

order	**025**	**026**	**027**	**028**	**029**	**030**	**031**	**032**
location	CEF-OGC-SS-109	CEF-OGC-SS-110	CEF-OGC-SS-111	CEF-OGC-SS-010	CEF-OGC-SS-113	CEF-OGC-SS-114	CEF-OGC-SS-115	CEF-OGC-SS-116
nsample	CEF-OGC-SS-109-01	CEF-OGC-SS-110-01	CEF-OGC-SS-111-01	CEF-OGC-SS-112-02	CEF-OGC-SS-113-01	CEF-OGC-SS-114-01	CEF-OGC-SS-115-01	CEF-OGC-SS-116-01
sample	CEF-OGC-SS-109-01	CEF-OGC-SS-110-01	CEF-OGC-SS-111-01	CEF-OGC-SS-112-02	CEF-OGC-SS-113-01	CEF-OGC-SS-114-01	CEF-OGC-SS-115-01	CEF-OGC-SS-116-01
sample_dat	02/01/00	02/01/00	02/01/00	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00
depth	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[1.00 - 2.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']
sort	**c_025**	**c_026**	**c_027**	**c_028**	**c_029**	**c_030**	**c_031**	**c_032**
Pesticides/PCBs (ug/kg)								
4,4'-DDD								
4,4'-DDE								
4,4'-DDT								
ALPHA-CHLORDANE								
GAMMA-CHLORDANE								
HEPTACHLOR EPOXIDE								
Inorganics (mg/kg)								
ARSENIC	4.2	0.39 U	2.2	1.1	4	3.4	3.8	11.5

Old Golf Course
Summary of Positive Detections - Soil Data

order	033	034	035	036	037	038	039	040
location	CEF-OGC-SS-117	CEF-OGC-SS-118	CEF-OGC-SS-119	CEF-OGC-SS-120	CEF-OGC-SS-121	CEF-OGC-SS-122	CEF-OGC-SS-123	CEF-OGC-SS-124
nsample	CEF-OGC-SS-117-01	CEF-OGC-SS-118-01	CEF-OGC-SS-119-01	CEF-OGC-SS-120-01	CEF-OGC-SS-121-01	CEF-OGC-SS-122-01	CEF-OGC-SS-123-01	CEF-OGC-SS-124-01
sample	CEF-OGC-SS-117-01	CEF-OGC-SS-118-01	CEF-OGC-SS-119-01	CEF-OGC-SS-120-01	CEF-OGC-SS-121-01	CEF-OGC-SS-122-01	CEF-OGC-SS-123-01	CEF-OGC-SS-124-01
sample_dat	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00	01/31/00
depth	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']
sort	**c_033**	**c_034**	**c_035**	**c_036**	**c_037**	**c_038**	**c_039**	**c_040**
Pesticides/PCBs (ug/kg)								
4,4'-DDD								
4,4'-DDE								
4,4'-DDT								
ALPHA-CHLORDANE								
GAMMA-CHLORDANE								
HEPTACHLOR EPOXIDE								
Inorganics (mg/kg)								
ARSENIC	5	14.5	1.4	3.3	0.81	0.76	2.5	0.86

Old Golf Course
Summary of Positive Detections - Soil Data

order	**041**	**042**	**043**	**044**	**045**	**046**	**047**	**048**
location	CEF-OGC-SS-125	CEF-OGC-SS-126	CEF-OGC-SS-127	CEF-OGC-SS-201	CEF-OGC-SS-202	CEF-OGC-SS-203	CEF-OGC-SS-203	CEF-OGC-SS-204
nsample	CEF-OGC-SS-125-01	CEF-OGC-SS-126-01	CEF-OGC-SS-127-01	CEF-OGC-SS-201-01	CEF-OGC-SS-202-01	CEF-OGC-SS-203-01	CEF-OGC-SS-203-01-D	CEF-OGC-SS-204-01
sample	CEF-OGC-SS-125-01	CEF-OGC-SS-126-01	CEF-OGC-SS-127-01	CEF-OGC-SS-201-01	CEF-OGC-SS-202-01	CEF-OGC-SS-203-01	CEF-OGC-SU-DU06	CEF-OGC-SS-204-01
sample_dat	01/31/00	01/31/00	01/31/00	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00
depth	*[0.00 - 1.00']*	*[0.00 - 1.00']*	*[0.00 - 1.00']*	*[0.00 - 1.00']*	*[0.00 - 1.00']*	*[0.00 - 1.00']*	*[0.00 - 1.00']*	*[0.00 - 1.00']*
sort	**c_041**	**c_042**	**c_043**	**c_044**	**c_045**	**c_046**	**c_047**	**c_048**
Pesticides/PCBs (ug/kg)								
4,4'-DDD								
4,4'-DDE								
4,4'-DDT								
ALPHA-CHLORDANE								
GAMMA-CHLORDANE								
HEPTACHLOR EPOXIDE								
Inorganics (mg/kg)								
ARSENIC	0.38 U	0.35 U	4.1	0.59 U	0.88 U	0.69 U	0.38 U	0.63 U

Old Golf Course
Summary of Positive Detections - Soil Data

order	049	050	051	052	053	054	055	056
location	CEF-OGC-SS-205	CEF-OGC-SS-206	CEF-OGC-SS-207	CEF-OGC-SS-208	CEF-OGC-SS-208	CEF-OGC-SS-209	CEF-OGC-SS-210	CEF-OGC-SS-211
nsample	CEF-OGC-SS-205-01	CEF-OGC-SS-206-01	CEF-OGC-SS-207-01	CEF-OGC-SS-208-01	CEF-OGC-SS-208-01-D	CEF-OGC-SS-209-01	CEF-OGC-SS-210-01	CEF-OGC-SS-211-01
sample	CEF-OGC-SS-205-01	CEF-OGC-SS-206-01	CEF-OGC-SS-207-01	CEF-OGC-SS-208-01	CEF-OGC-SS-DU05	CEF-OGC-SS-209-01	CEF-OGC-SS-210-01	CEF-OGC-SS-211-01
sample_dat	03/08/00	03/08/00	03/07/00	03/08/00	03/08/00	03/07/00	03/07/00	03/08/00
depth	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']
sort	**c_049**	**c_050**	**c_051**	**c_052**	**c_053**	**c_054**	**c_055**	**c_056**
Pesticides/PCBs (ug/kg)								
4,4'-DDD								
4,4'-DDE								
4,4'-DDT								
ALPHA-CHLORDANE								
GAMMA-CHLORDANE								
HEPTACHLOR EPOXIDE								
Inorganics (mg/kg)								
ARSENIC	0.7 U	0.66 U	0.36 U	0.49 U	0.99 U	5.2	0.37 U	0.37 U

Old Golf Course
Summary of Positive Detections - Soil Data

order	057	058	059	060	061	062	063	064
location	CEF-OGC-SS-212	CEF-OGC-SS-213	CEF-OGC-SS-214	CEF-OGC-SS-215	CEF-OGC-SS-216	CEF-OGC-SS-217	CEF-OGC-SS-218	CEF-OGC-SS-219
nsample	CEF-OGC-SS-212-01	CEF-OGC-SS-213-01	CEF-OGC-SS-214-01	CEF-OGC-SS-215-01	CEF-OGC-SS-216-01	CEF-OGC-SS-217-01	CEF-OGC-SS-218-01	CEF-OGC-SS-219-01
sample	CEF-OGC-SS-212-01	CEF-OGC-SS-213-01	CEF-OGC-SS-214-01	CEF-OGC-SS-215-01	CEF-OGC-SS-216-01	CEF-OGC-SS-217-01	CEF-OGC-SS-218-01	CEF-OGC-SS-219-01
sample_dat	03/08/00	03/08/00	03/07/00	03/07/00	03/07/00	03/07/00	03/08/00	03/08/00
depth	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']
sort	**c_057**	**c_058**	**c_059**	**c_060**	**c_061**	**c_062**	**c_063**	**c_064**
Pesticides/PCBs (ug/kg)								
4,4'-DDD								
4,4'-DDE								
4,4'-DDT								
ALPHA-CHLORDANE								
GAMMA-CHLORDANE								
HEPTACHLOR EPOXIDE								
Inorganics (mg/kg)								
ARSENIC	0.36 U	0.49 U	0.69 U	1.6 U	23.3	2.3 U	0.36 U	0.44 U

Old Golf Course
Summary of Positive Detections - Soil Data

order	065	066	067	068	069	070	071	072
location	CEF-OGC-SS-220	CEF-OGC-SS-221	CEF-OGC-SS-222	CEF-OGC-SS-120	CEF-OGC-SS-123	CEF-OGC-SS-127	CEF-OGC-SS-301	CEF-OGC-SS-302
nsample	CEF-OGC-SS-220-01	CEF-OGC-SS-221-01	CEF-OGC-SS-222-01	CEF-OGC-SS-224-02	CEF-OGC-SS-225-02	CEF-OGC-SS-226-02	CEF-OGC-SS-301-01	CEF-OGC-SS-302-01
sample	CEF-OGC-SS-220-01	CEF-OGC-SS-221-01	CEF-OGC-SS-222-01	CEF-OGC-SS-224-02	CEF-OGC-SS-225-02	CEF-OGC-SS-226-02	CEF-OGC-SS-301-01	CEF-OGC-SS-302-01
sample_dat	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00	03/08/00	05/10/00	05/10/00
depth	[0.00 - 1.00']	[0.00 - 1.00']	[0.00 - 1.00']	[1.00 - 2.00']	[1.00 - 2.00']	[1.00 - 2.00']	NA	NA
sort	**c_065**	**c_066**	**c_067**	**c_068**	**c_069**	**c_070**	**c_071**	**c_072**
Pesticides/PCBs (ug/kg)								
4,4'-DDD								
4,4'-DDE								
4,4'-DDT								
ALPHA-CHLORDANE								
GAMMA-CHLORDANE								
HEPTACHLOR EPOXIDE								
Inorganics (mg/kg)								
ARSENIC	3.7 U	1.8 U	4.3	0.55 U	0.42 U	0.52 U	0.37 U	0.36 U

Old Golf Course
Summary of Positive Detections - Soil Data

order	073	074	075	076	077	078
location	CEF-OGC-SS-303	CEF-OGC-SS-303	CEF-OGC-SS-118	CEF-OGC-SS-216	CEF-OGC-SS-216	CEF-OGC-SS-005
nsample	CEF-OGC-SS-303-01	CEF-OGC-SS-303-01-D	CEF-OGC-SS-304-02	CEF-OGC-SS-305-02	CEF-OGC-SS-306-03	CEF-OGC-SU-223-03
sample	CEF-OGC-SS-303-01	CEF-OGC-SS-DU07	CEF-OGC-SS-304-02	CEF-OGC-SS-305-02	CEF-OGC-SS-306-03	CEF-OGC-SU-223-03
sample_dat	05/10/00	05/10/00	05/10/00	05/10/00	05/10/00	03/08/00
depth	NA	NA	NA	NA	NA	[2.00 - 3.00']
sort	**c_073**	**c_074**	**c_075**	**c_076**	**c_077**	**c_078**
Pesticides/PCBs (ug/kg)						
4,4'-DDD						
4,4'-DDE						
4,4'-DDT						
ALPHA-CHLORDANE						
GAMMA-CHLORDANE						
HEPTACHLOR EPOXIDE						
Inorganics (mg/kg)						
ARSENIC	0.35 U	0.36 U	1.9 U	5.8	1 U	0.35 U

APPENDIX B

REMEDIAL DESIGN

REMOVAL ACTION DESIGN PACKAGE
for
Old Golf Course

SITE BACKGROUND

Arsenic was detected at concentrations in excess of the site-specific inorganic background data set (IBDS) concentration (HLA, 1998). The Base Realignment and Closure (BRAC) Cleanup Team (BCT) reviewed analytical results, and a decision was made to delineate the extent of contaminated soil. A statistical evaluation was conducted to determine the areas requiring removal to achieve a site-wide UCL that was below the IBDS. Additional site background information may be obtained through reference to the Action Memorandum (TtNUS, 2000).

Arsenic contamination was limited to five locations. To determine how much excavation would be performed for arsenic, a statistical-based approach was used. It was determined that not all samples with arsenic concentrations greater than the IBDS value of 2.04 mg/kg would need to be removed. The exceedance of a criterion by an individual sample does not necessarily indicate a significant exceedance of a risk level. Exposure to the arsenic in the soil is a result of exposure to an area, not an individual sampling location. Therefore, the entire data set was used to determine a post-excavation exposure concentration that would be less than the IBDS value.

The exposure concentration is represented best by the 95% upper confidence level (UCL) of the mean. Using an iterative statistical process, the concentration above which soil must be removed to achieve a UCL less than or equal to the IBDS value (pickup-level) is determined. In theory, the sampling locations with the highest arsenic concentrations would be excavated and replaced with clean fill. The excavated sample points were assumed to be replaced with clean fill having an arsenic concentration of one half the detection limit. The data set was evaluated in a stepwise manner by replacing the highest concentration with the clean fill concentration, then recalculating the UCL. When the UCL was less than the IBDS value, the calculations were stopped. If samples with concentrations greater than 3 times the IBDS value are still present, these samples are also removed. This iterative process indicated that soil with arsenic concentrations greater than 5.6 mg/kg in Area 4 and 3.8 mg/kg in Area 5 would require removal to achieve a UCL less than 2.04 mg/kg. No remediation would be required in Areas 1, 2 and 3 because the UCLs are currently less than 2.04 mg/kg. The areas to be excavated are shown in Figure E-1. The statistical evaluation is presented in Table 1.

GUIDANCE NOTES

This information is provided for general guidance purposes only. The approximate area of excavations is shown on Figure E-1. The actual extent of excavation will be defined by Tetra Tech NUS, Inc. (TtNUS) with white spray-down paint (or equivalent) prior to the execution of the removal action. Analytical results identifying the areas that required removal and the vertical extent sample results are provided in tag map E-1.

The Remedial Action Contractor (RAC) shall be responsible for the following:

- The schedule and methods of excavation.
- All aspects of work-site health and safety.
- Identification and avoidance of all aboveground and underground utilities or other manmade structures.
- Waste characterization, transport (both on and off site), and disposal of all excavated soil.
- Notification of TtNUS and the Navy if observations indicate contaminants may extend beyond the planned lateral or vertical limits of the excavation.
- Except where necessary for avoidance of structures or utilities, or where otherwise specified by TtNUS, the depth of the excavation should extend 1 to 2 feet below ground surface, as shown on Figure E-1.
- Excavated soil shall be stockpiled on, and covered with, heavy-duty polyethylene sheeting at the site. This shall be done in a manner to avoid the potential for contaminating surrounding soil or surface water. Alternatively, soils may be stockpiled in properly covered roll-off containers.
- Stockpiling and combining of materials from different sites is permitted with prior approval of the BCT, if similar types and concentrations of contaminants are involved and were generated by similar processes.
- Materials used to backfill the excavations shall be from an uncontaminated source and be capable of supporting the same type of vegetation as the soil removed. The ground surface shall be restored to a similar or better condition than existed prior to excavation.

TABLE 1

ATTAINMENT OF ARSENIC SCTL - OLD GOLF COURSE
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

AREA 1	
Sample	PRE
N	6
Mean	1.0
St Dev	1.2
t	0.254734637
UCL	1.1
SS-119	1.4
SS-120	3.3
SS-201	0.3
SS-202	0.44
SS-203	0.35
SS-224-02	0.28

No remediation required for this area.

AREA 2	
Sample	PRE
N	6
Mean	1.0
St Dev	0.8
t	0.620842326
UCL	2.0
SS-004	4.6
SS-103	2
SS-102	1.5
SS-104	0.93
SS-003	0.28
SS-101-02	0.19

No remediation required for this area.

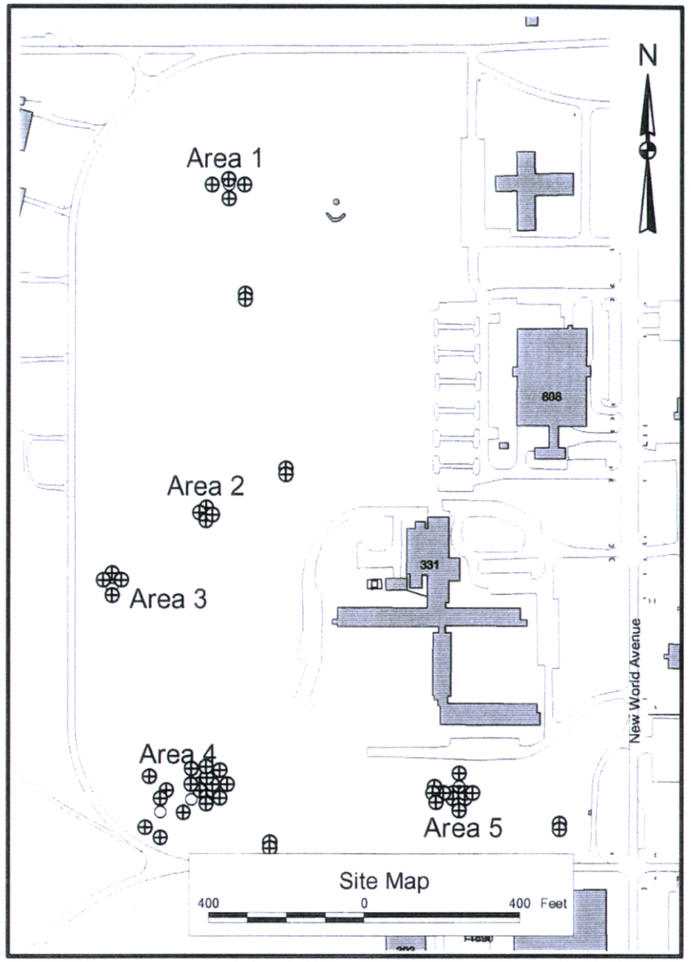
AREA 3	
Sample	PRE
N	6
Mean	0.8
St Dev	0.9
t	-0.0013237
UCL	0.8
SS-123	2.5
SS-124	0.86
SS-204	0.32
SS-205	0.35
SS-206	0.33
SS-225-02	0.21

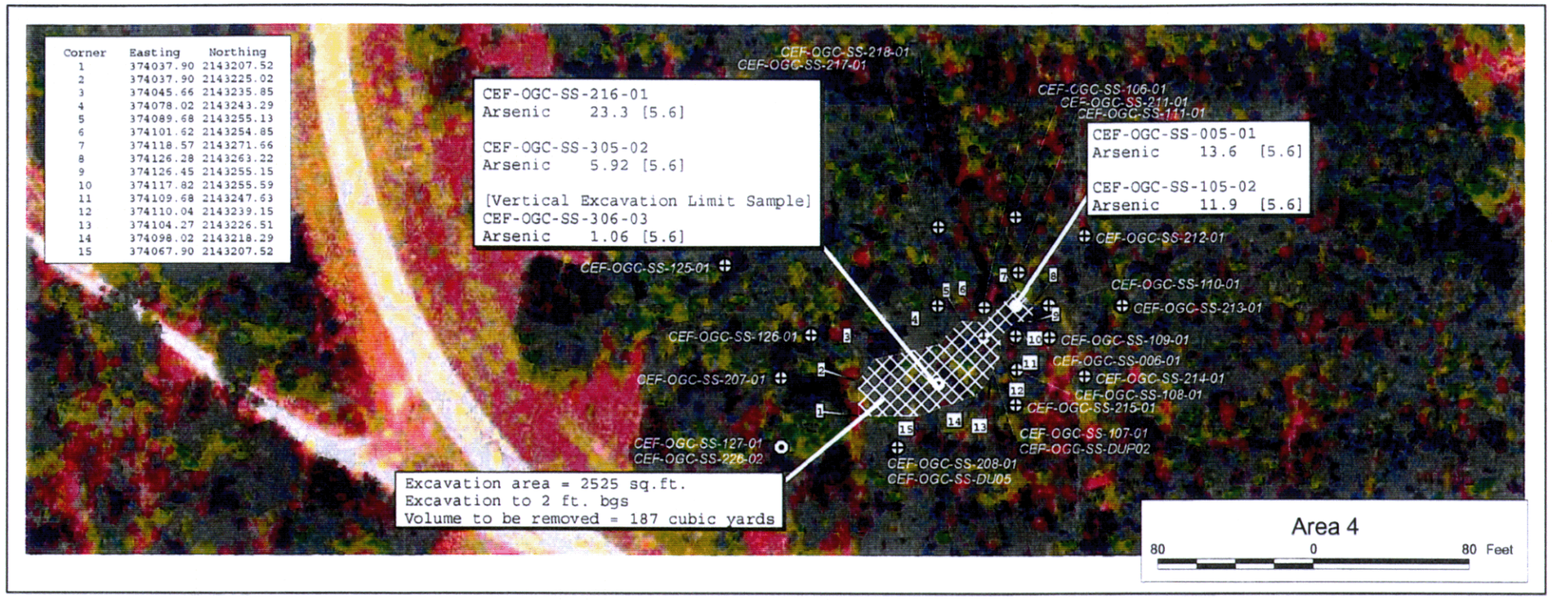
No remediation required for this area.

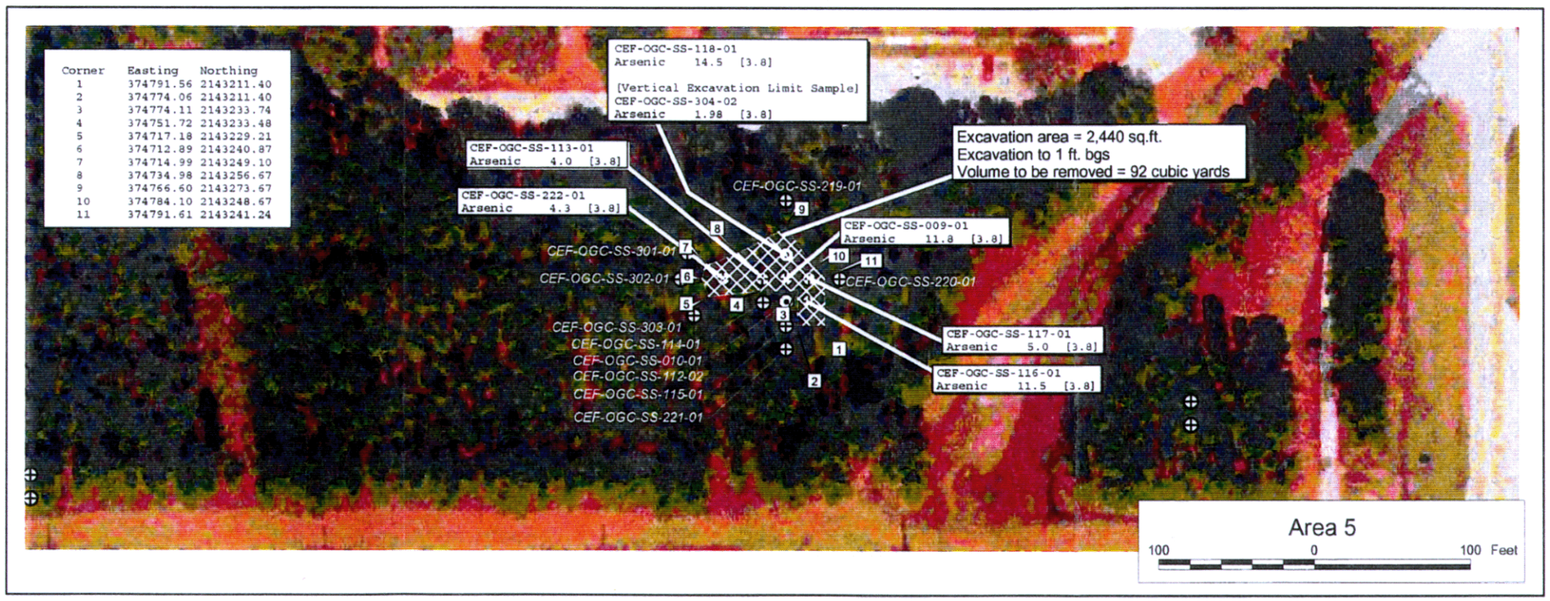
AREA 4		
Sample	PRE	POST (Res)
N	25	25
Mean	4.1	0.7
St Dev	6.1	0.7
t	0.6574807	0.47603892
UCL	4.9	1.5
Goal	2.04	2.04
Remediation Level	0.5	0.5
SS-216	23.3	0.5
SS-107	20.3	0.5
SS-005	13.6	0.5
SS-105-02	11.9	0.5
SS-106	5.6	5.6
SS-209	5.2	5.2
SS-109	4.2	4.2
SS-127	4.1	4.1
SS-217	2.3	2.3
SS-108	2.2	2.2
SS-111	2.2	2.2
SS-006	1.6	1.6
SS-215	1.6	1.6
SS-218	1.1	1.1
SS-214	0.35	0.35
SS-226-02	0.26	0.26
SS-208	0.25	0.25
SS-213	0.25	0.25
SS-110	0.2	0.2
SS-125	0.19	0.19
SS-210	0.19	0.19
SS-211	0.19	0.19
SS-126	0.18	0.18
SS-207	0.18	0.18
SS-212	0.18	0.18

AREA 5		
Sample	PRE	POST (Res)
N	13	13
Mean	5.3	1.6
St Dev	4.5	1.5
t	1.204985	0.675155754
UCL	6.8	1.9
Goal	2.04	2.04
Remediation Level	0.5	0.5
SS-118	14.5	0.5
SS-009	11.8	0.5
SS-116	11.5	0.5
SS-117	5	0.5
SS-222	4.3	0.5
SS-113	4	0.5
SS-115	3.8	3.8
SS-220	3.7	3.7
SS-010	3.5	3.5
SS-114	3.4	3.4
SS-221	1.8	1.8
SS-112-02	1.1	1.1
SS-219	0.22	0.22

Arsenic SCTL is the IBDS value of 2.04 mg/kg.
Bold Samples are those to be remediated.
Concentrations are mg/kg.







Legend
- Surface Soil Sample
- Surface and Subsurface Soil Sample
- Subsurface Soil Sample
- Buildings
- Excavation Area

CEF-P46-SS-001 — Sample ID
Fraction (ug/kg)
PARAMETER 500 [100.00] — Soil Pickup Level
— Detection Concentration
— Parameter

Notes:
1. Warning: Obtain utility clearance before excavation.
2. Extent of excavation to be marked by Tetra Tech NUS, Inc.
3. Removal will be conducted to either 1' or 2' below ground surface as noted on label.
4. Contaminant of concern is Arsenic.
5. Waste characterization, transport, and disposal of excavated soil are the responsibility of the remedial action contractor.
6. Return site to pre-excavation conditions.
7. [3.8] and [5.6] Arsenic pickup values based on specific area statistical evaluation to achieve UCL below the hi-cut SCTL.
8. These areas are currently heavily wooded.

DRAWN BY MJJ	DATE 29Feb00	REMOVAL ACTION DESIGN PLAN SOIL EXCAVATION OLD GOLF COURSE NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0039
CHECKED BY	DATE		APPROVED BY / DATE
COST/SCHED-AREA			APPROVED BY / DATE
SCALE AS NOTED			DRAWING NO. FIGURE E-1 / REV. 0

04063R02Y