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TECHNICAL MEMORANDUM ON SURFACE SOILS REMEDIATION AT OPERABLE UNIT 3 (OU 3) SITE 7 NAS CECIL FIELD FL

12/1/1998

TETRA TECH NUS INC

Technical Memorandum
Surface Soil Remediation
for
Operable Unit 3, Site 7

Naval Air Station Cecil Field
Jacksonville, Florida

Southern Division
Naval Facilities Engineering Command
Contract Number N62467-94-D-0888

Contract Task Order 0066

December 1998

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, Tetra Tech NUS, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-94-D-0888 are complete and accurate and comply with all requirements of this contract.

DATE: _____December 14, 1998_____

NAME AND TITLE OF CERTIFYING OFFICAL: Mark Speranza, P.E.
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICAL: Debbie Wroblewski
Program Manager

1.0 INTRODUCTION

This Technical Memorandum for surface soil remediation at Naval Air Station (NAS) Cecil Field, Operable Unit (OU) 3, Site 7 has been prepared for the Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) under the Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Contract Number N62467-94-D-0888, Contract Task Order (CTO) 0066. The Base Realignment and Closure Team (BCT) has elected to remediate soil at OU3, Site 7 that is contaminated with polynuclear aromatic hydrocarbons (PAHs), total recoverable petroleum hydrocarbons (TRPHs) and selected metals (antimony, arsenic, iron, lead and thallium). The purpose of this Technical Memorandum is to provide the rationale for the selection of the clean-up criterion used to delineate the extent of excavation for contaminated soil at OU3, Site 7.

This Technical Memorandum is divided into four sections. Section 1.0 provides this brief introduction. Section 2.0 summarizes site background information, the Remedial Investigation (RI), and the Remedial Action Objective. Section 3.0 describes the selected remedial action, including delineation of the excavation limits, excavation and offsite transportation and disposal, and confirmatory sampling. Section 4.0 presents the rationale for the selection of the clean-up criterion used to delineate the extent of excavation.

2.0 SITE BACKGROUND

2.1 LOCATION, DESCRIPTION, AND HISTORY

OU3, Site 7, also known as the Former Firefighting Training Area, is located near the northwest end of the old 310 flightline, approximately 800 feet east of Lake Fretwell and 1,200 feet northwest of the east and west flightline on the main Base of NAS Cecil Field. Training activities ceased in 1975, and OU3, Site 7 is currently used as an ordnance and general storage area. The primary sources of contamination at OU3 Site 7 were the liquid wastes (e.g., waste solvents, paints, paint thinners, and fuel) used to ignite aircraft frames during firefighting training activities.

2.2 INVESTIGATION HISTORY

In the fall in 1994, one hundred and eighteen surface soil screening samples (CEF-7-SS-01 through CEF-7-SS-118) were collected from 0 to 1 foot below ground surface (bgs) as part of the RI (ABB-ES, August 1997). On-site laboratory analyses performed on these samples included PAHs, TRPH, and lead. The nature and extent of the contamination detected in the screening program was confirmed by collecting 52 confirmatory surface soil samples (CF7SS1 through CF7SS52) between 0 to 1 foot bgs. Samples CF7SS1 through CF7SS20 were collected in January 1995, samples CF7SS21 through CF7SS26 were collected in May 1996, and samples CF7SS27 through CF7SS52 were collected in March 1997 (ABB-ES, August 1997).

Tetra Tech NUS, Inc. (TtNUS) collected an additional 62 soil samples (CEF-07-SS-119 to CEF-07-SS-180) in September 1998 from 0 to 1 foot bgs to further delineate the extent of contamination at OU3, Site 7. Based on these analytical results, eleven additional samples (CEF-07-SS-181 to CEF-07-SS-191) were collected in October 1998. The locations of the surface soil samples from the RI and TtNUS sampling events are shown on Figure 2-1.

The analytical results were compared to the Florida Brownfields Cleanup Criteria Rules (FAC 62-785) for residential uses. The inorganic contaminants were also compared to the NAS Cecil Field background data set. The maximum background concentration was applied if a Brownfield criterion was less than the maximum background concentration. The residential criteria used to determine the limits of excavation are shown on Table 2-1. The concentrations of TRPHs and PAHs [predominately benzo(a)pyrene] control the extent of the excavation. The metals concentrations exceedances are removed coincidentally in satisfying the PAH and TRPH cleanup criteria.

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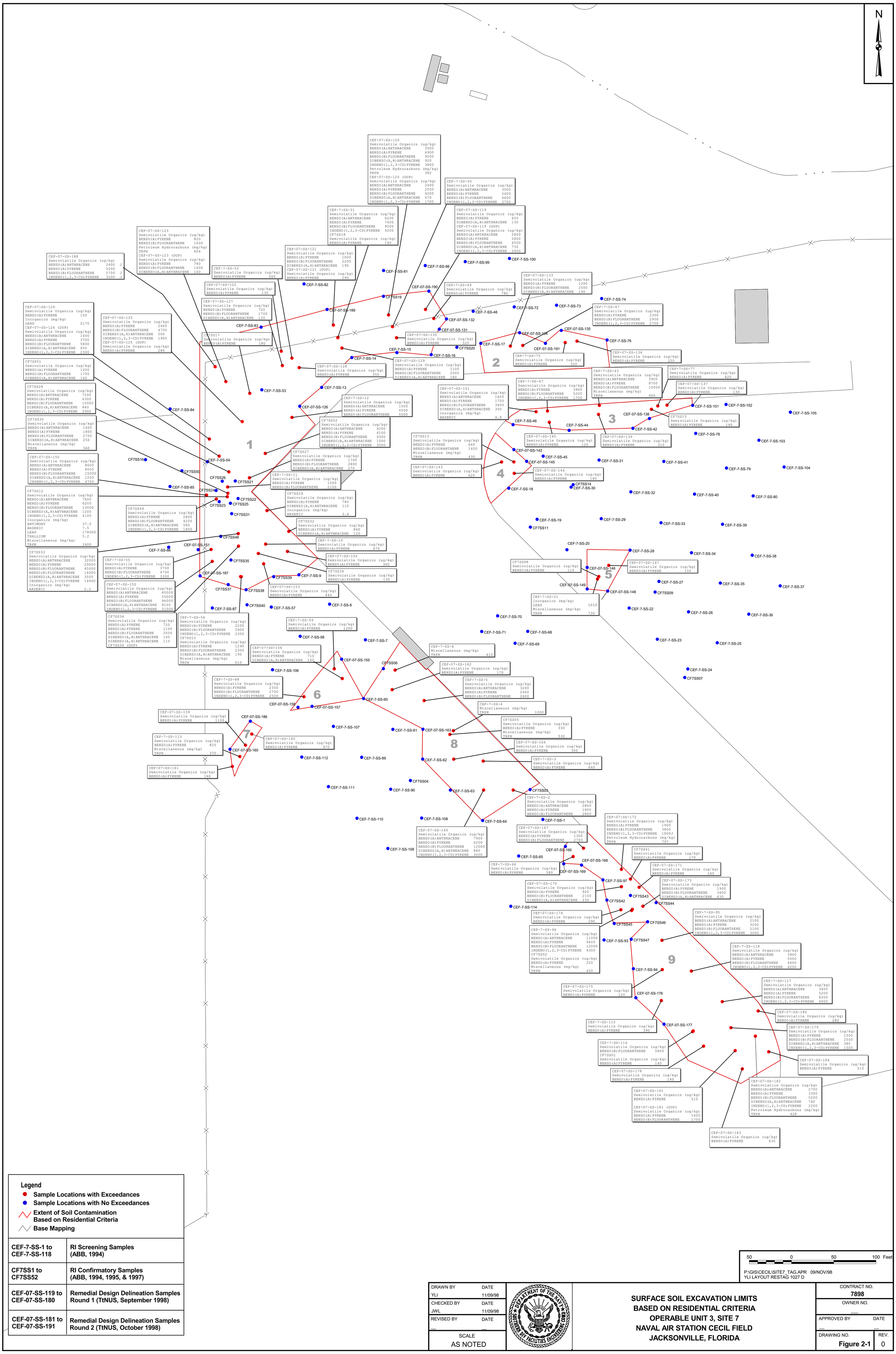

Legend

- Sample Locations with Exceedances
- Sample Locations with No Exceedances
- Extent of Soil Contamination Based on Residential Criteria
- Base Mapping

CEF-7-SS-1 to CEF-7-SS-118	RI Screening Samples (ABB, 1994)
CF7SS1 to CF7SS52	RI Confirmatory Samples (ABB, 1994, 1995, & 1997)
CEF-07-SS-119 to CEF-07-SS-180	Remedial Design Delineation Samples Round 1 (TtNUS, September 1998)
CEF-07-SS-181 to CEF-07-SS-191	Remedial Design Delineation Samples Round 2 (TtNUS, October 1998)

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DEPARTMENT OF THE NAVY ★ SOUTHERN DIV FACILITIES ENGINEERING COMD

SURFACE SOIL EXCAVATION LIMITS BASED ON RESIDENTIAL CRITERIA
OPERABLE UNIT 3, SITE 7
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO.	7898
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TABLE 2-1

RESIDENTIAL REMEDIAL GOALS FOR CHEMICALS OF CONCERN
OPERABLE UNIT 3, SITE 7
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Chemical of Concern	FDEP Brownfield Criteria, mg/kg[1]
Antimony	26
Arsenic	2.04 [2]
Benzo(a)anthracene	1.4
Benzo(a)pyrene	0.1
Benzo(b)fluoranthene	1.4
Benzo(k)fluoranthene	15
Dibenzo(a,h)anthracene	0.1
Indeno(1,2,3-cd)pyrene	1.5
Iron	23,000
Lead	500
Thallium	2.84 [2]
Total recoverable petroleum hydrocarbons (TRPH)	350

1 Brownfields Cleanup Residential Soil Criteria, F.A.C. 62-785, except as noted.
2 Maximum value from the NAS Cecil Field Inorganic Background Data Set.

2.3 REMEDIAL ACTION OBJECTIVE

The remedial action at OU3, Site 7 will consist of the removal of soils contaminated with PAHs, TRPH, antimony, arsenic and lead at concentrations which exceed the Florida Brownfields Cleanup Criteria Rules (FAC 62-785) for residential uses. Thallium was detected at concentrations greater than the NAS Cecil Field Inorganic Background concentration. Although originally identified as a chemical of concern in the RI, iron was not detected in concentrations that exceeded cleanup criteria. Remediation will consist of excavation of contaminated surface soil to a depth of one foot below ground surface. The residential-based cleanup goals were chosen to eliminate requirements for providing institutional controls for site soil after site closure. In summary, the Remedial Action Objective (RAO) for contaminated soil at Site 7 is as follows:

- Reduce human health risk associated with exposure to surface soil containing PAH, TRPH, antimony, arsenic, lead and thallium concentrations which exceed the residential cleanup criteria (Table 2-1).

Using screening, confirmatory, and delineation analytical data from the RI and subsequent field efforts, excavation limits were established which encompass surface soil that exceeds this RAO. On that basis, and assuming a depth of excavation of one foot below ground surface (bgs), the total volume of excavated soil is estimated at 3,901 cubic yards (yd^3).

3.0 REMEDIAL ACTION DESCRIPTION

3.1 OVERVIEW

The remedial action for soil to be conducted at OU3, Site 7 includes the following elements:

- Identification of the remedial action limit using marked sample locations and field survey, as required.
- Sampling and analysis of soil for disposal characterization.
- Excavation of approximately 3,901 yd^3 of contaminated soil that exceeds the State of Florida Brownfields Cleanup Criteria for residential use.
- Collection and analysis of confirmation samples to verify that contaminated soil has been removed.
- Offsite transportation and disposal of excavated soil.
- Backfilling of excavation with clean fill.
- Grading of excavated areas and site restoration with topsoil, seed, and mulch.

Estimated volumes of excavated soil are summarized below on an area by area basis:

Area	Volume (yd^3)
1	1,681
2	222
3	196
4	93
5	74
6	93
7	30
8	593
9	919
TOTAL	**3,901**

The soil does not contain listed hazardous wastes and thus is not anticipated to require disposal at a hazardous waste facility. Additional characterization of the soil for waste disposal classification may need to be performed.

3.2 SEQUENCE OF OPERATIONS

The remedial action will be conducted in the following sequence:

1. An offsite disposal facility permitted to accept the excavated soil will be identified. The waste profiling and acceptance testing requirements of this facility will be determined and, as required, soil characterization sample(s) will be collected and analyzed, if needed.

2. Underground utilities and other obstacles located in and near areas to be excavated will be identified.

3. Excavation limits and confirmatory sample locations will be established using existing flagging and field survey, as required. Anticipated excavation limits are shown on Figure 3-1, and survey data for the points defining these limits are listed on Table 3-1.

4. Erosion and sediment controls, such as silt fence, will be constructed in areas downgradient of excavation areas prior to any earth disturbance activities.

5. The areas to be excavated will be cleared and grubbed as necessary. The portions of the existing fence that interfere with excavation activities will be removed.

6. Soil will be excavated within the pre-determined boundaries. Soil will be excavated to a depth of one foot bgs. Additional excavation will be performed if field observations (such as visible staining or elevated PID/FID measurements) indicate residual contamination.

7. Excavated soil will be handled as follows:

   7.1 If the disposal facility accepts pre-excavation analytical test results, excavated soil will be directly loaded into trucks and transported for off-site disposal.

   7.2 If the disposal facility requires analytical test results from post-excavation composite sample(s), the excavated soil will be stockpiled, sampled, and analyzed as required. After the approved results has been received from the disposal facility, the stockpiled soil will be loaded into trucks and transported to the disposal facility. Stockpiled soil will be stored on, and covered with, plastic sheeting.

8. Confirmation sampling will be performed. Confirmation sampling locations are shown on Figure 3-1. Location, depth, survey data, and analytical parameters for confirmation samples are summarized on Table 3-2. If analytical results for any of the confirmation samples exceed the values shown on Table 2-1, additional soil will be excavated in the area represented by the "failed" sample. Additional

excavation at the base of the excavation, if required, shall consist of excavating an additional 1 foot of depth as directed by the Resident Officer in Charge of Construction (ROICC).

9. Any surface water or ground water entering the excavation will not be removed.

10. After receipt of confirmatory sample test results which do not exceed the criteria, the excavated areas will be backfilled with clean fill and compacted in 8-inch lifts (maximum) to within 6 inches of grade. A 6-inch layer of topsoil will be placed on top of the backfilled areas. The disturbed areas will be graded to match existing contour elevations, and irregularities in finished surfaces will be corrected to eliminate depressions.

11. All disturbed areas will be stabilized by seeding. Seed type shall match existing vegetation. Seeding will be provided at rate of five pounds per 1,000 square feet. The disturbed and seeded areas will be mulched and watered to establish an acceptable stand of grass. A uniform erosion resistant perennial vegetative cover of at least 70 percent will be achieved.

12. Temporary erosion and sediment control measures will be removed.

13. Existing fence will be replaced to pre-construction location.

TABLE 3-1

EXCAVATION LIMITS DATA
OPERABLE UNIT 3, SITE 7
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 1 OF 2

Area	Excavation Limit Point	Corresponding Delineation Sample ID	Northing	Easting
1	1	NA	2141706.97	373228.26
1	2	CEF-7-SS-83	2141723.76	373300.43
1	3	CEF-07-SS-189	2141744.71	373378.56
1	4	CF7SS19	2141760.30	373445.33
1	5	CEF-07-SS-190	2141766.31	373499.06
1	6	CEF-07-SS-132	2141733.40	373519.85
1	7	CEF-07-SS-131	2141721.35	373511.47
1	8	CEF-7-SS-16	2141691.15	373501.85
1	9	CEF-7-SS-15	2141693.63	373461.24
1	10	CEF-7-SS-14	2141687.75	373407.90
1	11	CEF-7-SS-13	2141652.41	373372.19
1	12	CEF-07-SS-126	2141630.20	373346.19
1	13	NA	2141607.82	373365.12
1	14	NA	2141529.10	373289.77
1	15	NA	2141450.46	373367.50
1	16	CEF-7-SS-9	2141430.66	373345.24
1	17	CF7SS39	2141428.43	373315.37
1	18	CF7SS38	2141413.01	373282.71
1	19	CEF-07-SS-187	2141429.43	373228.24
2	20	CEF-7-SS-17	2141704.61	373560.53
2	21	CEF-07-SS-134	2141717.13	373606.46
2	22	CEF-07-SS-191	2141704.61	373637.03
2	23	CEF-07-SS-135	2141719.82	373655.83
2	24	CEF-7-SS-76	2141708.53	373710.08
2	25	NA	2141607.82	373712.98
2	26	NA	2141669.49	373564.87
3	27	NA	2141613.08	373590.21
3	28	NA	2141639.33	373810.40
3	29	CEF-7-SS-101	2141631.15	373811.37
3	30	CEF-07-SS-138	2141615.59	373760.20
3	31	CEF-7-SS-42	2141604.02	373740.59
3	32	CEF-7-SS-44	2141601.59	373665.09
3	33	CEF-7-SS-46	2141608.36	373598.69
4	34	NA	2141598.57	373577.73
4	35	NA	2141559.88	373620.59
4	36	NA	2141515.89	373572.80
5	37	NA	2141460.81	373686.33
5	38	CEF-7-SS-28	2141459.86	373737.30
5	39	CEF-07-SS-148	2141411.45	373710.78
5	40	CEF-07-SS-149	2141413.89	373686.47
6	41	NA	2141339.97	373390.38
6	42	CEF-7-SS-60	2141284.26	373421.79
6	43	NA	2141270.28	373335.73
7	44	NA	2141249.72	373300.63

TABLE 3-1

EXCAVATION LIMITS DATA
OPERABLE UNIT 3, SITE 7
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Area	Excavation Limit Point	Corresponding Delineation Sample ID	Northing	Easting
7	45	NA	2141257.24	373287.60
7	46	CEF-07-SS-160	2141224.24	373263.66
7	47	CEF-07-SS-161	2141203.92	373266.38
7	48	NA	2141192.13	373269.05
8	49	NA	2141351.00	373464.58
8	50	NA	2141318.32	373495.90
8	51	NA	2141320.26	373497.57
8	52	CEF-7-SS-64	2141139.92	373562.68
8	53	NA	2141184.69	373681.24
8	54	CEF-7-SS-63	2141175.93	373524.53
8	55	CEF-7-SS-62	2141212.61	373491.69
8	56	CEF-07-SS-163	2141247.91	373492.03
9	57	NA	2141131.81	373681.24
9	58	CEF-07-SS-166	2141109.27	373660.70
9	59	CEF-07-SS-169	2141088.74	373658.69
9	60	CEF-07-SS-168	2141087.22	373679.80
9	61	CEF-7-SS-97	2141069.68	373705.13
9	62	CF7SS42	2141045.76	373709.87
9	63	CF7SS45	2141018.09	373718.45
9	64	CF7SS46	2141020.11	373758.07
9	65	CF7SS47	2140999.42	373738.65
9	66	CEF-07-SS-176	2140930.20	373744.11
9	67	CEF-07-SS-177	2140898.95	373777.44
9	68	NA	2140855.45	373806.41
9	69	NA	2140828.76	373869.80
9	70	NA	2140855.75	373914.99

NOTE:

NA: Not Applicable

TABLE 3-2

PROPOSED CONFIRMATORY SAMPLE LOCATIONS
OPERABLE UNIT 3, SITE 7
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Sample	Area No.	Location	
		Northing	Easting
CEF-07-CS-001	1	2141744.89	373480.05
CEF-07-CS-002	1	2141713.60	373444.62
CEF-07-CS-003	1	2141732.49	373370.82
CEF-07-CS-004	1	2141670.50	373349.56
CEF-07-CS-005	1	2141714.19	373317.09
CEF-07-CS-006	1	2141696.48	373249.19
CEF-07-CS-007	1	2141659.28	373286.38
CEF-07-CS-008	1	2141603.19	373318.86
CEF-07-CS-009	1	2141601.42	373256.27
CEF-07-CS-010	1	2141531.15	373266.31
CEF-07-CS-011	1	2141492.19	373275.17
CEF-07-CS-012	1	2141449.08	373246.23
CEF-07-CS-013	1	2141454.99	373330.08
CEF-07-CS-014	2	2141689.98	373591.05
CEF-07-CS-015	2	2141697.66	373671.94
CEF-07-CS-016	3	2141617.95	373662.49
CEF-07-CS-017	3	2141626.80	373749.28
CEF-07-CS-018	4	2141555.36	373581.60
CEF-07-CS-019	5	2141443.77	373700.87
CEF-07-CS-020	6	2141300.29	373378.49
CEF-07-CS-021	7	2141230.62	373276.94
CEF-07-CS-022	8	2141316.83	373477.68
CEF-07-CS-023	8	2141276.09	373471.19
CEF-07-CS-024	8	2141256.01	373543.22
CEF-07-CS-025	8	2141200.51	373527.87
CEF-07-CS-026	8	2141195.79	373590.46
CEF-07-CS-027	9	2141097.78	373693.19
CEF-07-CS-028	9	2141048.18	373733.34
CEF-07-CS-029	9	2140997.40	373780.58
CEF-07-CS-030	9	2140961.39	373814.23
CEF-07-CS-031	9	2140934.82	373775.85
CEF-07-CS-032	9	2140919.46	373853.79
CEF-07-CS-033	9	2140890.53	373817.77
CEF-07-CS-034	9	2140875.18	373869.14

NOTES:

All samples are grab samples obtained from the bottom of the excavation.

All samples are analyzed for PAHs, TRPHs, antimony, arsenic, iron, lead, and thallium

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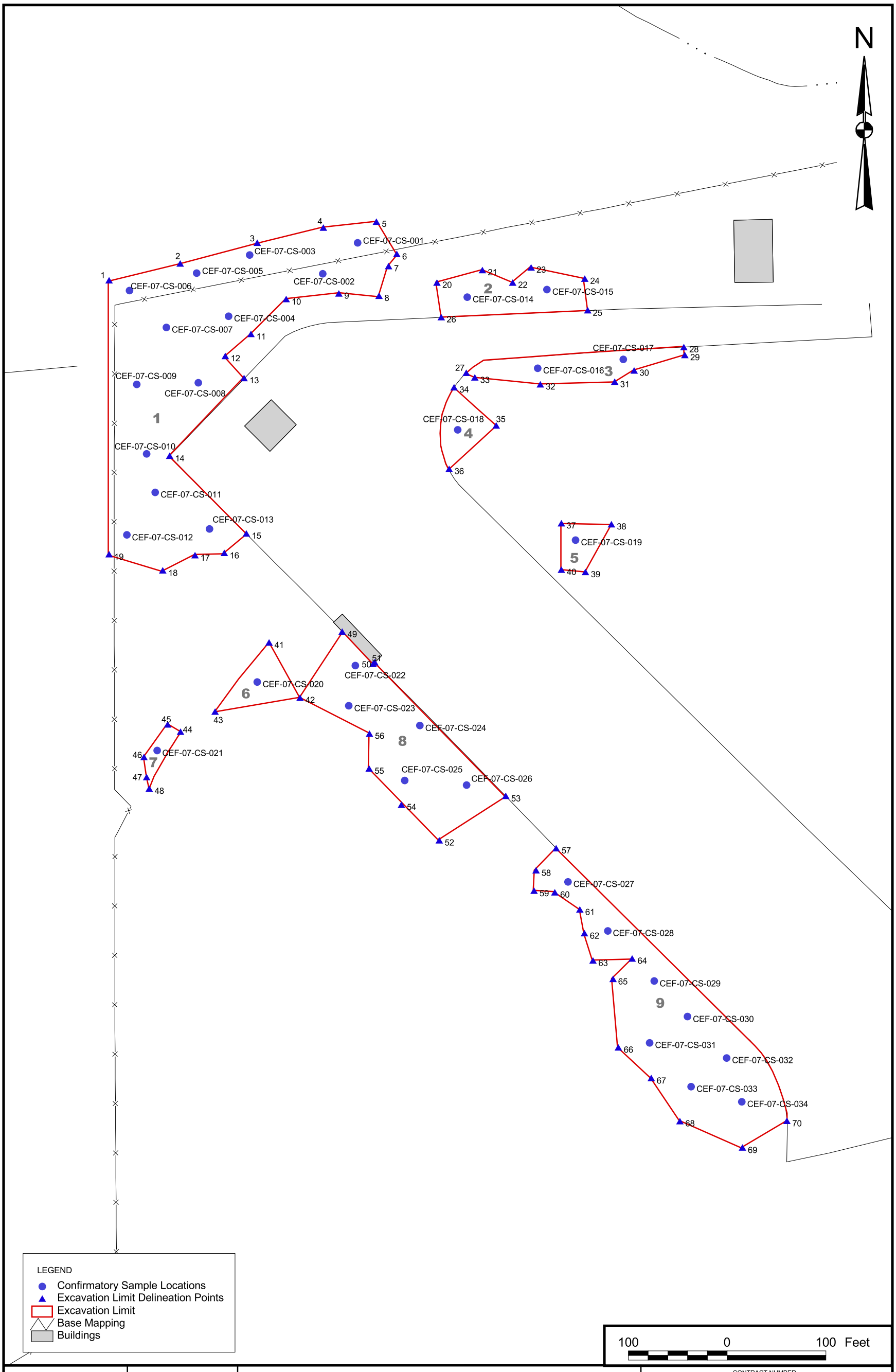

DRAWN BY YLI	DATE 11/09/98	SURFACE SOIL EXCAVATION CONFIRMATORY SAMPLE LOCATIONS OPERABLE UNIT 3, SITE 7 NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 7898
CHECKED BY JWL	DATE 11/09/98		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 REV 0

4.0 CLEANUP CRITERION SELECTION

The soil cleanup criterion was selected based on a comparison that was performed of the respective consequences of removing soil contaminated in excess of the industrial or residential exposure criteria, as defined in the State of Florida Brownfields Cleanup Criteria Rule as shown below:

Chemical of Concern	Residential Cleanup Criteria[1]	Industrial Cleanup Criteria[2]
Polynuclear Aromatic Hydrocarbons (PAHs) (µg/kg)		
Benzo(a)anthracene	1,400	5,200
Benzo(a)pyrene	100	500
Benzo(b)fluoranthene	1,400	5,100
Benzo(k)fluoranthene	15,000	52,000
Dibenzo(a,h)anthracene	100	500
Indeno(1,2,3-cd)pyrene	1,500	5,200
Inorganics (mg/kg)		
Antimony	26	240
Arsenic	2.04[3]	3.7
Iron	23,000	490,000
Lead	500	920
Thallium	2.84[3]	2.84[3]
Total Recoverable Petroleum Hydrocarbons (TRPHs) (mg/kg)		
TRPHs	350	2,500

1 FDEP Brownfields residential cleanup criteria, unless otherwise noted
2 FDEP Brownfields industrial cleanup criteria, unless otherwise noted
3 Maximum value from the NAS Cecil Field Inorganic Background Data Set

A summary of this comparison is presented on Table 4-1.

Removing soil contaminated in excess of the residential rather than industrial exposure criteria would significantly reduce the need for institutional controls and thus lessen the administrative burden of post removal action monitoring. Removing soil contaminated in excess of the residential exposure criteria would also maximize the flexibility of post-removal action site use and thus guarantee site transfer acceptance. However, the overall cost would be approximately 1.23 times higher.

On the basis of this rationale, the BCT agreed that the cleanup goal for the upcoming soil removal action will be the residential exposure criteria as defined by the State of Florida Brownfields Cleanup Criteria Rule and as shown in the above table.

TABLE 4-1

SUMMARY COMPARISON
SOIL REMOVAL TO RESIDENTIAL VS. INDUSTRIAL LEVELS
OPERABLE UNIT 3, SITE 7
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

REMOVAL TO RESIDENTIAL LEVEL	REMOVAL TO INDUSTRIAL LEVEL
Would require excavation and disposal of 3,901 yd^3 of soil at a cost of $568,000 (1)	Would require excavation and disposal of 3,024 yd^3 of soil at a cost of $462,000(1)
No institutional controls would be required for surface soil. Once cleanup goals have been reached for groundwater, institutional controls could be stopped altogether.	Institutional controls would be required for the foreseeable future for both surface soil and groundwater.
Estimated cost of institutional controls would be $39,200 (2)	Estimated cost of institutional controls would be $58,800 (2)
No "Dirty Transfer" would be required for soil.	"Dirty Transfer" would be required for both soil and groundwater.
There would be no limitation to use of property following transfer.	Following transfer, approximately 60% of the property would be limited to use as an airport, 20% could be used for manufacturing facilities, and 20% for recreational facilities.
Only minimal continued Navy presence would be required.	Significant continued Navy presence would be required to insure continued compliance with institutional controls.
City of Jacksonville would readily accept transfer.	City of Jacksonville might not readily accept transfer.

NOTES:

1 Cost of removal to residential level as per cost estimate presented in Appendix B of Draft Remedial Design for Soils, Operable Unit 3, Site 7 (TtNUS, November 1998). Cost of removal to industrial level based on same estimate, pro-rated for reduced volume.

2 Based upon $1,200/year for site inspection (16 hours @ $75/hour) plus $3,800 every 5 years for site review. Duration of Institutional Controls estimated at 20 years for removal to residential level and 30+ years for removal at industrial level. The institutional controls cost does not include sampling and analysis activities that may be required for post closure inspections.

REFERENCES

ABB Environmental Services, Inc., August 1997. Remedial Investigation, Operable Unit 3, Sites 7 and 8, Naval Air Station Cecil Field, Jacksonville, Florida prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

ABB Environmental Services, Inc., March 1998. Record of Decision, Site 7, Operable Unit 3, Naval Air Station Cecil Field, Jacksonville, Florida prepared for SOUTHNAVFACENGCOM, North Charleston, South Carolina.

TtNUS, November 1998. Remedial Design for Soils at Operable Unit 3, Site 7, Naval Air Station Cecil Field, Jacksonville, Florida.