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WORK PLAN FOR SUPPLEMENTAL SITE INVESTIGATION AT OCALA F-18 CRASH SITE

NAS CECIL FIELD FL

1/1/2005

TETRA TECH NUS INC

Work Plan
for
Supplemental Site Investigation at Ocala F-18 Crash Site

Naval Air Station Cecil Field
Jacksonville, Florida

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

Contract Task Order 0213

January 2005

WORK PLAN
FOR
SUPPLEMENTAL SITE INVESTIGATION AT
OCALA F-18 CRASH SITE

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
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North Charleston, South Carolina 29406

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CERTIFICATION OF TECHNICAL DATA CONFORMITY

The Contractor, Tetra Tech NUS, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under the Contract Number N62467-94-D-0888 are complete and accurate and comply with all requirements of this contract.

Date 01-05-05

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ACRONYMS

ABB-ES	ABB Environmental Services
BCT	Base Closure Team
BEI	Bechtel Environmental Services, Inc.
BWGWP	Base-Wide Generic Work Plan
COCs	Contaminants of Concern
CTO	Contract Task Order
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FL-PRO	Florida Petroleum Range Organics
FOL	Field Operations Leader
ft	Foot/Feet
IDW	Investigative Derived Waste
MOPAO	Monitoring Only Plan Approval Order
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAS	Naval Air Station
NAVFAC EFD SOUTH	Southern Division, Naval Facilities Engineering Command
Navy	United States Navy
PAH	Polynuclear Aromatic Hydrocarbon
POP	Project Operations Plan
QA	Quality Assurance
QC	Quality Control
SOPs	Standard Operating Procedures
TOC	Top of Casing
TOM	Task Order Manager
TRPH	Total Recoverable Petroleum Hydrocarbons
TtNUS	Tetra Tech NUS, Inc.
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
VOHs	Volatile Organic Hydrocarbons

1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS) has prepared this work plan for the Ocala F-18 Crash Site as it applies to the Naval Air Station (NAS) Cecil Field, Jacksonville, Florida, in accordance with Statement of Work Number 231 and dated September 25, 2001. This work plan was prepared for the United States Navy (Navy) Southern Division, Naval Facilities Engineering Command (NAVFAC EFD SOUTH) under Contract Task Order (CTO) 0213, for the Comprehensive Long-term Environmental Action Navy III Contract Number N62467-94-D-0888.

This work plan will address the field activities associated with the installation of additional monitoring wells at the Ocala F-18 Crash Site.

1.1 OBJECTIVES

1.1.1 Ocala F-18 Crash Site

Groundwater monitoring at the Ocala F-18 Crash Site indicates groundwater contamination is likely confined to a single monitoring well on site (CEF-CS-1A). However, the concentrations of contaminants of concern (COCs) continue to exceed the groundwater cleanup target levels (GCTLs) specified in Chapter 62-770 of the Florida Administrative Code (F.A.C.). As a result, the FDEP has requested that additional monitoring wells be installed to better delineate the horizontal extent of the dissolved hydrocarbon plume. To accomplish this objective, three additional monitoring wells will be installed and groundwater samples collected from the three new monitoring wells and all existing monitoring wells. The data collected during the investigation will be used to prepare a brief letter report detailing the results of the well installation and laboratory analytical results. In addition, conclusions and recommendations will be presented to the Navy regarding the future courses of action for the site, which may include preparation of a Remedial Action Plan.

2.0 SITE HISTORY

The following six paragraphs were excerpted from the ABB Environmental Services, Inc. (ABB-ES) letter report for the site dated January 20, 1998:

> The Navy F-18 crashed in the Ocala National Forest on June 21, 1994. Navy personnel determined that approximately 1,285 gallons of JP-5 jet fuel was on board at the time of the crash.
>
> As part of an initial remedial action between September and November, 1994, 2,650 cubic yards of excessively contaminated soil were excavated from the crash site by Bechtel Environmental Services, Inc. (BEI). The contaminated soil was removed and disposed off-site at a Florida Department of Environmental Protection (FDEP)-approved thermal treatment facility.
>
> In February 1995, a site assessment was completed by BEI. Sixty soil borings were advanced, and three piezometers and one monitoring well were installed.
>
> In January 1996, an additional 576 tons of excessively contaminated soil were removed. During the course of the soil excavation, monitoring well CEF-CS-1 and the three piezometers were abandoned. Upon completion of the soil excavation activities, six monitoring wells (CEF-CS-1A through CEF-CS-6) were installed to evaluate groundwater quality and assess the groundwater flow direction. The location of these monitoring wells and the groundwater flow direction measured in March 1996 are shown on Figure 2. A summary of the contaminants detected in groundwater collected from three designated monitoring wells is presented in Table 1. In June 1996, a remedial action closure report was prepared by BEI and submitted to the FDEP.
>
> In May 1997, ABB-ES conducted site reconnaissance and conducted a water level elevation survey using the existing monitoring wells. The purpose of this event was to confirm the groundwater flow direction and determine if additional monitoring wells were necessary to evaluate and monitor groundwater quality. The May 1997 groundwater flow direction is shown on Figure 3. May 1997 measurements correlated to the March 1996 measurements which indicated a northeasterly flow. Based on groundwater flow direction, an additional monitoring well was required to assess downgradient groundwater quality.

> In September and November 1997, ABB-ES sampled various monitoring wells on site to establish groundwater quality conditions at the site. Their letter report concluded the site was eligible for Natural Attenuation Monitoring and the FDEP subsequently agreed in their Monitoring Only Plan Approval Order (MOPAO) dated April 3, 1998.

Figures 2 and 3 and Table 1 mentioned from the ABB-ES letter report (ABB-ES, 1998) above are included in Appendix A of this document. During the third year of monitoring in October 2002, TtNUS recommended preparation of a treatability study to use innovative technology to remediate the site since the COCs had not decreased in concentration (TtNUS, 2002). Monitoring continued in April 2003 (TtNUS, 2003), and the COCs appeared to be within milestones in the MOPAO; therefore, continued monitoring was recommended. However, the FDEP reviewed the Monitoring Only Plan Report and stated that five years had transpired without a decrease in COCs below groundwater cleanup target levels. Response from the FDEP required an additional well directly downgradient of the source well concurrent with sampling and reporting and recommendations. Since the groundwater flow direction has been fairly consistent to the northeast and there are no existing wells downgradient of the source well in that direction, TtNUS proposes in this work plan to complete the delineation of the groundwater plume on site.

3.0 SITE LOCATION AND SPECIFIC GEOLOGY

3.1 OCALA F-18 CRASH SITE

NAS Cecil Field is located in southwestern Duval County and partially in Clay County. The air base was operated by the Navy from approximately 1943 to 1999. The Ocala F-18 Crash Site is located in the Ocala National Forest approximately 120 miles south of NAS Cecil Field, Jacksonville, Florida and approximately 35 miles east of Ocala, Florida. Figure 1 in Appendix A provides a location map for the site.

According to BEI (BEI, 1994a), "in order to get to the "Crash Site" from Cecil Field, take 103rd Street to I-295S. Take I-295S to Roosevelt Ave. (Highway 17S). Exit to the right. Take 17S through Green Cove Springs, Florida, and proceed south on 17 to State Road 19 at Palatka, Florida. Take State Road 19 (right turn) approximately 50 miles to the main entrance of Detachment Astor, Pinecastle. At 7.4 miles south of the Pinecastle main entrance on State Road 19, turn right into Ocala National Forest Road 537 (Big Scrubb). Take 573 west for 10.5 miles. There is a four-way intersection 10.5 miles and a stop sign. Turn right onto Ocala National Forest Road 579 and go 0.6 of a mile. A path has been graded to the site on the left."

The crash site is generally overlain by coastal sediments. A surficial layer of fine to coarse-grained sand, approximately 12 feet (ft) in thickness, was observed at the crash site excavation. Below this sand layer, a very fine to medium coarse clayey silty sand was observed to be varying in thickness from approximately 0.2 to 4 ft thick. Below this clayey sand, a fine to coarse sand was encountered to the local aquifer. Minor amounts of gravel were observed throughout the sands encountered at the site (BEI, 1994b).

4.0 SCOPE OF WORK

The work in the following sections will be completed in accordance with the Base-Wide Generic Work Plan (BWGWP), Project Operations Plan (POP), Volume II (TtNUS, 1998) and the TtNUS Standard Operating Procedures (SOPs) contained in the POP.

TtNUS personnel in charge will maintain a logbook in accord with the BWGWP, POP, Volume II (TtNUS, 1998) and the TtNUS SOP SA-6.3. At the end of each day in the field, the Field Operations Leader (FOL) will complete a Daily Activities Record for any subcontractor activities (see Appendix B).

4.1 MONITORING WELL INSTALLATION

The drilling subcontractor, prior to initiation of drilling activities at the site, will obtain well installation permits. TtNUS will provide a copy of the special-use permit from the National Forest Service prior to initiation of activities. The drilling company will furnish the necessary 4-wheel drive drill rig, support crew, all necessary tools, personal protective equipment for the drill crew, and any miscellaneous equipment and materials required to complete the activities described in this work plan. All down-hole drilling equipment, sampling tools, and the rear of the drill rig will be steam cleaned prior to arrival onsite. All safety shut-off equipment must be in full working condition and will be tested by TtNUS prior to initiating drilling activities. Other equipment checked prior to mobilization onto the site includes back-up warning beeper, cables, clamps, winches, hydraulic leaks, electrical contacts, fire extinguisher, etc. All drilling equipment will be in good condition with no oil or other fluid leaks. Any rig that does not pass the initial safety and cleanliness inspection (see Appendix B) will not be allowed to enter the site.

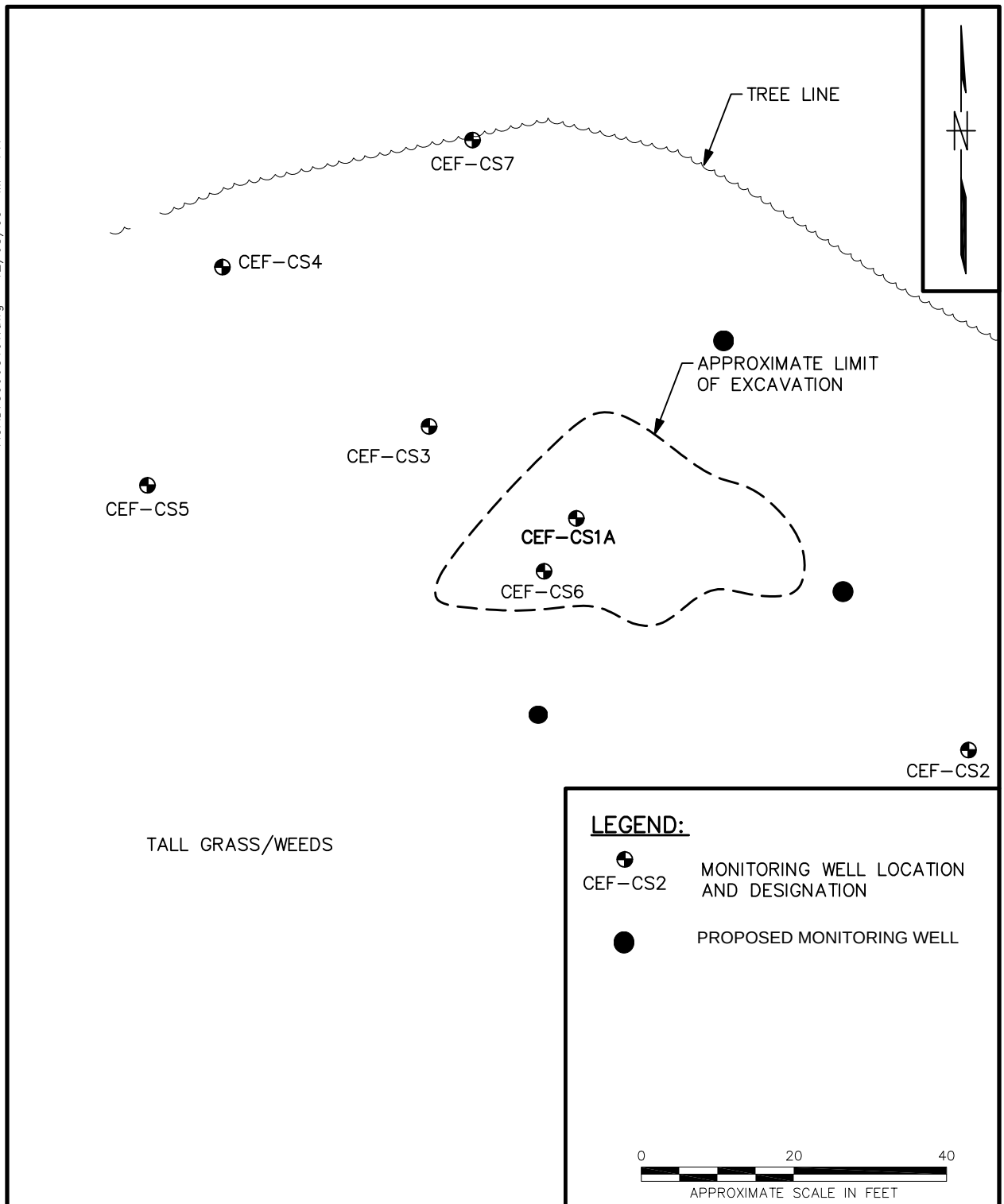
All drilling subcontractor personnel must attend the initial training/orientation/health and safety meeting held on the first day. All drilling subcontractor personnel will provide and use safety glasses, appropriate gloves, steel-toe work boots, hearing protection, and hard hats during TtNUS-designated activities. The drilling subcontractor will keep the work site and adjacent areas as free of material, debris, and rubbish as is practicable and shall remove from any portion of the site such materials, which in the opinion of TtNUS, may interfere with the work or constitute a nuisance to onsite personnel. All efforts will be made to minimize dispersal of cuttings and water produced during drilling operations. The subcontractor will be required to provide a power supply and an adequate water supply necessary for drilling and decontamination activities.

All activities will be conducted in an efficient and professional manner, with the minimum practical damage to the site environment. This site is in a national forest and TtNUS is required by a special use permit “to maintain the permit area to standards of repair, orderliness, neatness, and sanitation and

safety acceptable to the Forestry Supervisor." The boring locations are in semi-open, high grassy vegetative cover in an opening in the forest so that access limitations are minimal. However, the driller will be prepared with small powered equipment to do some brush clearing. Also, the ground is sandy soft in some areas, which may necessitate 4-wheel drive-type drill rig and support vehicles. To access the site, 3 concrete posts at the entrance to the site must be removed and replaced after the completion of the drilling activities. Each concrete post is 8" by 8" and is placed a minimum of 2 ft below ground surface, having a minimum of 3 ft above ground surface. The concrete post will be painted white once installation is complete. The drilling subcontractor will be responsible for the security of their equipment and materials throughout the duration of the project. The wells will be installed and constructed in general accordance with applicable guidelines from the following sources: Monitoring Well Design, Installation, Construction, and Development Guidelines (NAVFAC EFD SOUTH, 1997); Chapter 40C-3, Florida Administrative Code (FAC), Water Wells (Revised) (St. Johns River Water Management District, 1995); and the Environmental Investigations Standard Operating Procedures and Quality Assurance Manual [United States Environmental Protection Agency (USEPA), 1996]. In some cases, site conditions, geologic settings, or unknown factors, may require slight modifications in well installation and/or construction methods. Modifications from the aforementioned guidance documents will be evaluated and reviewed by the on-site senior field geologist. Any deviations or modifications deemed appropriate will be properly documented.

4.1.1 Monitoring Wells – General Details

Three permanent monitoring wells will be installed using hollow stem auger drilling techniques. These monitoring wells will be single-cased. Primary casing and screens of the monitoring wells will be constructed of 2-inch inside diameter, Schedule 40, flush-joint polyvinyl chloride riser and flush-joint 0.010-inch factory-slotted well screen. The monitoring well screen sections will be 15 ft in length. After the borings are drilled to the desired depth, wells will be installed through the augers. The wells will be finished with above-grade locking, weather-resistant protective covers. Figure 2-1 of the BWGWP, POP, Volume II, (TtNUS, 1998) illustrates a typical monitoring well construction. A boring log, monitoring well sheet, and certificate of conformance will be maintained for each well installation (see Appendix B). The proposed location for these three downgradient wells is shown by Figure 4-1.



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DRAWN BY MF DATE 12/8/03		PROPOSED MONITORING WELL LOCATIONS	CONTRACT NO. 4117
CHECKED BY DATE		OCALA F-18 CRASH SITE OCALA NATIONAL FOREST NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	APPROVED BY DATE
COST/SCHED-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 4-1 / REV. 0

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4.2 MONITORING WELL DEVELOPMENT

Monitoring well development will be conducted in general accordance with NAVFAC EFD SOUTH guidelines (NAVFAC EFD SOUTH, 1997). The monitoring wells will be developed no sooner than 24 hours after placement of grout to remove fine sediment from around the screened interval of the well. Wells will be developed by bailing and surging, or by pumping, as determined by the field geologist. Field parameters (pH, temperature, turbidity, and specific conductance) will be measured at equally spaced time intervals during well development. Wells will be developed a maximum of one hour or until the field measurements become stable and the development water is visibly clear. Water quality stabilization will be determined using the following criteria:

- Temperature, plus or minus 0.5 degrees Celsius
- pH, plus or minus 0.1 unit
- Specific conductivity, plus or minus 10 micro-siemens

These data will be recorded on a monitoring well development record (see Appendix B). No sooner than 24 hours after development, groundwater samples will be collected from monitoring wells in accordance with SOPs.

4.3 GROUNDWATER ASSESSMENT ACTIVITIES

4.3.1 Groundwater Levels and Surveying

Prior to obtaining samples, synoptic water levels and total well depths will be measured and recorded on site-specific groundwater level measurement sheets (see Appendix B). A second round of water levels will be collected approximately one month later on the same type data sheet. This task will be accomplished in accordance with the BWGWP, POP, Volume II (TtNUS, 1998) and TtNUS SOP GH-1.2.

A registered surveyor will survey the permanent monitoring wells installed during the site assessment. Horizontal positioning will be measured and plotted with respect to the Florida State Plane Coordinate System and the North American Datum of 1983. The top of casing (TOC) elevation of each permanent monitoring well will be surveyed with respect to the North American Vertical Datum of 1988 and referenced to site features (building corners, etc.). The TOC elevations will be used with the depth-to-water data previously mentioned to determine groundwater flow direction and gradient.

4.3.2 Laboratory Analyses

In accordance with the Navy's scope of work to re-baseline the site, the groundwater at the site will be analyzed for volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs). The specific associated methods and number of samples are shown on Table 4-1. The seven existing wells on site and the three new monitoring wells will be sampled for the listed items on Table 4-1.

4.3.3 General Sampling Protocols

General sampling protocols will be followed in accordance with the BWGWP, POP, Volume II (TtNUS, 1998) and TtNUS SOP SA-1.1. The data will be recorded on a groundwater sample log sheet and a low flow purge data sheet (see Appendix B).

4.3.4 Aquifer Testing

Aquifer testing will not be necessary to determine aquifer characteristics, since this site has been investigated extensively and reported in previous reports.

4.4 EQUIPMENT DECONTAMINATION

The equipment involved in well installation and well sampling activities will be decontaminated prior to and during the respective field activities in accordance with the BWGWP, POP, Volume II (TtNUS, 1998) and TtNUS SOP SA-7.1.

4.5 WASTE HANDLING

Drill cuttings from the well installations and water from the well development and purging and sampling will be collected and containerized in Department of Transportation-approved (17-E or 17-H) 55-gallon drums. Each drum will be sealed, labeled, and maintained on site, pending investigation derived waste (IDW) analytical results. The driller will be required to move the full drums of waste approximately 0.5 mile to the entrance of the crash site. For this investigation, a single, composite soil IDW sample will be collected to characterize the soil IDW for disposal. This sample will be collected to satisfy the requirements of Chapter 62 713, FAC. Table 4-1 lists and describes the sample requirements for the soil IDW sample. Groundwater analytical results from the mobile and fixed-base laboratories will be used for aqueous IDW disposal. The method of off-site disposal will be determined by these analytical results.

A lined decontamination pad will be constructed and used to collect the water from steam cleaning of drilling equipment. Decontamination materials generated during the site investigation will be containerized for proper disposal.

TABLE 4-1
ANALYTICAL SAMPLE SUMMARY
OCALA F-18 CRASH SITE

Work Plan
Navail Air Station Cecil Field
Jacksonville, Florida
Page 1 of 2

Analyte	Proposed Method (1)	Environmental Samples	IDW Samples (2)	Duplicate Samples	MS/MSD (3)	Equipment Blanks	Total Samples
Groundwater							
VOC (4)	SW846 USEPA 8260B	10	0	1	1	0	12
PAH (5)	SW846 USEPA 8310	10	0	1	1	0	12

See notes at end of table.

TABLE 4-1
ANALYTICAL SAMPLE SUMMARY
OCALA F-18 CRASH SITE

Work Plan
Naval Air Station Cecil Field
Jacksonville, Florida
Page 2 of 2

Analyte	Proposed Method (1)	Environmental Samples	IDW Samples (2)	Duplicate Samples	MS/MSD (3)	Equipment Blanks	Total Samples
Soil							
TRPH	FL-PRO	0	1	0	0	0	1
VOH	SW846 8021B	0	1	0	0	0	1
Metals (6)	SW846 6010B	0	1	0	0	0	1

Notes:
(1) Method referenced reflects FDEP requirements for petroleum contaminants of concern.
(2) IDW sample numbers based on disposal of approximately 20 55-gallon drums (one composite sample) of soil.
Groundwater analyticals will be used to determine the appropriate disposal method of the development and purge water.
In accordance with Chapter 62-713, FAC, a composite sample will be collected for volatile organic halocarbons (VOHs), TRPH, and metals.
(3) MS/MSD = Matrix Spike/Matrix Spike Duplicate (a laboratory quality assurance requirement).
(4) VOCs must include the various trimethyl benzenes.
(5) Includes 1-methylnaphthalene, 2-methylnaphthalene and the 16-method listed PAHs included in Table A of Chapter 62-770, FAC.
(6) Total arsenic, cadmium, chromium, and lead.
TRPH = total recoverable petroleum hydrocarbons
FL-PRO = Florida petroleum range organics

4.6 SAMPLING HANDLING

Sample handling includes the selection of sample containers, preservatives, allowable holding times, and analytical methods. In addition, sample identification, packaging, and shipping will be addressed. Sample handling procedures will be in accordance with the BWGWP, POP, Volume II (TtNUS, 1998) and the TtNUS SOP SA-6.1.

4.7 SAMPLE PACKAGING, SHIPPING, AND NOMENCLATURE

Samples will be packaged and shipped in accordance with the BWGWP, POP, Volume II (TtNUS, 1998) and the TtNUS SOP SA-6.1. The FOL will be responsible for completing the following forms when samples are collected for shipping:

- Sample labels
- Chain-of-Custody labels
- Appropriate labels applied to shipping coolers
- Chain-of Custody Forms
- Federal Express Air Bills

The site has previously been assigned a unique facility number as follows: Ocala Crash Site = CS. Each sample will be assigned a unique sample identification number. The unique label system established for this sampling event is as follows:

1	2	3	4
General Site Name	**Facility Number**	**Sample Identifier**	**Sequence Number**

Where:

1	General Site Name	CEF
2	Facility Number	CS
3	Sample Identifier	Monitoring well identification number
4	Sequence number	See below

Special note regarding monitoring well numbering: Monitoring well numbers for NAS Cecil Field will be coordinated with the Geographic Information System specialists at TtNUS Pittsburgh when assigning the next set of well numbers at each site to prevent replicate numbers.

Groundwater samples collected from permanent monitoring wells will have a sequence number beginning at 01 (for the baseline event) and continuing consecutively, based on the sampling round.

For example, a groundwater sample collected from monitoring well number two at the site during the first groundwater sampling round would have the following nomenclature:

CEF-CS2-01

It should be noted that well one at the site was abandoned and replaced, and the replacement nomenclature for that particular well is augmented with an “A” as follows:

CEF-CS1A

4.8 SAMPLE CUSTODY

The chain-of-custody begins with the release of the empty sample bottles from the laboratory and must be documented and maintained from that point forward. To maintain custody of the sample bottles or samples, they must be in someone's physical possession, in a locked room or vehicle, or sealed with an intact custody seal. When the possession of the bottles or samples is transferred from one person to another it will be documented in the field logbook and on the chain-of-custody.

4.9 QUALITY CONTROL (QC) SAMPLES

In addition to periodic calibration of field equipment and appropriate documentation on a field calibration sheet (see Appendix B), QC samples will be collected or generated during environmental sampling activities. QC samples will be collected in accordance with the “Proposal for Reduction of Quality Assurance (QA) Sample Collection and Data Validation” from the NAS Cecil Field Installation Restoration and Base Realignment and Closure programs, which are summarized in Table 4-2.

TABLE 4-2
QUALITY CONTROL SAMPLE FREQUENCY

Work Plan
Naval Air Station Cecil Field
Jacksonville, Florida

Type of samples	Number of samples	Frequency
Field Duplicate	10+	1/10 samples/matrix
Field Duplicate	5 to 9	1 per matrix
Field Duplicate	Less than 5	Not required
Lab MS/MSD	Less than 20	At least 1
Lab MS/MSD	20+	1/20 samples
Field Blank	Not Applicable	1 every 6 months or if source changes

(1) MS/MSD is a laboratory QA/QC requirement, separate sample not required, only additional volume.
(2) Rinsate blanks (or equipment blanks) and trip blanks have been eliminated from the QA program.
(3) See Harding Lawson Associates QA reduction memo or Comprehensive Quality Assurance Plan for explanations of QC sample types.

As agreed upon by the Base Closure Team (BCT), formal data validation has been eliminated from the installation restoration program at NAS Cecil Field; however, TtNUS personnel will review the analytical data packages generated by the analytical laboratory to eliminate false positive and false negative results.

4.10 SITE MANAGEMENT AND BASE SUPPORT

TtNUS will perform this project with support from the Navy. This section of the work plan describes the project contacts, support personnel, project milestones, and time frames of all major events.

Throughout the duration of the investigation activities, work at NAS Cecil Field (now known as Cecil Commerce Center) will be coordinated through NAVFAC EFD SOUTH, FDEP, and U. S. Department of Agriculture personnel. The primary contacts are as follows:

1. NAVFAC EFD SOUTH Engineer in Charge
   Mr. Nick Ugolini
   (843) 820-5596

2. FDEP
   Mr. David Grabka
   (850) 488-3693

3. U. S. Department of Agriculture
   Mr. Jim Thorsen
   (352) 669-3153

NAVFAC EFD SOUTH personnel will provide the following support functions:

- Provide existing engineering plans, drawings, diagrams, files, etc. to facilitate evaluation of the sites under investigation.

- Provide all historical data, background geological and hydrogeological information, and initial site investigation documents.

Jacksonville Airport Authority personnel will aid in arranging the following:

- Personnel identification badges, vehicle passes, and/or entry permits.

- Provide areas for storage of IDW as necessary.

The project will be staffed with personnel from the TtNUS' Jacksonville, Florida office. During field activities, TtNUS will provide an FOL who is familiar with the scope of work to be completed and requirements of working at NAS Cecil Field. Additionally, TtNUS will subcontract one 4-wheel drive hollow stem drill rig and crew and provide a TtNUS field crew to supervise drilling activities and sample the groundwater monitoring wells.

Mr. Paul Calligan, is the Task Order Manager (TOM) for CTO 0213 and will be the primary point of contact for the base and the FOL. He is responsible for cost and schedule control as well as technical performance. Mr. Calligan will provide senior level review and oversight during field activities.

4.11 CONTINGENCY PLAN

In the event of problems that may be encountered during site activities, the NAVFAC EFD SOUTH point of contact will be notified immediately, followed by the TtNUS TOM. The TOM will determine a course of action designed not to interfere with the schedule or budget. All contingency plans will be approved through the NAVFAC EFD SOUTH point of contact before being enacted.

5.0 PROPOSED LABORATORY ANALYSIS

Table 4-1 contains the basic information for the site's soil and/or groundwater fixed-base analytical requirements. The aqueous IDW components will be characterized for proper disposal based on the groundwater analytical data collected for the site.

Since soil cuttings will be generated, but no soil analytical data is planned for collection. A composite soil sample will be collected for TRPH, VOHs, and metals (total arsenic, cadmium, chromium, and lead). This data will be used to characterize the soil IDW for proper disposal.

Analyses for TRPH, VOHs, and total metals (arsenic, cadmium, chromium, and lead) is required to comply with the soil thermal treatment and disposal regulations in Chapter 62-713, FAC.

6.0 LEVEL OF EFFORT

Field activities including utility clearance, monitoring well installation and development, sampling, surveying, and IDW management at this site is proposed to begin in January 2005 and take approximately two months to complete. The following is the anticipated level of effort for the activities associated with this investigation:

- Utility Clearances — 1 week
- Driller Coordination and Mobilization — 0.25 days
- Monitoring Well Installation and Development — 1-2 days
- Monitoring Well Sampling — 2 days
- Monitoring Well Re-sampling (if needed) — 1 day
- Off-site Laboratory Analyses — 30 days
- IDW Management/Disposal — 1-3 days

It is currently anticipated that tasks for this project will be completed with limited delays occurring during transition between tasks. However, delays during task transition are possible.

Assuming that nothing unusual is found during this scope of work, once the fieldwork is complete and the laboratory analytical data is received and processed, a letter report will be prepared for the site. Prior to final submittal of the document, TtNUS will present the results to the BCT.

REFERENCES

ABB-ES (ABB Environmental Services), 1998. Monitoring Only Proposal for Natural Attenuation, Ocala F-18 Crash Site, NAS Cecil Field, Jacksonville, Florida. Prepared for NAVFAC EFD SOUTH, North Charleston, South Carolina. January.

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APPENDIX A

ABB-ES, JANUARY 1998 LETTER REPORT TABLES AND FIGURES

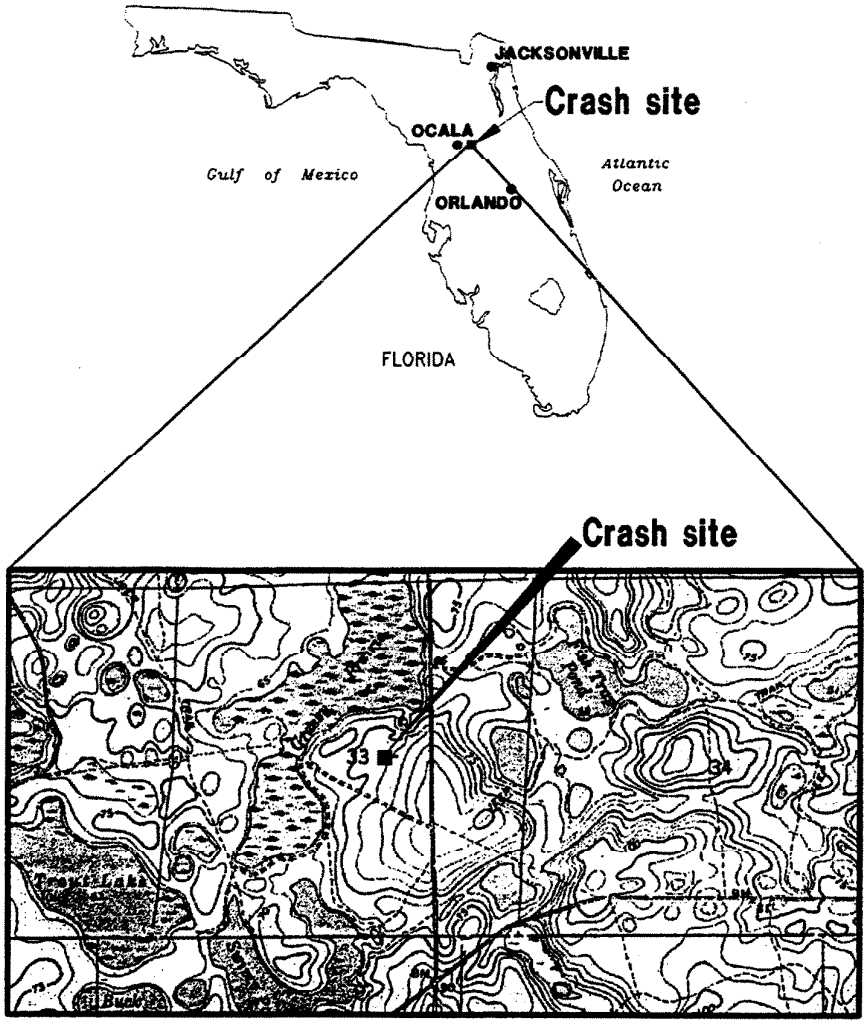
Ocala F-18 Crash Site

Table 1
Summary of Detections in Groundwater

Monitoring Only Proposal for Natural Attenuation
Ocala Crash Site
NAS Cecil Field, Jacksonville, Florida

Parameter	Groundwater Cleanup Target Levels[1]	Natural Attenuation Default Source Concentrations[2]	CEF-CS-1A Total Depth: 31 feet bls Screen Interval: 15.5 - 30.5 feet bls		CEF-CS-2 Total Depth: 29.5 feet bls Screen Interval: 14 - 29 feet bls		CEF-CS-3 Total Depth: 32 feet bls Screen Interval: 16.5 - 31.5 feet bls		CEF-CS-7 Total Depth: 30 feet bls Screen Interval: 20 - 30 feet bls
			Feb. 96	Sept. 97	Feb. 96	Sept. 97	Feb. 96	Sept. 97	Nov. 97
Benzene (ug/l)	1	100	12	14	ND	ND	ND	ND	ND
Toluene (ug/l)	40	400	8	6	ND	ND	ND	ND	ND
Ethylbenzene (ug/l)	30	300	42	82	ND	ND	ND	ND	ND
Total Xylenes (ug/l)	20	200	160	118	ND	ND	ND	ND	ND
Naphthalene (ug/l)	20	200	48	135	ND	ND	ND	ND	ND
Total Petroleum Hydrocarbons (mg/l)	5[3]	50[3]	NS	2.6[3]	ND	ND	ND	ND	ND

Notes: All concentrations in ug/l unless otherwise noted.
[1] Groundwater Cleanup Target Levels based on Chapter 62-770, Florida Administrative Code.
[2] Default source concentrations as promulgated in Chapter 62-770.690(e).
[3] Concentration in mg/l.
Feb. 96 = February 1996.
Sept. 97 = September 1997.
Nov. 97 = November 1997.
NA = Not Applicable.
ND = Not Detected.
NS = Not Sampled.
bls = below land surface.



Source:
Lake Mary Quadrangle
Florida – Marion County
7.5 minute series (topograghic) 1980

NOT TO SCALE

FIGURE 1
LOCATION MAP

OCALA CRASH SITE
OCALA NATIONAL FOREST
OCALA, FLORIDA

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

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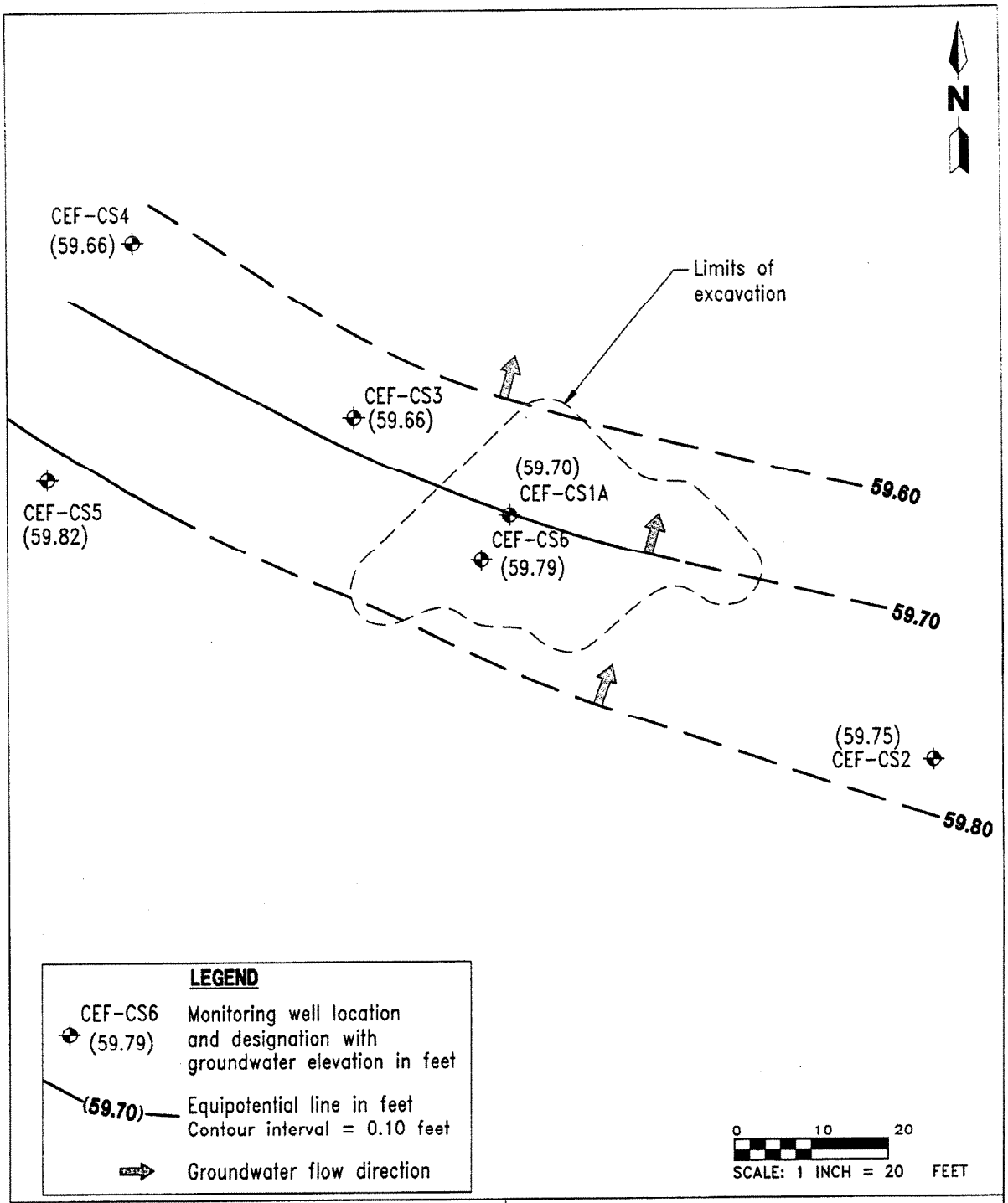

FIGURE 2
WATER TABLE ELEVATION MAP
MARCH 1996

OCALA CRASH SITE
OCALA NATIONAL FOREST
OCALA, FLORIDA

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

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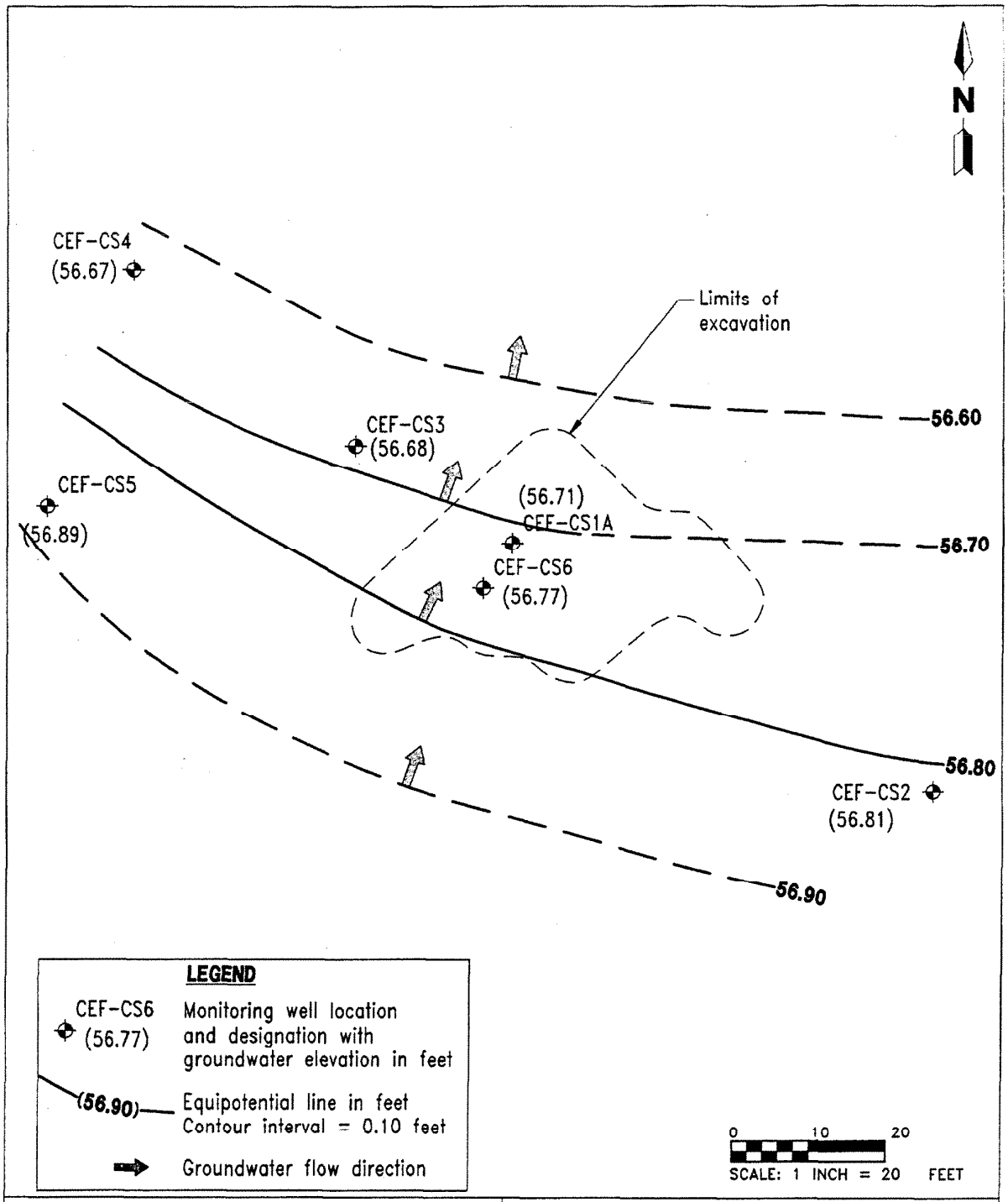

FIGURE 3
WATER TABLE ELEVATION MAP
MAY 1997

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OCALA CRASH SITE
OCALA NATIONAL FOREST
OCALA, FLORIDA

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

APPENDIX B

FIELD FORMS

Tetra Tech NUS, Inc.

DAILY ACTIVITIES RECORD

PROJECT NAME: _____ **PROJECT NUMBER:** _____

CLIENT: _____ **LOCATION:** _____

DATE: _____ **ARRIVAL TIME:** _____

Tt NUS PERSONNEL: _____ **DEPARTURE TIME:** _____

CONTRACTOR: _____ **DRILLER:** _____

ITEM	QUANTITY ESTIMATE	QUANTITY TODAY	PREVIOUS TOTAL QUANTITY	CUMULATIVE QUANTITY TO DATE

COMMENTS: _____

_____

_____

_____

APPROVED BY:

_____ _____

Tt NUS REPRESENTATIVE DRILLER

DATE: _____

EQUIPMENT INSPECTION

COMPANY:_____ **UNIT NO.**_____

FREQUENCY: Inspect at the initiation of the project, after repairs, once every 10-day shift.

Inspection Date: ____/____/____ Time: _____ Equipment Type:_____
(e.g., bulldozer, generator)

	Good	Need Repair	N/A
Tires or tracks	❒	❒	❒
Hoses and belts	❒	❒	❒
Cab, mirrors, safety glass	❒	❒	❒
- Turn signals, lights, brake lights, etc. (front/rear) for equipment approved for highway use?	❒	❒	❒
- Is the equipment equipped with audible back-up alarms and back-up lights?	❒	❒	❒
Horn and gauges	❒	❒	❒
Brake condition (dynamic, park, etc.)	❒	❒	❒
Fire extinguisher (Type/Rating -_____)	❒	❒	❒
Fluid Levels:			
- Engine oil	❒	❒	❒
- Transmission fluid	❒	❒	❒
- Brake fluid	❒	❒	❒
- Cooling system fluid	❒	❒	❒
- Windshield wipers	❒	❒	❒
- Hydraulic oil	❒	❒	❒
Oil leak/lube	❒	❒	❒
Coupling devices and connectors	❒	❒	❒
Exhaust system	❒	❒	❒
Blade/boom/ripper condition	❒	❒	❒
Access-ways: Frame, hand holds, ladders, walkways (non-slip surfaces), guardrails?	❒	❒	❒
Power cable and/or hoist cable	❒	❒	❒
Steering (standard and emergency)	❒	❒	❒

Safety Guards:	**Yes**	**No**
– Around rotating apparatus (belts, pulleys, sprockets, spindles, drums, flywheels, chains) all points of operations protected from accidental contact?_____	❒	❒
– Hot pipes and surfaces exposed to accidental contact?_____	❒	❒
– All emergency shut offs have been identified and communicated to the field crew?_____	❒	❒
– Have emergency shutoffs been field tested? _____	❒	❒
– Results?_____	❒	❒
– Are any structural members bent, rusted, or otherwise show signs of damage?_____	❒	❒
– Are fueling cans used with this equipment approved type safety cans?_____	❒	❒
– Have the attachments designed for use (as per manufacturer's recommendation) with this equipment been inspected and are considered suitable for use?_____	❒	❒

EQUIPMENT INSPECTION (Continued)

_____

Portable Power Tools:

- Tools and Equipment in Safe Condition?_____ ❒ ❒
- Saw blades, grinding wheels free from recognizable defects (grinding wheels have been sounded)? ❒ ❒
- Portable electric tools properly grounded?_____ ❒ ❒
- Damage to electrical power cords?_____ ❒ ❒
- Blade guards in place?_____ ❒ ❒
- Components adjusted as per manufacturers recommendation?_____ ❒ ❒

Cleanliness:

- Overall condition (was the decontamination performed prior to arrival on-site considered acceptable)?_____
- Where was this equipment used prior to its arrival on site?_____
- Site Contaminants of concern at the previous site?_____
- Inside debris (coffee cups, soda cans, tools and equipment) blocking free access to foot controls?_____

Operator Qualifications (as applicable for all heavy equipment):

- Does the operator have proper licensing where applicable, (e.g., CDL)?_____
- Does the operator, understand the equipment's operating instructions?_____
- Is the operator experienced with this equipment? _____
- Does the operator have emotional and/or physical limitations which would prevent him/her from performing this task in a safe manner?_____
- Is the operator 21 years of age or more?_____

Identification:

- Is a tagging system available, for positive identification, for tools removed from service?__

Additional Inspection Required Prior to Use On-Site

	Yes	No
– Does equipment emit noise levels above 90 decibels?	❒	❒
– If so, has an 8-hour noise dosimetry test been performed?	❒	❒

- Results of noise dosimetry:_____
- Defects and repairs needed:_____
- General Safety Condition: _____
- Operator or mechanic signature:_____

Site Safety Officer Signature:_____

Approved for Use: ❒ Yes ❒ No

BORING LOG

Tetra Tech NUS, Inc.

Page ___ of ___

PROJECT NAME: _____ BORING NO.: _____
PROJECT NUMBER: _____ DATE: _____
DRILLING COMPANY: _____ GEOLOGIST: _____
DRILLING RIG: _____ DRILLER: _____

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	Color	Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	Sampler BZ	Borehole**	Driller BZ**

* When rock coring, enter rock brokeness.

** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): _____

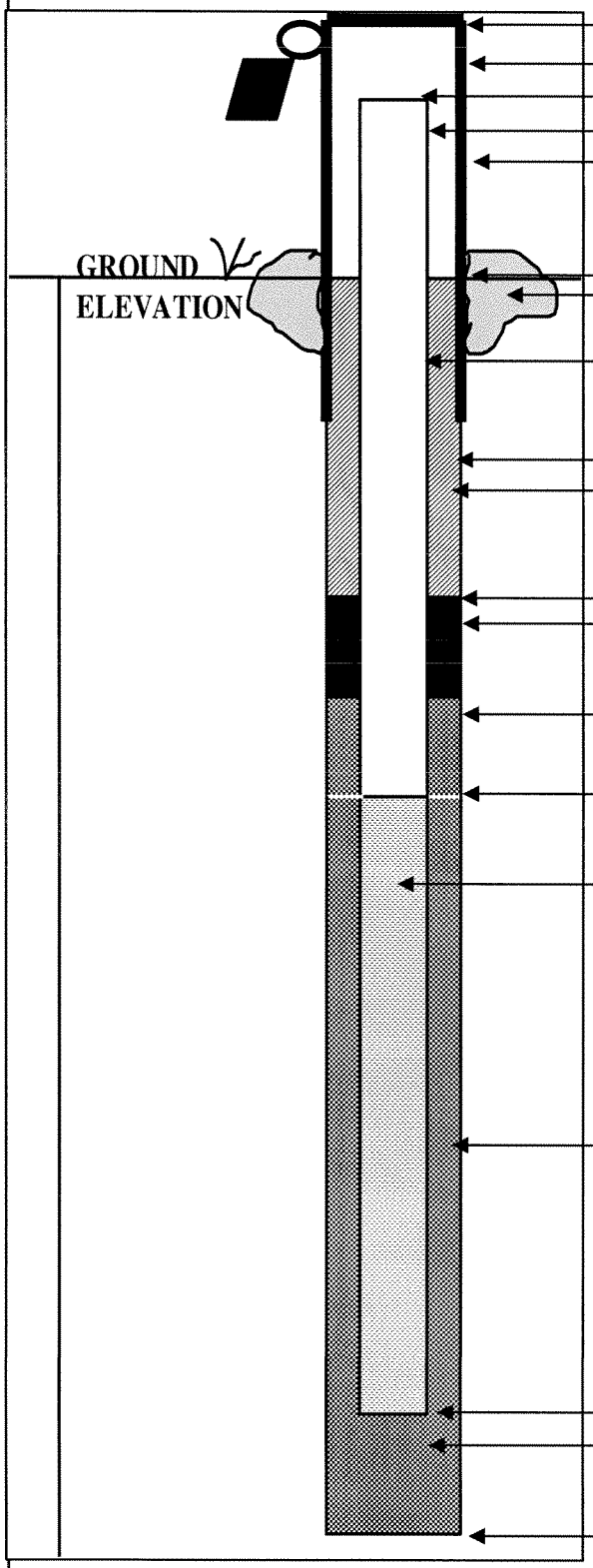
Remarks: _____

Converted to Well: Yes _____ No _____ Well I.D. #: _____

BORING NO.: _____

Tetra Tech NUS, Inc. **OVERBURDEN MONITORING WELL SHEET**

PROJECT:		DRILLING Co.:		BORING No.:	
PROJECT No.:		DRILLER:		DATE COMPLETED:	
SITE:		DRILLING METHOD:		NORTHING:	
GEOLOGIST:		DEV. METHOD:		EASTING:	



ELEVATION OF TOP OF SURFACE CASING: _____

STICK -UP TOP OF SURFACE CASING: _____

ELEVATION OF TOP OF RISER PIPE: _____

RISER STICK-UP ABOVE GROUND SURFACE: _____

I.D. OF SURFACE CASING: _____

TYPE OF SURFACE CASING: _____

GROUND ELEVATION: _____

TYPE OF SURFACE SEAL: _____

RISER PIPE I.D.: _____

TYPE OF RISER PIPE: _____

BOREHOLE DIAMETER: _____

TYPE OF SEAL: _____

ELEVATION / DEPTH OF SEAL: _____ / _____

TYPE OF SEAL: _____

ELEVATION / DEPTH TOP OF FILTER PACK: _____ / _____

ELEVATION / DEPTH TOP OF SCREEN: _____ / _____

TYPE OF SCREEN: _____

SLOT SIZE X LENGTH: _____

I.D. OF SCREEN: _____

TYPE OF FILTER PACK: _____

ELEVATION / DEPTH BOTTOM OF SCREEN: _____ / _____

ELEVATION / DEPTH BOTTOM OF FILTER PACK: _____ / _____

TYPE OF BACKFILL BELOW WELL: _____

ELEVATION / DEPTH OF BOREHOLE: _____ / _____

MONITORING WELL MATERIALS
CERTIFICATE OF CONFORMANCE

Well Designation:_____ Site Geologist: _____

Site Name: _____ Drilling Company: _____

Date Installed: _____ Driller:_____

Project Name: _____ Project Number: _____

Material	Brand/Description	Source/Supplier	Sample Collected ?
Well Casing			
Well Screen			
End Cap			
Drilling Fluid			
Drilling Fluid Additives			
Backfill Material			
Annular Filter Pack			
Bentonite Seal			
Annular Grout			
Surface Cement			
Protective Casing			
Paint			
Rod Lubricant			
Compressor Oil			

To the best of my knowledge, I certify that the above described materials were used during installation of this monitoring well.

Signature of Site Geologist:_____

Tetra Tech NUS, Inc.

MONITORING WELL DEVELOPMENT RECORD

Page ____ of _____

Well: _____ Depth to Bottom (ft.): _____ Responsible Personnel: _____
Site: _____ Static Water Level Before (ft.): _____ Drilling Co.: _____
Date Installed: _____ Static Water Level After (ft.): _____ Project Name:
Date Developed: _____ Screen Length (ft.): _____ Project Number:
Dev. Method: _Pump_____ Specific Capacity: _____
Pump Type: _____ Casing ID (in.): _____

Time	Estimated Sediment Thickness (Ft.)	Cumulative Water Volume (Gal.)	Water Level Readings (Ft. below TOC)	Temperature (Degrees C)	pH	Specific Conductance (Units: mS/cm)	Turbidity (NTU)	Remarks (odor, color, etc.)

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: _____ **Project No.:** _____

Location: _____ **Personnel:** _____

Weather Conditions: _____ **Measuring Device:** _____

Tidally Influenced: Yes ___ No _X_ **Remarks:** _____

Well or Piezometer Number	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	PID (ppm) BK/BH

ppm=parts per million; BK=background; and BH=borehole of the well.

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: _____
Project No.: _____

[ ] Domestic Well Data
[X] Monitoring Well Data
[ ] Other Well Type: _____
[ ] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____
Type of Sample:
[ ] Low Concentration
[ ] High Concentration

SAMPLING DATA

Date: / Time:	Color Visual	pH Standard	S.C. mS/cm	Temp. °C	Turbidity NTU	DO mg/l	ORP mV	Other
Method: Low Flow Peristaltic								

PURGE DATA

Date:	Time	pH	S.C.	Temp (°C)	Turbidity	DO		ORP
Method: Low Flow Peristaltic	See Low Flow Purge Sheet for data.							
Monitor Reading (ppm):								
Well Casing Diameter: 2 inch								
Well Casing Material: Sch. 40 PVC								
Total Well Depth (TD):								
Static Water Level (WL):								
One Casing Volume(gal/L):								
Start Purge (hrs):								
End Purge (hrs):								
Total Purge Time (min):								
Total Vol. Purged (gal/L):								

SAMPLE COLLECTION INFORMATION

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

LOW FLOW PURGE DATA SHEET

PROJECT SITE NAME:
PROJECT NUMBER:

WELL ID.:
DATE:

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	Cum. Vol. (Liters)	pH (S.U.)	Cond. (mS/cm)	Turb. (NTU)	DO (mg/L)	Temp. (Celsius)	ORP (mV)	Comments

SIGNATURE(S): _____

PAGE___OF___

Tetra Tech NUS, Inc.

DOCUMENTATION OF FIELD CALIBRATION

PROJECT NAME : _____ INSTRUMENT NAME/MODEL: _____

SITE NAME: _____ MANUFACTURER: _____

PROJECT No.: _____ SERIAL NUMBER: _____

Date of Calibration	Instrument Name and Model	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
				Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		