N60200.AR.002922
NAS CECIL FIELD, FL
5090.3a

SAMPLING AND ANALYSIS PLAN FOR UNDERGROUND STORAGE TANK INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES NAS CECIL FIELD FL

5/1/2001

TETRA TECH NUS INC

Sampling and Analysis Plan for UST Investigations at North Fuel Farm and Other Sites

Naval Air Station Cecil Field

Jacksonville, Florida

Southern Division Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0168

May 2001

01JAX0073

SAMPLING AND ANALYSIS PLAN

FOR

UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS, Inc.
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220-2745

CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0168

MAY 2001

PREPARED UNDER THE SUPERVISION OF:

Paul E. Calligan

PAUL CALLIGAN, P.G.
TASK ORDER MANAGER
TETRA TECH NUS, INC.
TALLAHASSEE, FLORIDA

APPROVED FOR SUBMITTAL BY:

Mark T. Perry for

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS, INC.
PITTSBURGH, PENNSYLVANIA

TABLE OF CONTENTS

ACRONYMS iv

1.0 INTRODUCTION 1-1
1.1 GENERAL SITE DESCRIPTION 1-1
1.2 OBJECTIVE 1-1
1.3 GUIDANCE 1-2

2.0 SITE-SPECIFIC SCOPE OF WORK – SAR SITES 2-1
2.1 JETC AND 334 O/W 2-1
2.2 312 O/W 2-1
2.2.1 Site Description and History 2-1
2.2.2 Conclusions And Proposed Investigation 2-3
2.2.3 Analytical Rationale 2-3
2.2.4 Phase I 2-5
2.2.5 Data Evaluation 2-6
2.2.6 Phase II 2-6
2.3 824 O/W 2-7
2.3.1 Site Description and History 2-7
2.3.2 Conclusions And Proposed Investigation 2-7
2.3.3 Analytical Rationale 2-10
2.3.4 Phase I 2-10
2.3.5 Data Evaluation 2-11
2.3.6 Phase II 2-11
2.4 NFF 2-12
2.4.1 Site Description and History 2-12
2.4.2 Analytical Rationale 2-13
2.4.3 Phase I 2-15
2.4.4 Data Evaluation 2-17
2.4.5 Phase II 2-17

3.0 SITE-SPECIFIC SCOPE OF WORK – MOP SITES 3-1
3.1 BP WELLS 3-1
3.2 NSAP 3-1

4.0 FIELD OPERATIONS 4-1
4.1 SITE RESTORATION 4-1
4.2 UTILITY CLEARANCE 4-1
4.3 EQUIPMENT CALIBRATION 4-1
4.4 TEMPORARY PIEZOMETER INSTALLATION 4-2
4.5 DPT INVESTIGATION – O/W SITES 4-2
4.5.1 DPT Soil Investigation 4-3
4.5.2 DPT Groundwater Investigation 4-4
4.6 DPT WITH MIP/SC GROUNDWATER INVESTIGATION – NFF 4-5
4.7 MOBILE LABORATORY ACTIVITIES 4-5
4.8 PERMANENT MONITORING WELL INSTALLATION 4-6
4.9 MONITORING WELL DEVELOPMENT 4-7
4.10 SPECIFIC CAPACITY (SPECAP) TESTING 4-10
4.11 SURVEYING 4-11
4.12 EQUIPMENT DECONTAMINATION 4-11
4.13 WASTE HANDLING 4-12

5.0 ENVIRONMENTAL SAMPLING 5-1
5.1 SUMMARY OF ENVIRONMENTAL SAMPLING 5-1
5.2 SAMPLING PROCEDURES 5-1
5.2.1 Sediment Sampling 5-1
5.2.2 Subsurface Soil Sampling 5-7

TABLE OF CONTENTS (CONT'D)

5.2.3 Surface Water Sampling 5-7
5.2.4 Groundwater Sampling....5-9
5.3 SAMPLE HANDLING 5-14
5.3.1 Sample Containers, Preservation, Holding Times, and Analyses....5-14
5.3.2 Sample Nomenclature For DPT 5-15
5.3.3 Sample Nomenclature For Activities Other Than DPT 5-16
5.3.4 Sample Documentation, Packaging, and Shipping 5-17
5.3.5 Sample Custody and Shipment....5-18

6.0 PROJECT MANAGEMENT ORGANIZATION....6-1
6.1 PROJECT CONTACTS AND MANAGEMENT 6-1
6.2 PROJECT PERSONNEL RESPONSIBILITIES 6-2
6.3 CONTINGENCY PLAN 6-3

7.0 QA/QC SYSTEM....7-1
7.1 EXTERNAL (FIELD) QC SAMPLES 7-1
7.2 CORRECTIVE ACTIONS....7-2

REFERENCES R-1

APPENDICES

A MONA ORDER – BP WELLS....A-1
B MONA ORDER – NSAP....B-1
C JETC AND 334 O/W SAP C-1
D WATER LEVEL FORMS....D-1
E JPA DIG PERMIT FORM....E-1
F DRILLING FORMS F-1
G IDW DRUM MANIFEST FORM G-1
H SAMPLING FORMS H-1
I FIELD TASK MODIFICATION REQUEST FORM....I-1

TABLE OF CONTENTS (CONT'D)

TABLES

NUMBER		PAGE
3-1	Site-Specific Analytical Requirements, BP Wells Area	3-3
3-2	Site-Specific Groundwater Sampling Locations and Analyses, BP Wells Area	3-4
3-3	Site-Specific Analytical Requirements, North-South Apron Plume	3-7
3-4	Site-Specific Groundwater Sampling Locations and Analyses, North-South Apron Plume	3-8
4-1	Soil IDW Analytical Requirements	4-15
4-2	Soil IDW Sampling Locations and Analyses	4-16
5-1	Soil Used Oil Group Analytical Requirements	5-2
5-2	Soil KAG Requirements	5-3
5-3	Groundwater Used Oil Group Requirements	5-4
5-4	Groundwater KAG Requirements	5-5
5-5	Sediment Sampling Locations and Analyses	5-6
5-6	Soil Sampling Locations and Analyses	5-8
5-7	Surface Water Sampling Locations and Analyses	5-10
5-8	Groundwater (Used Oil Group) Sampling Locations and Analyses - NFF	5-11
5-9	Groundwater (KAG) Sampling Locations and Analyses	5-12

FIGURES

NUMBER		PAGE
2-1	Site Location Map – Building 312 O/W Separator	2-2
2-2	Proposed DPT Investigation – Building 312 O/W Separator	2-4
2-3	Site Location Map – Building 824 O/W Separator	2-8
2-4	Proposed DPT Investigation – Building 824 O/W Separator	2-9
2-5	Proposed Groundwater and Surface Water/Sediment Sampling Locations	2-16
3-1	Site Location Map – BP Wells Site	3-2
3-2	Site Location Map – North-South Apron Plume	3-5
4-1	Typical Monitoring Well Design – Flush Mount	4-8
4-2	Typical Monitoring Well Design – Above Grade	4-9

ACRONYMS

ABB-ES	ABB Environmental Services
bls	Below Land Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Total Xylenes
BP Wells	BP Wells Area
BWGWP	Base-Wide Generic Work Plan
CAR	Contamination Assessment Report
CLEAN	Comprehensive Long-term Environmental Action Navy
CompQAP	Comprehensive Quality Assurance Plan
CSO	Caretaker Site Officer
CT	Columbia Technologies
CTO	Contract Task Order
°C	Degree Celsius
DPT	Direct Push Technology
DRO	Diesel Range Organics
ECD	Electrical Conductivity Detector
EISOPQAM	Environmental Investigation Standard Operating Procedures and QA Manual
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FID	Flame Ionization Detector
FOL	Field Operations Leader
HLA	Harding Lawson Associates
ID	Inside Diameter
IDW	Investigative-Derived Waste
JETC	Jet Engine Test Cell
GC	Gas Chromatograph
GCTLs	Groundwater Cleanup Target Levels
JPA	Jacksonville Port Authority
JP-5	Jet Fuel
KAG	Kerosene Analytical Group
MIP/SC	Membrane Interface Probe/Soil Conductivity
MOP	Monitoring Only Plan
Navy	United States Navy
NASCF	Naval Air Station Cecil Field
NSF	National Sanitation Foundation

ACRONYMS (Cont'd)

NFF	North Fuel Farm
NSAP	North-South Apron Plume
NTU	Nephelometric Turbidity Units
OVA	Organic Vapor Analyzer
O/W	Oil Water Separator
PAHs	Polynuclear Aromatic Hydrocarbons
PG	Professional Geologist
PID	Photoionization Detector
POP	Project Operations Plan
PPE	Personal Protective Equipment
ppm	Parts Per Million
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAB	Restoration Advisory Board
RAP	Remedial Action Plan
SA	Site Assessment
SCTLs	Soil Cleanup Target Levels
SPECAP	Specific Capacity
SAP	Sampling and Analysis Plan
SAR	Site Assessment Report
SOPs	Standard Operating Procedures
SOUTHDIV	Southern Division
SSO	Site Safety Officer
TRPH	Total Recoverable Petroleum Hydrocarbons
TtNUS	Tetra Tech NUS, Inc.
TCE	Trichloroethene
TOM	Task Order Manager
USCS	Unified Soil Classification System
UST	Underground Storage Tank
USGS	United States Geological Survey
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) was prepared for the United States Navy (Navy), Southern Division (SOUTHDIV) Naval Facilities Engineering Command under Contract Task Order (CTO) 168, for the Comprehensive Long-Term Environmental Action Navy (CLEAN III) Contract Number N62467-94-D-0888. Tetra Tech NUS, Inc. (TtNUS) has prepared this SAP in accordance with the Plan of Action (TtNUS, 2001a) for the following sites: North Fuel Farm (NFF), Jet Engine Test Cell (JETC), Building 312 Oil/Water Separator (312 O/W), Building 334 Oil/Water Separator (334 O/W), Building 824 Oil/Water Separator (824 O/W), BP Wells Area (BP Wells) and the North-South Apron Plume (NSAP). This SAP outlines the requirements and describes the procedures for conducting site assessments (SA) at the first five sites and monitoring programs at the latter two sites.

1.1 GENERAL SITE DESCRIPTION

The seven sites described in this SAP are located at Naval Air Station Cecil Field (NASCF) in Jacksonville, Florida. These sites are in that part of the base in Duval County on the Main Station Area [ABB-Environmental Services (ABB-ES), 1994].

1.2 OBJECTIVE

The SAP provides the rationale and methodology for two types of field activities: site assessments and groundwater monitoring programs. SOUTHDIV has requested that TtNUS conduct site assessments at NFF, JETC, 312 O/W, 334 O/W, and 824 O/W. The BP Wells site and the NSAP site are under Florida Department of Environmental Protection (FDEP) Approval Order for Natural Attenuation Monitoring Plans (see Appendices A and B, respectively).

The SA are designed for performing field activities to evaluate the extent of petroleum hydrocarbons in the surface and subsurface at the specified site(s). Site-specific details and a proposed plan of action for each site will be covered in Section 2.0. Section 3.0 covers the details for the monitoring only plan (MOP) sites. General field operations are covered in Section 4.0. Section 5.0 describes protocols for environmental sampling. Section 6.0 provides information about project management and emergency contact information. Section 7.0 describes the Quality Assurance and Quality Control (QA/QC) measures for this investigation.

Data collected during the site assessments will be used to prepare site assessment reports (SAR) for the sites and to evaluate the need for future remedial action, long term monitoring, or for no further action proposal (TtNUS, 2001a). The groundwater monitoring programs are intended to sample, monitor and

report the progress of natural attenuation of groundwater at the specified sites. Since these sites are projected for regular monitoring for five years, each site's progress is gauged against a set of established milestone objectives to determine if continued action, no further action or corrective action is warranted at each site.

1.3 GUIDANCE

Since the sites are petroleum sites, the SARs should conform to Chapter 62-770, Florida Administrative Code (FAC). The field work and sampling procedures described in this SAP will be performed in general accord with the United States Environmental Protection Agency (USEPA) Region 4 Environmental Investigation Standard Operating Procedures and QA Manual (EISOPQAM) (USEPA, 1996) and the Base-Wide Generic Work Plan (BWGWP) for NASCF (TtNUS, 1998). The BWGWP contains the Investigative-Derived Waste (IDW) Plan in Volume I and the Standard Operating Procedures (SOPs) in Volume II, Project Operations Plan. Those SOPs and procedures will be used to augment the guidance in Chapter 62-770, FAC, which requires that TtNUS follow the company's FDEP-approved Comprehensive Quality Assurance Plan (CompQAP) No. 980038.

2.0 SITE-SPECIFIC SCOPE OF WORK – SAR SITES

2.1 JETC AND 334 O/W

The SAP for the JETC and 334 O/W sites was generated prior to initiating this SAP. Appendix C contains the plan that was developed for those sites.

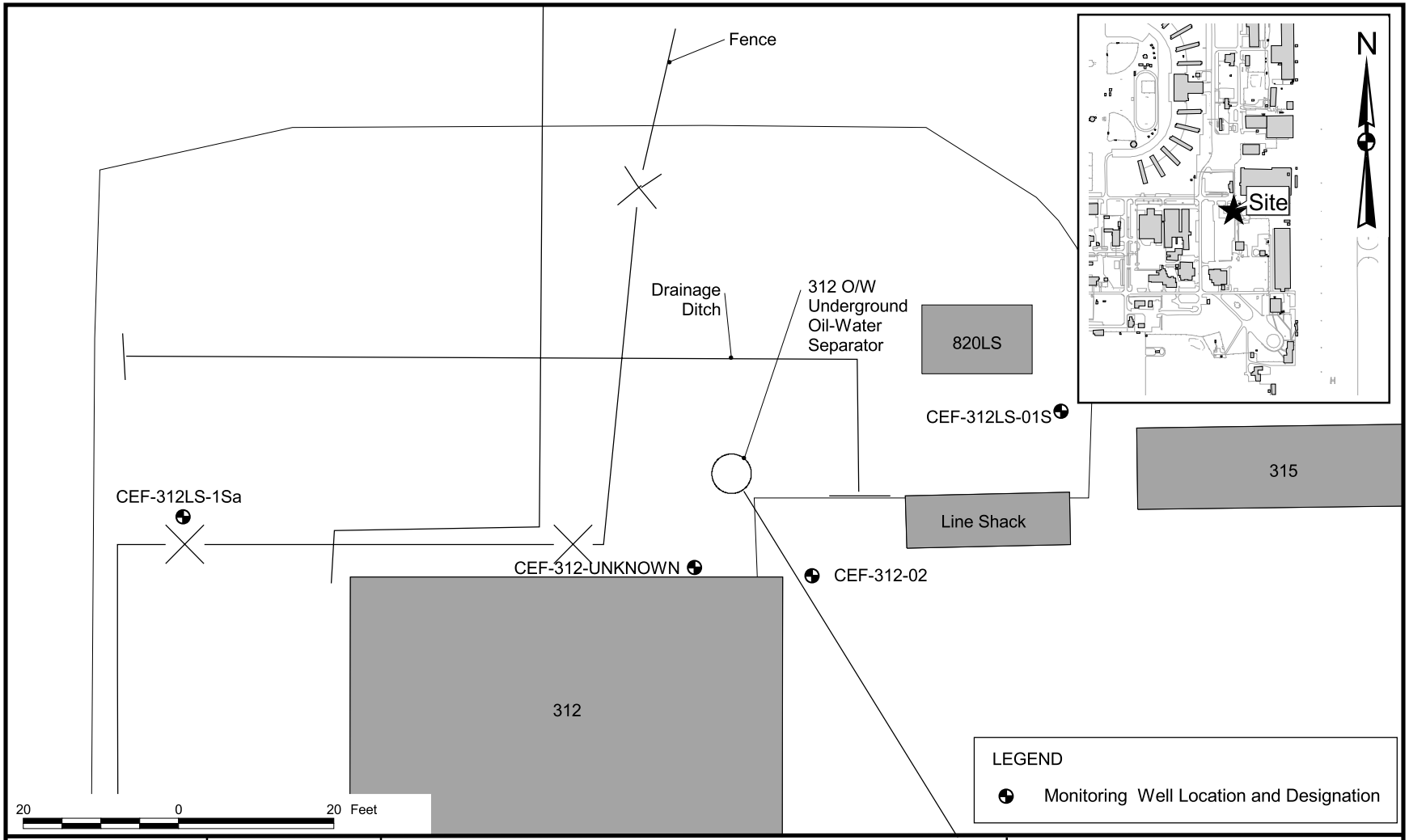
2.2 312 O/W

2.2.1 Site Description and History

Oil/water separator 312 O/W is located on the north side of Building 312, formerly a corrosion control hangar for NASCF (Figure 2-1). The site is surrounded by grass, but there is concrete paving to the north and east and Building 312 is about 10 feet to the south. There are no surface water bodies within 1,000 feet of the site, but a ditch that is normally dry exists on the north side of the site. The O/W separator was installed in 1988 and has a 900-gallon capacity. According to Harding Lawson Associates (HLA, 1998), wastewater from Building 312 and wash and rinse water from the wash rack on site are piped into this O/W separator. The wastewater from 312 O/W flows to Facility 312LS (a lift station) that pumps its load to the base wastewater treatment plant.

In July 1998, HLA initiated a confirmatory sampling investigation of the soil and groundwater (HLA, 1999a). Four soil borings were conducted and screened with an organic vapor analyzer (OVA) with a flame ionization detector (FID), five subsurface soil samples were collected and analyzed for used oil group constituents, and one groundwater sample was collected from a downgradient monitoring well for used oil group analyses. HLA used aquifer data from Day Tank 1 (a site about 1,000 feet north of Building 312) to establish a south-southeast groundwater flow direction for the site. That flow direction appears to agree with a current investigation of the wash rack at Building 312.

The results of HLA's investigation indicated that used oil group constituents had impacted the site's soil and not the groundwater. One soil sample (CEF-312-SB4) proved excessively contaminated by OVA-FID, and subsequent lab analyses confirmed that total xylenes and total recoverable petroleum hydrocarbons (TRPH) exceeded FDEP soil cleanup target levels (SCTLs). Trichloroethene (TCE) was detected in another subsurface soil sample (CEF-312-SB6) at a concentration above the SCTL, but was not detected in a second soil sample. Since the laboratory data for the other three soil samples indicated no petroleum impacts, HLA considered the excessive contamination defined around soil sample CEF-312-SB4. The groundwater sample results for monitoring well CEF-312-12S (renamed CEF-312-02 for this



DRAWN BY MJJ	DATE 10Apr01	SITE LOCATION MAP BUILDING 312 O/W SEPARATOR NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 121
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-1 / REV 0

P:\GIS\NAS_CecilField\bldg0312-ows.apr 12Apr01 MJJ Layout1

report) were non-detect for used oil group analyses. Figure 2-2 shows these soil and groundwater sample locations.

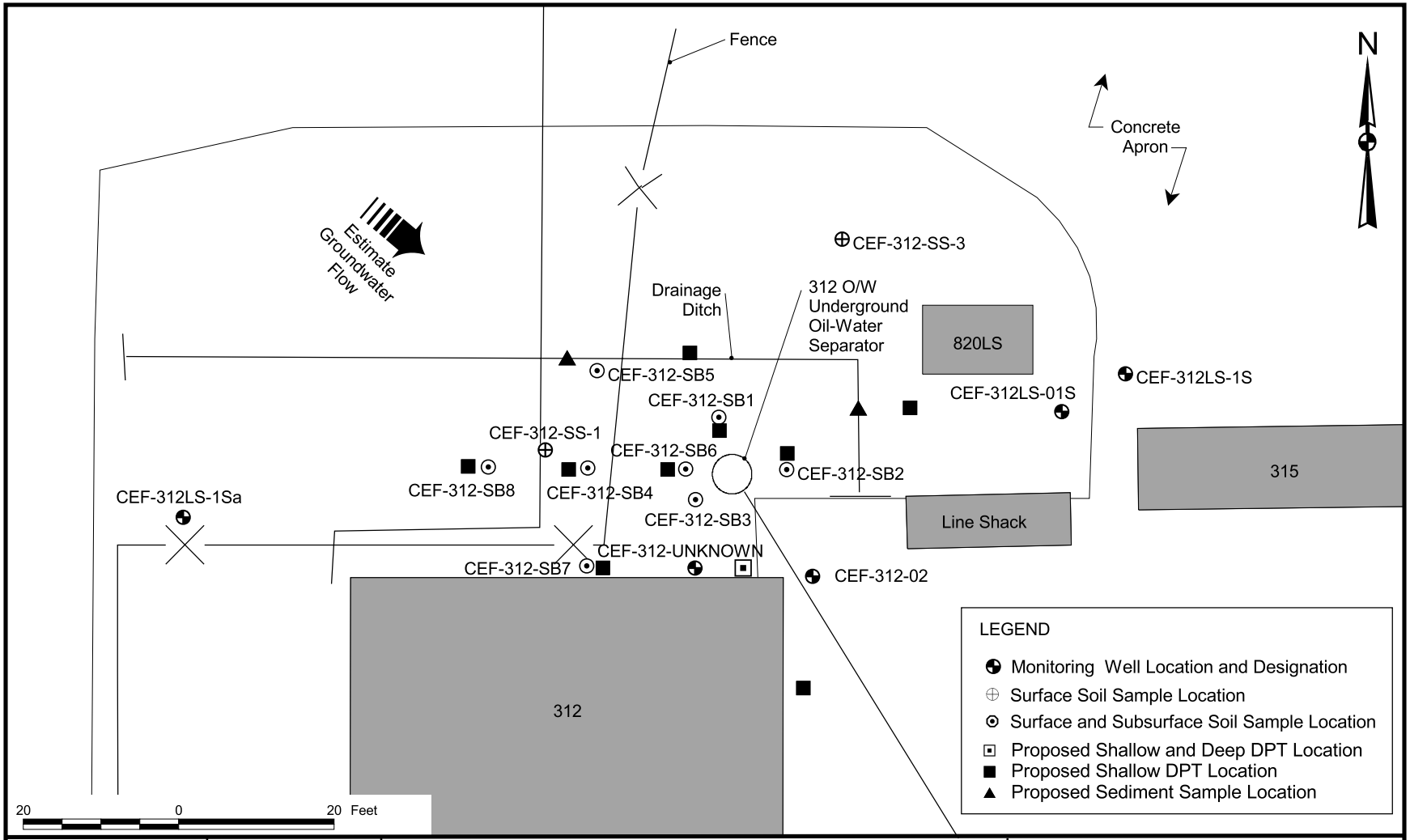
2.2.2 Conclusions And Proposed Investigation

HLA determined that the soil contamination had been delineated around a single location with excessively contaminated soil and there was no apparent impact to groundwater at the site (HLA, 1999a). They recommended no further action should be taken until the O/W separator is removed at which time the soil should be delineated. Since the Navy is transferring the property under federal mandate and the O/W separator remains in place, a site assessment has been ordered to address the current condition of the site before the final transfer to the new tenant.

The O/W separator has remained in place for about two years since the HLA report, and the previously reported contamination could have abated or gotten worse. TtNUS considers the site a typical underground storage tank (UST) site requiring investigation in two main phases. Phase I will involve the installation of approximately 15 combined soil and groundwater locations using direct push technology (DPT) drilling with mobile laboratory screening. Figure 2-2 shows ten proposed DPT sample locations, and the other five locations will be field located as needed by the field operations leader (FOL). The results from the Phase I sampling will be reviewed and evaluated to propose necessary fieldwork before proceeding with Phase II. Phase II will involve the installation of additional monitoring wells as needed, and the sampling of existing and newly installed monitoring wells. The Phase I field and laboratory results and the resulting recommendations for each site will determine the scope of the Phase II work. For the purposes of this work plan, it is assumed that the soil will be delineated in the first phase and up to five shallow and one deep well may be needed to confirm and delineate groundwater contamination. The site also has a small ditch that appears to be dry most of the year. Two sediment samples will be collected from the ditch during Phase I for mobile lab screening and fixed-based laboratory confirmation. TtNUS anticipates that a SAR will be prepared and submitted at the completion of Phase II activities.

2.2.3 Analytical Rationale

Mobile laboratory screening analyses for the O/W sites is very similar, so this will be discussed in Section 4.0. Existing fixed-based laboratory data from the Confirmatory Sampling Report for Building 312 (HLA, 1999a) shows that used oil group analyses have been used previously at the site. TtNUS plans to use the same group of analytical methods at 312 O/W. In accordance with Chapter 62-770, FAC, a total corrected hydrocarbon measurement of 50 parts per million (ppm), will be used to define “excessively contaminated” soil at the site.



DRAWN BY MJJ	DATE 10Apr01	PROPOSED DPT INVESTIGATION BUILDING 312 O/W SEPARATOR NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 121
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-2 / REV 0

P:\GIS\NAS_CecilField\bldg0312-ows.apr 12Apr01 MJJ Layout2

2.2.4 Phase I

This section outlines the proposed Phase I activities at 312 O/W. The details of each activity are provided in Section 4.0. The proposed activities are:

- Locate utilities, research the Navy map vault for utility information and update site maps with utility data.

- Mark and clear the proposed subsurface locations for drilling.

- Conduct relative survey of four existing monitoring wells, gauge and record water levels in the existing wells on the applicable forms in Appendix D and confirm south-southeast groundwater flow for the site.

- Collect two sediment samples in the ditch from the 0 to 1-foot interval below land surface (bls) for mobile laboratory screening and fixed-based laboratory confirmation.

- Use DPT to collect vadose zone soil samples from the four initial locations in and around the source area and screen the original soil boring location CEF-312-SB4 since elevated OVA-FID readings were previously documented there.

- Based on the initial OVA-FID screenings, move to the next set of borings out from the source area and use DPT to collect and screen vadose zone soil samples as necessary to delineate horizontally.

- Add additional soil sample locations as necessary to delineate soil contamination.

- At each DPT soil boring location, a soil sample will be collected for mobile laboratory screening. The sample will be collected from the interval above the water table with the highest OVA-FID reading; however, if the screening data register no readings, then a mobile lab-screening sample will be collected from the last interval screened above the water table.

- Three soil samples that represent high, medium, and low OVA concentrations for the site will be collected from the appropriate depth in a fresh soil boring within a foot of the original DPT sample location and sent to a fixed-based laboratory for used oil group analyses.

- Use DPT to collect shallow groundwater samples for mobile laboratory screening at each of the locations screened for soil contamination.

- Add additional DPT sample locations as necessary to estimate the extent of shallow groundwater contamination.

- Use DPT to collect one discrete deep groundwater sample from 26 to 30 feet bls for mobile laboratory screening.

- If the deep groundwater sample exceeds Groundwater Cleanup Target Levels (GCTLs), add 20 feet to the last interval sampled and collect and screen the groundwater at that next interval.

2.2.5 Data Evaluation

The DPT data and recommendations for the well locations will be submitted to the Navy and the FDEP. It is assumed that the Navy and the FDEP will review and comment on the data and recommendations within two weeks. Following approval of the well locations, TtNUS personnel will re-mobilize to the site for the well installation.

2.2.6 Phase II

This section outlines the proposed Phase II activities at 312 O/W, and the details of each activity are provided in Section 4.0. The proposed activities are:

- Mark and clear utilities at the proposed monitoring well locations.

- Installation of approved shallow groundwater wells and/or one deep monitoring well.

- Gauge and record water levels in the four existing monitoring wells and any newly installed monitoring wells.

- Collect groundwater samples from the newly installed monitoring wells and existing downgradient well CEF-312-02 for used oil group analyses by a fixed-based laboratory.

- Perform aquifer testing on three shallow monitoring wells concurrent with a survey of DPT sample locations and monitoring wells by a registered surveyor.

- Collect one soil IDW sample for characterization prior to disposal.

- Evaluate data from Phase I and II and prepare the SAR.

2.3 824 O/W

2.3.1 Site Description and History

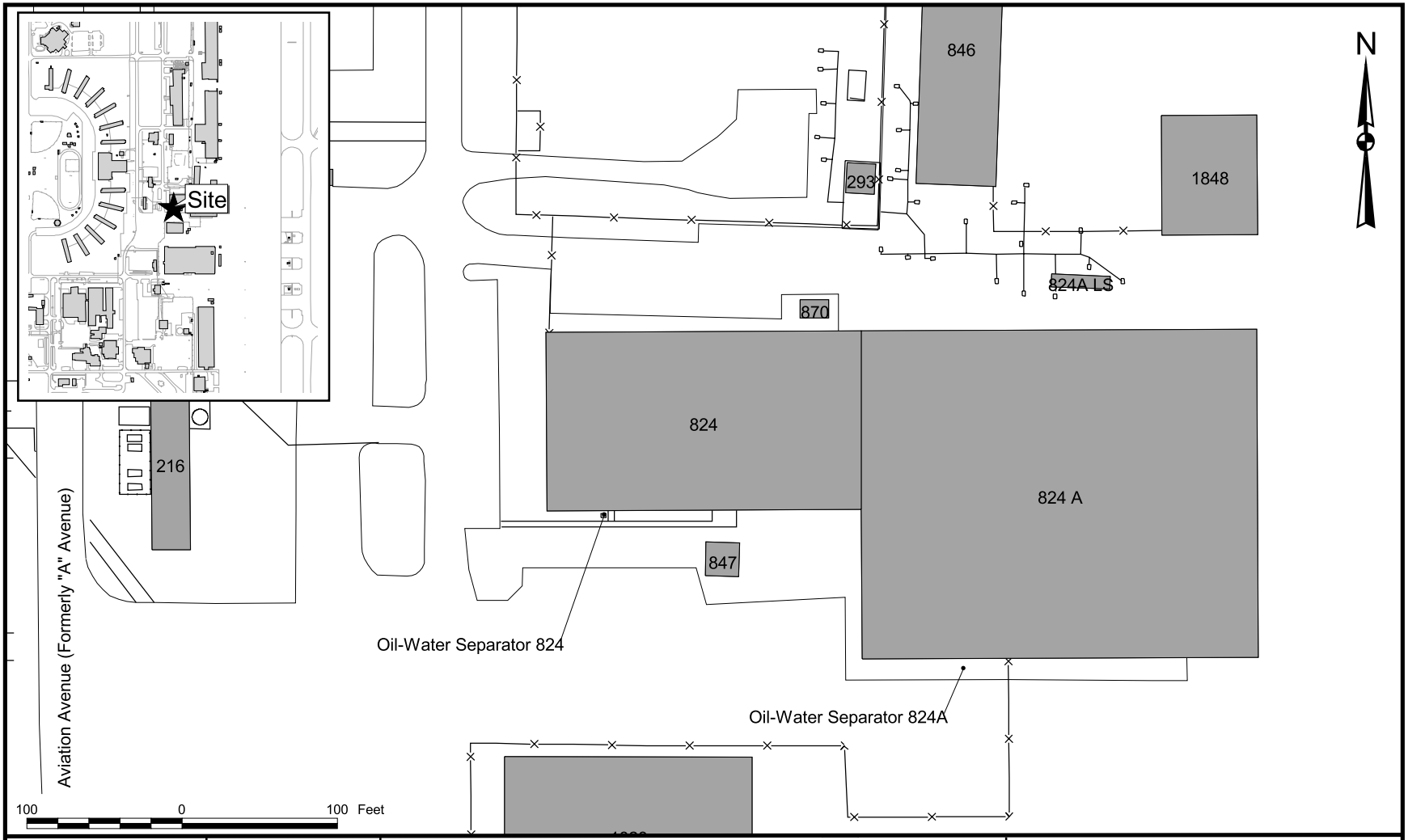
Oil/water separator 824 O/W is located on the south side of Building 824, formerly the avionics shop for NASCF (Figure 2-3). The separator is bound to the north and east by the building and a concrete ramp, respectively. Grass cover extends from the west side of the separator for several feet, and grass cover exists on the south side for a couple of feet before encountering a concrete sidewalk. There are no surface water bodies within 1,000 feet of the site. The installation date and capacity of the O/W separator are unknown (HLA, 1999b).

In September 1998, HLA initiated a confirmatory sampling investigation (HLA, 1999b). Four soil borings were conducted and screened with an OVA-FID, four subsurface soil samples were collected and analyzed for used oil group constituents, and one groundwater sample was collected from a downgradient monitoring well. HLA used the United States Geological Survey (USGS) groundwater model for NASCF (Halford, 1998) to stipulate a south-southeast flow direction for the site.

The results of HLA's investigation indicated that used oil group constituents had adversely impacted the site's soil and not the groundwater. One soil sample (CEF-824-SB4) proved excessively contaminated by OVA-FID, and subsequent lab analyses confirmed that TRPH exceeded that FDEP SCTLs. The groundwater sample results for downgradient monitoring well CEF-824-1S were non-detect for used oil group analyses except for detection of barium, chromium, and lead. The concentrations for those metals were below their respective GCTLs. Figure 2-4 shows these soil and groundwater sample locations.

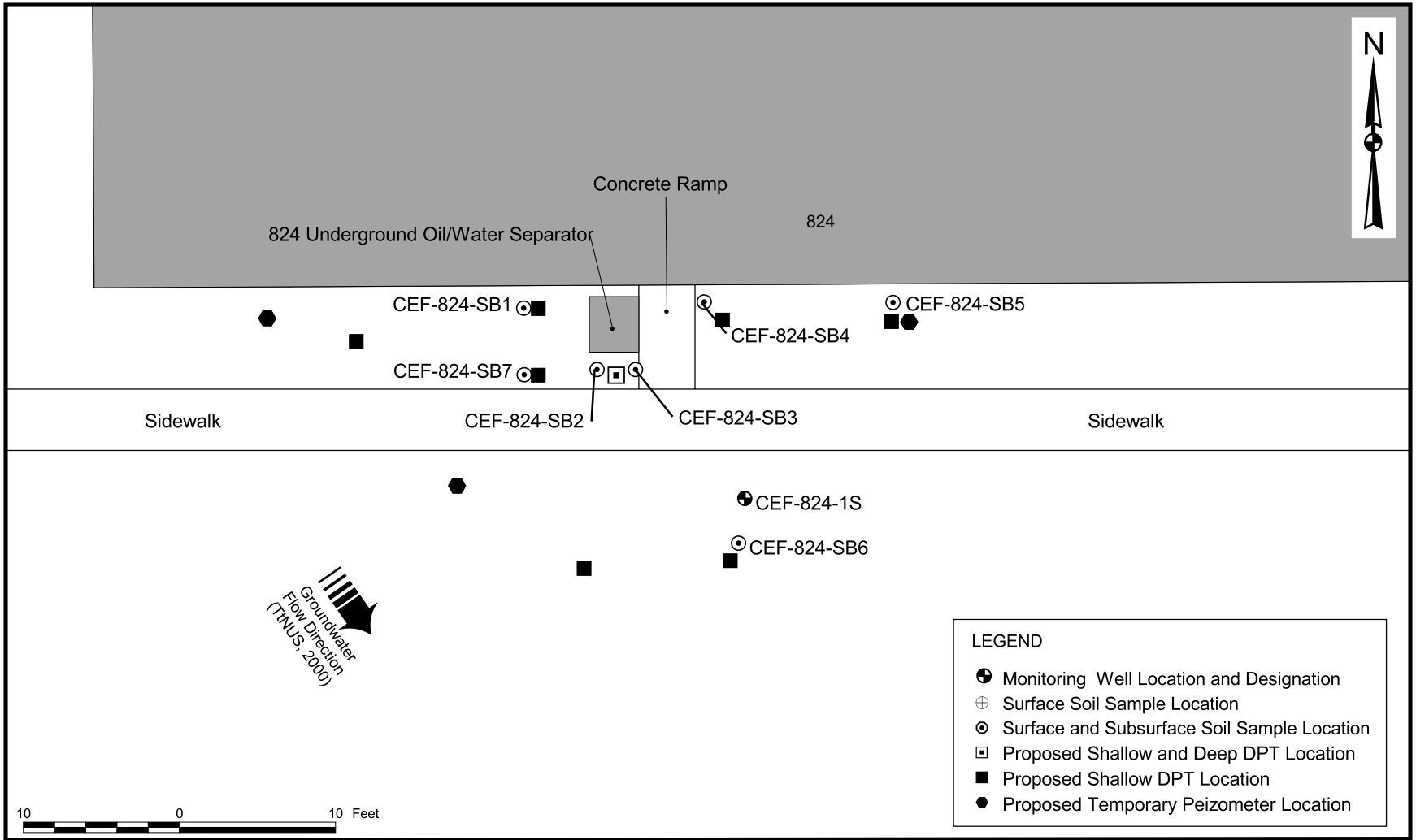
2.3.2 Conclusions And Proposed Investigation

HLA stated that contaminants in the groundwater were below regulatory limits, but the presence of soil contamination required additional action (HLA, 1999b). Since the Navy is transferring the property under federal mandate and the O/W separator remains in place, a site assessment has been ordered to address the current condition of the site before the final transfer to the new tenant.



DRAWN BY MJJ	DATE 10Apr01	SITE LOCATION MAP BUILDING 824 O/W SEPARATOR NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 121
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-3 / REV 0

P:\GIS\NAS_CecilField\bldg0824-ows.apr 12Apr01 MJJ Layout1



DRAWN BY MJJ	DATE 10Apr01	PROPOSED DPT INVESTIGATION BUILDING 824 O/W SEPARATOR NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 121
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-4 / REV 0

P:\GIS\NAS_CecilField\bldg0824-ows.apr\Layout2 JCB 4/17/01

The proposed investigation for 824 O/W separator is very similar to the plan proposed for 312 O/W, and it assumes the site is a typical UST site. The Phase I DPT sample locations are shown on Figure 2-4. Only eight locations are proposed, and the other seven locations will be field located as needed by the FOL. Additionally, temporary piezometers will be used to establish groundwater flow for the site since only one permanent monitoring well exists at the site (Figure 2-4). Phase II is planned similar to the plan for 312 O/W except that there are no surface water bodies on site that require sampling.

2.3.3 Analytical Rationale

Mobile laboratory screening analyses for the O/W sites is very similar, so this will be discussed in Section 4.0. Existing fixed-based laboratory data from the Confirmatory Sampling Report for Building 824 (HLA, 1999b) shows that used oil group analyses have been used previously at the site. TtNUS plans to use the same group of analytical methods for fixed-based laboratory analysis. Regarding soil screening with the OVA-FID, a total corrected hydrocarbon measurement of 50 parts per million (ppm), will be used to define excessively contaminated soil at the site.

2.3.4 Phase I

This section outlines the proposed Phase I activities at 824 O/W. The details of each activity are provided in Section 4.0. The proposed activities are:

- Locate utilities, research the Navy map vault for utility information, and clear the proposed subsurface locations for drilling.

- Use DPT to install three temporary piezometers in the shallow water table zone to establish groundwater flow.

- Conduct relative survey of the top-of-casing of the temporary piezometers and the monitoring well CEF-824-1S, gauge and record water levels in the monitoring well and piezometers on the applicable forms in Appendix D and determine groundwater flow direction for the site.

- Use DPT to collect vadose zone soil samples from the four initial proposed locations in and around the source area and screen with OVA-FID.

- Based on the initial OVA-FID reading, move to the next set of borings out from the source area and use DPT to collect and screen vadose zone soil samples as necessary to delineate horizontally.

- Add additional soil sample locations as necessary to delineate soil contamination.

- At each DPT soil boring location, a soil sample will be collected for mobile laboratory screening. The sample will be collected from the interval above the water table with the highest OVA-FID reading; however, if the screening data register no readings, then a mobile lab-screening sample will be collected from the last interval screened above the water table.

- Three soil samples that represent high, medium, and low OVA concentrations for the site will be collected from the appropriate depth in a fresh soil boring within a foot of the original DPT sample location and sent to a fixed-based laboratory for used oil group analyses.

- Use DPT to collect shallow groundwater samples for mobile laboratory screening at each of the locations screened for soil contamination.

- Add additional DPT sample locations as necessary to estimate the extent of shallow groundwater contamination.

- Use DPT to collect one discrete deep groundwater sample from 26 to 30 feet bls for mobile laboratory screening.

- And, If the deep groundwater sample exceeds GCTLs, add 20 feet to the last interval sampled and collect and screen the groundwater at that next interval.

2.3.5 Data Evaluation

The DPT data and recommendations for the well locations will be submitted to the Navy and the FDEP. It is assumed that the Navy and the FDEP will review and comment on the data and recommendations within two weeks. Following approval of the well locations, TtNUS personnel will re-mobilize to the site for the well installation.

2.3.6 Phase II

This section outlines the proposed Phase II activities at 312 O/W, and the details of each activity are provided in Section 4.0. The proposed activities are:

- Mark and clear utilities at the proposed monitoring well locations.

- Installation of approved shallow groundwater wells and/or one deep monitoring well.

- Gauge and record water levels in the three temporary piezometers, one existing monitoring well, and any newly installed monitoring wells.

- Collect groundwater samples from the newly installed monitoring wells and existing downgradient well CEF-824-1S for used oil group analyses by a fixed-based laboratory.

- Perform aquifer testing on three shallow monitoring wells (if no permanent wells are planned, then two of the temporary piezometers may be retained for this purpose).

- Concurrent with the aquifer testing, a survey of DPT sample locations and monitoring wells will be conducted by a registered surveyor.

- Collect one soil IDW sample for characterization prior to disposal.

- Remove the temporary piezometers and grout the remaining hole.

- Evaluate data from Phase I and II and prepare the SAR.

2.4 NFF

2.4.1 Site Description and History

The NFF is located at the northeast corner of A Avenue and Loop Road. There were six 595,000-gallon cut-and-cover storage tanks used to store jet fuel (JP-5). The six tanks were covered under a single large mound with approximately 19 feet of topographic relief. The tanks were numbered 76 and 76-A through 76-E. Two of the tanks were installed in 1952 and the other four were installed in 1954. Tank 76-E was taken out of service in 1991, when it was determined to be leaking. The other tanks remained in service until approximately mid-September 1999.

In addition to releases due to normal operations and tank leakage, three major JP-5 spills were documented at the site:

- August 3, 1987 22,772 gallons
- February 10, 1991 913,000 gallons
- November 28, 1993 1,800 gallons

Petroleum releases at the site resulted in the presence of free petroleum product, excessively contaminated soil, and groundwater contamination at concentrations exceeding FDEP cleanup standards.

Site assessments were conducted from 1991 to 1995. Approximately 200 soil borings and 40 monitoring wells were installed at the site and a DPT groundwater investigation was performed. A contamination assessment report (CAR) was issued in 1992 and a technical memorandum presenting the findings of the DPT investigation was issued in 1995.

Remedial actions were conducted at the site beginning in 1995. Approximately 11,000 cubic yards of soil were excavated on the west side of the tank farm mound and at the JP-5 spill site at the northeast corner of the tank mound. During 1995 and 1996 a bioslurping and interceptor trench system were operated at the tank mound in an attempt to recover free product and to treat vadose zone soil. A CAR addendum was issued in 1996, which incorporated the new site assessment and remediation data. A remedial action plan (RAP) was issued in 1997, recommending a variety of technologies to remediate the free product, contaminated soil and groundwater plume. A pilot-scale test of recirculation well technology was conducted at the site from 1997 through 1999. An additional 9,500 cubic yards of soil were excavated from the west side of the tank farm in 1999.

In 1999, removal of the tanks and tank mound was chosen as the final plan for soil remediation at the NFF site. A RAP addendum was prepared which outlined the impact of the tank removal on future remedial actions planned for the site. Groundwater sampling to evaluate natural attenuation and contaminant migration at the site was conducted from 1999 to 2000. The most recent groundwater concentration data from July 2000 is condensed on Figure 2-5 to illustrate the known extent of the plume. Source removal at the NFF and adjacent Truck Stand began in September 2000 and was completed in January 2001. The removal included the six bulk-storage tanks and the soil mound around them. Since the loss of that mass will directly affect the hydrogeology of the site, the Navy and the FDEP agreed that a supplemental site assessment is necessary to evaluate the impact of the source removal.

2.4.2 Analytical Rationale

Existing fixed-based laboratory data from previous investigations indicate that volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) are the primary contaminants. However, with the removal of the bulk storage tanks and the dramatic change to the local geology, the first round of sampling will be for Kerosene Analytical Group (KAG) constituents. Subsequent groundwater sampling rounds, following the SAR submittal, will be considered for a reduced set of analytical methods.

Several source removals have been performed for known sources at the NFF. The source removal that was completed in January 2001 was intended to be the final requirement for soil remediation at the site. The remedial action contractor is currently preparing a source removal report. The draft Source Removal Report indicates that all petroleum impacted soil has been removed from NFF. Therefore, no soil assessment will be included in this SAP for NFF.

The DPT investigation at NFF will involve a new technology [Membrane Interface Probe/Soil Conductivity (MIP/SC)] and traditional DPT/Mobile laboratory groundwater screening. The following paragraphs give a brief description of MIP/SC. Actual field operations for both types of DPT work at NFF is discussed in Section 4.0.

The MIP/SC probe is 1.5-inches in diameter and approximately 12-inches in length. The probe is driven into the ground at the rate of one foot per minute using a Geoprobe® or similar direct push rig.

The soil conductivity portion of the tool utilizes a dipole measurement arrangement. An alternating electrical current is passed from the center, isolated pin of the SC probe to the probe body. The voltage response of the soil to the imposed current is measured across the same two points. The probe is reasonably accurate for measurement of soil conductivities in the range of 5 to 400 microsiemens per meter (mS/m). In general, at a given location, lower conductivities will indicate sands while higher conductivities are indicative of silts and clays.

The MIP portion of the probe was developed and patented by Geoprobe Systems, Inc. The operating principle is based on heating the soil and/or water around a polymer membrane allowing VOCs to partition (absorb) across the polymer membrane. Because the immediate area around the membrane is heated (80 to 125 °C operating temperature) and the membrane is thin, this movement across the membrane is very rapid. After diffusing across the membrane, the VOCs partition into the carrier gas, which sweeps the back side of the membrane. It takes about 35 seconds for the carrier gas stream to then travel through about 100 feet of inert tubing and reach the installed detectors.

Generally three detectors are used: FID, photoionization detector (PID), and electrical conductivity detector (ECD) mounted on a laboratory grade gas chromatograph. The output signal from the detectors is displayed continuously in real time during each push of the probe. In addition, the data logs can be printed for display and analysis following the data logging run or exported to a common spreadsheet software.

2.4.3 Phase I

This section outlines the proposed Phase I activities at NFF. Figure 2-5 provides the locations of the proposed DPT locations. Approximately, 85 DPT locations are expected for DPT-MIP/SC probing. The details of each activity are provided in Section 4.0. The proposed activities are:

- Locate utilities, research the Navy map vault for utility information and update site maps with utility data.

- Survey and mark the sampling grid for DPT-MIP/SC locations and determine the elevation of sampling grid locations.

- Clear subsurface utilities at the proposed locations for DPT-MIP/SC.

- Verify top-of-casing elevation data for the existing monitoring wells, take synoptic water levels from the existing wells and surface water bodies, recording the data on the applicable forms in Appendix D, and establish groundwater flow direction for the site.

- Mobilize DPT crew to site and use them to install 12 piezometers as needed to supplement groundwater elevation data. Three per each of four arbitrarily assigned zones in the shallow aquifer [shallow (10 to 15 feet bls), upper intermediate (30 to 35 feet bls), lower intermediate (70 to 75 feet bls), and deep (105 to 110 feet bls)].

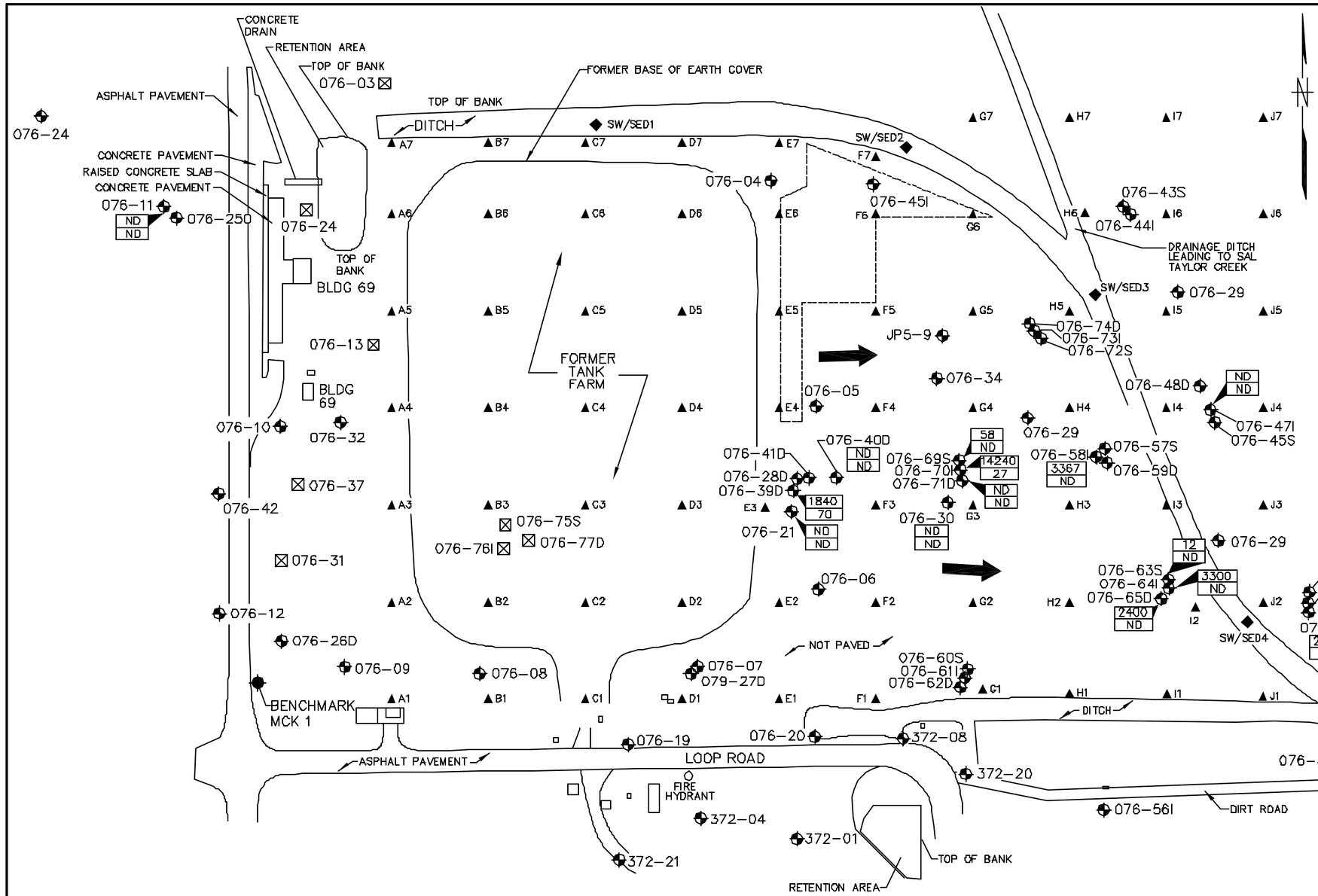
- Advance MIP/SC probe to 120 feet bls at 85 locations to collect soil conductivity and gas chromatograph (GC) data.

- Use DPT to advance soil borings at up to six selected locations to approximately 120 feet to collect soil, logging samples for correlation of site specific lithologies with soil conductivity data.

- Use DPT to collect groundwater samples for mobile laboratory screening from selected depth intervals based on MIP/SC response (TtNUS estimates this will be required at up to 30 percent of the 85 MIP/SC locations).

- Collect four co-located pairs of surface water/sediment samples from along the creek located to the north and east of the NFF for offsite laboratory analysis.

S:\PROJECTS\NASCF\CTO 72\CAD\0013PW02apr01



LEGEND:

- ▲ PROPOSED DPT GROUNDWATER SAMPLING LOCATION
- ◆ PROPOSED SURFACE WATER/SEDIMENT SAMPLING LOCATION
- EXISTING MONITORING WELL (S=SHALLOW, I=INTERMEDIATE, D=DEEP)
- ⊠ ABANDONED MONITORING WELL

1840 ◄ BTEX
70 ◄ TOTAL NAPHTHALENES

REPORTED CONCENTRATIONS (MICROGRAMS PER LITER) IN GROUNDWATER SAMPLES COLLECTED JULY 2000

ND NO ANALYZED CONSTITUENT DETECTED BY LAB

APPROXIMATE DIRECTION OF GROUNDWATER FLOW

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY LLK DATE 4/16/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

PROPOSED GROUNDWATER AND SURFACE WATER/SEDIMENT SAMPLING LOCATIONS
NORTH FUEL FARM
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. 3996
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2-5
REV. 0

FORM CADD NO. SOIV_BH.DWG – REV 0 – 1/20/98

2.4.4 Data Evaluation

The DPT-MIP/SC data, DPT-mobile laboratory data, and recommendations for additional permanent well locations will be submitted to the Navy and the FDEP for review. It is assumed that the Navy and the FDEP will review and comment on the data and recommendations within two weeks. Following approval of the well locations, TtNUS personnel will re-mobilize to the site for the well installation.

2.4.5 Phase II

This section outlines the proposed Phase II activities at NFF. The details of each activity are provided in Section 3.0. The proposed activities are:

- Mark and clear utilities at the proposed monitoring well locations.
- Install up to 40 monitoring wells (up to ten monitoring wells per each of the four possible zones) at approved locations and screened intervals.
- Gauge and record water levels from selected existing monitoring wells and the newly installed monitoring wells.
- Collect groundwater samples from the newly installed monitoring wells, and existing wells where appropriate, for KAG analyses by a fixed-based laboratory.
- Perform aquifer testing on three shallow monitoring wells and three intermediate or deep monitoring wells concurrent with a survey of DPT sample locations and monitoring wells by a registered surveyor. Additional aquifer testing will be conducted, as needed following completion of the Phase I evaluation.
- Collect a total of four composite soil IDW samples, one representing each of the four zones, for characterization prior to waste disposal.
- Evaluate data from Phase I and II and prepare the SAR.

3.0 SITE-SPECIFIC SCOPE OF WORK – MOP SITES

3.1 BP WELLS

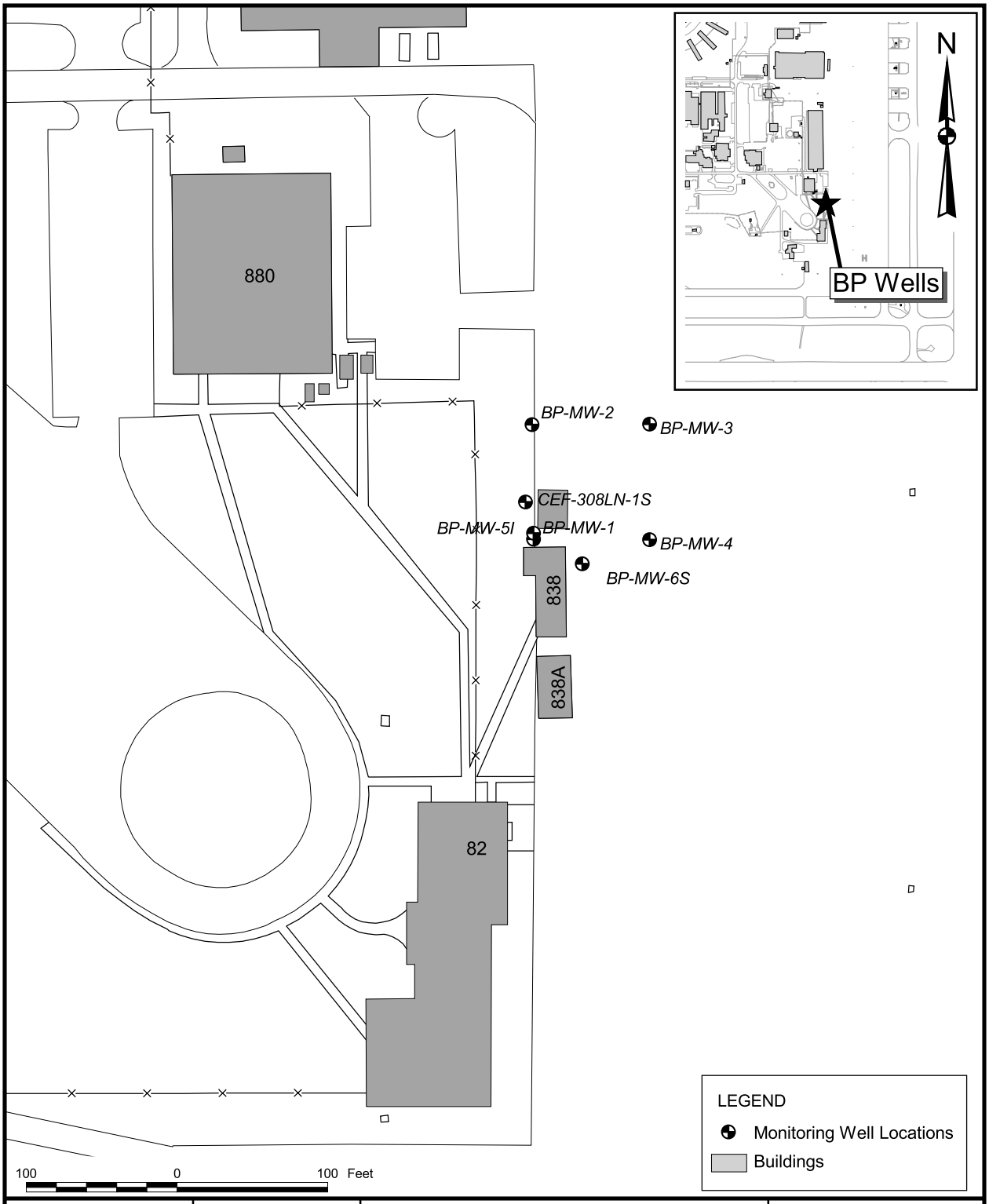
BP Wells is located on the north-south flightline, southeast of Building 880, on the west edge of the apron (Figure 3-1). TtNUS conducted a groundwater investigation at the site in February 2000 to follow-up on a previous investigation by Golder and Associates (1999). The Golder report indicated several contaminants were exceeding GCTLs in samples from monitoring wells CEF-BP-01S and CEF-BP-02S. The analytical results from two events conducted by TtNUS (2000) at the site indicated that three contaminants (total xylenes, 1, 2, 4-trimethylbenzene, and 1, 3, 5-trimethylbenzene) were confirmed for monitoring well CEF-BP-01S. The FDEP responded to the SAR with a Natural Attenuation Monitoring Plan Order (FDEP, 2000). The order is attached as Appendix A. Sampling activities and procedures will be conducted in general accord with the CompQAP.

In accordance with the FDEP order, the monitoring wells CEF-BP-1S and CEF-BP-6S (Figure 3-1) will be sampled semi-annually beginning in April 2001. The next scheduled event is in October 2001. The sampling analyses are listed by name and method list on Table 3-1 with bottleware, preservation and holding times. Table 3-2 provides sample identification numbers and location for the first round. Subsequent rounds will simply change the suffix on each identification number to match that round (e.g., Round 2 = 02, Round 3 = 03, and so on). Water levels will be collected from each of the wells listed on the form in Appendix D.

Access to the site will be coordinated at least one week ahead of schedule with the Jacksonville Port Authority (JPA) Facilities Supervisor (see Section 6.0). Analytical turnaround time for the results for this event will be provided on a 28-day (standard) basis.

3.2 NSAP

The NSAP site is located on the north-south flightline, east of Building 815, on the east edge of the apron (Figure 3-2). TtNUS installed and sampled several groundwater monitoring wells between November 1999 and November 2000 to confirm an earlier investigation's finding of benzene above GCTLs (HLA, 1999). Several shallow and intermediate wells were installed, and the analytical results indicated that two contaminants (benzene and/or total xylenes) were detected in the groundwater samples from three wells (CEF-M18-2I, CEF-M18-3I, and CEF-M18-4I) at concentrations above GCTLs. The FDEP responded to the SAR with a Natural Attenuation Monitoring Plan Order (FDEP, 2001). The order is attached as Appendix B. Sampling activities and procedures will be conducted in general accord with the CompQAP.



DRAWN BY MJJ	DATE 12Jun00	SITE LOCATION MAP BP WELLS SITE MONITORING ONLY FOR NATURAL ATTENUATION NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 3996
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 / REV 0

P:\GIS\CECIL\PSC47.APR\1-1 Layout JCB 4/20/01

TABLE 3-1

SITE-SPECIFIC ANALYTICAL REQUIREMENTS
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES
BP WELLS AREA

Analyses	Analytical Methods	Bottleware	Preservation	Holding Times[3]
Select VOCs[1]	SW-846 8260B[2]	3 40-ml glass; Teflon-lined septum	Cool to 4 degrees C, pH < 2 with HCl	14 days to analysis

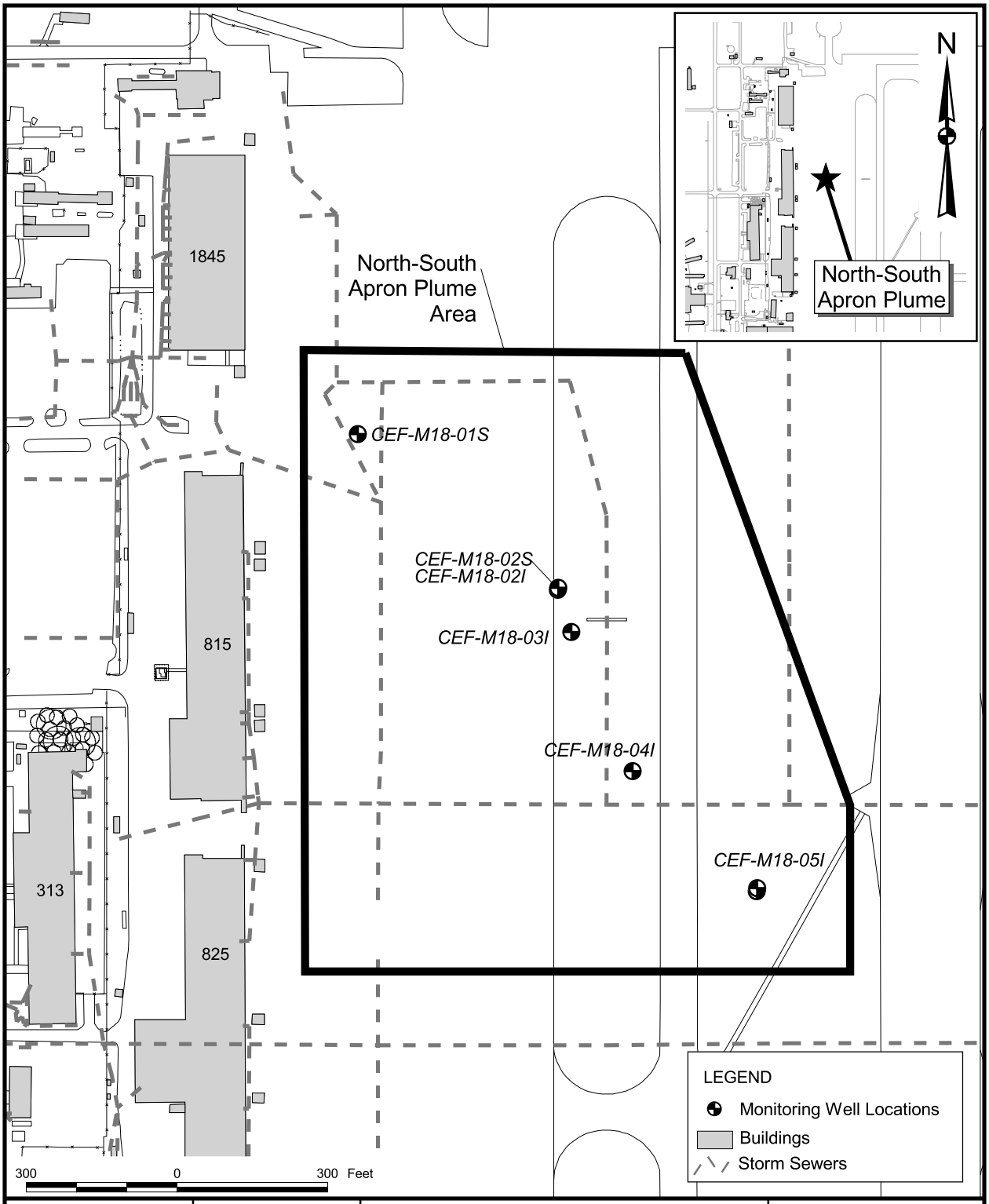
Notes:
[1] Total Xylenes, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.
[2] Record method on chain of custody with asterisk and write in comments "*Report only xylenes, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene."
[3] Holding times are measured from the date/time of sample collection.

TABLE 3-2

SITE-SPECIFIC GROUNDWATER SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES
BP WELLS AREA

Sample ID	Location	Analytical Methods
		SW846 8260B
CEF-BP-GW-1S-01	CEF-BP-1S	X
CEF-BP-GW-6S-01	CEF-BP-6S	X
CEF-BP-GW-DUP1-01	CEF-BP-1S	X

Note:
DUP = duplicate.
Refer to Table 3-1 for details of analytical methods, bottleware, preservation and holding times.



DRAWN BY MJJ	DATE 09Nov99	SITE LOCATION MAP NORTH-SOUTH APRON PLUME MONITORING ONLY FOR NATURAL ATTENUATION 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 3-2 / REV 1

P:\GIS\NAS_CecilField\MB18.apr\1-1 Layout JCB 4/18/01

In accordance with the FDEP order, the monitoring wells CEF-M18-2I, CEF-M18-3I, CEF-M18-4I, and CEF-M18-5I (Figure 3-2) will be sampled quarterly beginning in May 2001. Also, in accordance with the FDEP order, TtNUS will sample monitoring well CEF-M18-1S once during the first quarterly sampling event for VOCs. The sampling analyses are listed by name and method list on Table 3-3 with bottleware, preservation and holding times. Table 3-4 provides sample identification numbers. To avoid confusion with previous rounds, the first quarterly round will carry the suffix “05” and subsequent rounds will simply ascend sequentially (e.g., Round 2 = 06, Round 3 = 07, and so on). Water levels will be collected from each of the wells listed on the form in Appendix D.

Access to the site will be coordinated at least one week ahead of schedule with the JPA Facilities Supervisor (see Section 6.0). Analytical turnaround time for the results for this event will be provided on a 28-day (standard) basis.

TABLE 3-3

SITE-SPECIFIC ANALYTICAL REQUIREMENTS
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES
NORTH-SOUTH APRON PLUME

Analyses	Analytical Methods	Bottleware	Preservation	Holding Times[3]
Select VOCs[1]	SW-846 8260B[2]	3 40-ml glass; Teflon-lined septum	Cool to 4 degrees C, pH < 2 with HCl	14 days to analysis
VOCs[4]	SW846 8260B[5]	3 40-ml glass; Teflon-lined septum	Cool to 4 degrees C, pH < 2 with HCl	14 days to analysis

Notes:
[1] Benzene, toluene, ethylbenzene and total xylenes (BTEX).
[2] Record method on chain of custody with asterisk and write in comments "*Report only BTEX."
[3] Holding times are measured from the date/time of sample collection.
[4] One time sampling requirement for monitoring well CEF-M18-1S during first quarter (May 2001).
[5] Record method on chain specifically for CEF-M18-1S with double asterisk and write in comments "**Report full method list."

TABLE 3-4

SITE-SPECIFIC GROUNDWATER SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES
NORTH-SOUTH APRON PLUME

Sample ID	Location	Analytical Methods
		SW846 8260B
CEF-M18-GW-1S-05[1]	CEF-M18-1S	X
CEF-M18-GW-2I-05	CEF-M18-2I	X
CEF-M18-GW-3I-05	CEF-M18-3I	X
CEF-M18-GW-4I-05	CEF-M18-4I	X
CEF-M18-GW-5I-05	CEF-M18-5I	X
CEF-M18-GW-DUP1-05	CEF-M18-3I	X
CEF-M18-GW-MD1-05	CEF-M18-2I	X

Note:
[1] This well to be sampled only once during first event in May 2001.
DUP = duplicate.
MD = matrix spike and matrix spike duplicate.
Refer to Table 3-1 for details of analytical methods, bottleware, preservation and holding times.
Begin first MOP event with Round 5 to avoid confusion with previous SAR identification numbers.

4.0 FIELD OPERATIONS

This section describes field operations for the SA investigations and MOP sites specified in Section 1.0. This section outlines the project-specific field investigation activities that will be conducted. Field operation activities to be performed at NASCF for this investigation include mobilization of equipment, DPT, MIP/SC, monitoring well installation, monitoring well development, water-level measurements, field measurements, specific capacity testing, site surveying, equipment decontamination, waste handling, and site restoration. These procedures are to be used in conjunction with the BWGWP and the EISOPQAM.

4.1 SITE RESTORATION

If investigation activities (e.g., DPT and monitoring well installation) disturb or alter the landscape, vegetation, or other features any of the SA sites, the site(s) may require restoration to conditions prior to the investigation. If vegetation is stressed or damaged as a result of investigation activities, the affected area will be reseeded. It is anticipated that the area east of the creek at NFF will have to be cleared of brush and vegetation to allow access for the trucks and drill rigs. All locations drilled through asphalt or concrete will be completed with similar material and finished flush to existing grade.

4.2 UTILITY CLEARANCE

Prior to any machine-assisted ground penetrations at each of the five sites, utility clearance will be conducted in accordance with TtNUS SOP HS1.0. For properties currently leased by the JPA, permits required by that authority will be obtained. Appendix E contains a copy of the JPA dig/permit request. Any utility conflicts will be resolved prior to commencing ground penetration activities. An effort will be made to research the NASCF map vault at Building 1 for known utility line location, and TtNUS site maps will be updated to include that information.

4.3 EQUIPMENT CALIBRATION

The water quality indicator will be calibrated prior to mobilization and periodically at the discretion of the FOL. Other instruments, that require it, will be calibrated daily and/or according to the manufacturer's operation manual.

Calibration will be documented on an Equipment Calibration Log as shown in Appendix F. During calibration, an appropriate maintenance check will be performed on each piece of equipment. If damaged

or defective parts are identified during the maintenance check and it is determined that the damage could have an impact on the instrument's performance, the instrument will be removed from service until defective parts are repaired or replaced.

4.4 TEMPORARY PIEZOMETER INSTALLATION

Using DPT, TtNUS plans to have temporary piezometers installed as described in Section 2.0 for the 824 O/W site and the NFF. Large diameter DPT rods will be pushed to the desired depth with an expendable stainless steel tip. Temporary piezometers, constructed of approximately 1.25-inch inside diameter (ID) Schedule 40, flush-joint polyvinyl chloride (PVC) riser and flush-joint PVC 0.010-inch factory-slotted well screen, will be inserted through the rod and pushed to free the expendable tip from the push rods. Then clean sand (20/30 grade) will be added between the rods and the well material to adequately cover the screen. Then the rods will be extracted and the borehole allowed to collapse around the riser. The riser pipe will have at least 1 to 3 feet of stickup and will be capped. Shallow, water table screen sections for the piezometers will be 10 feet in length and positioned to intersect the water table. It is estimated that the depth of these piezometers will be approximately 12 feet bls. Intermediate and deep zone piezometer screens will be 5 feet in length. The piezometers will be developed for about a half-hour to ensure the screens are not clogged, but no water quality data will be collected.

4.5 DPT INVESTIGATION – O/W SITES

DPT soil borings will initially be installed in and around the source area at each site. If the field screening data indicates that the soil and/or the groundwater has been impacted by petroleum products then step-out borings will be installed approximately on a 15 foot by 15 foot grid until the extent of soil an/or groundwater contamination has been delineated. The grid spacing may be adjusted as necessary based on screening results and site conditions. Upon completion of mobile laboratory screening, the TtNUS personnel may return with the DPT field crew to collect the fixed-based laboratory soil samples or this activity may be accomplished solely by TtNUS personnel.

The DPT sample location design for 824 O/W is similar to that for 312 O/W with one major exception. The 824 O/W site requires temporary piezometers from which to gauge groundwater flow due to the lack of existing monitoring wells.

4.5.1 DPT Soil Investigation

Soil samples will be collected continuously from the ground surface to the water table. Soil samples will be collected either by stainless stell hand auger or with a 4-foot DPT tool sampler with plastic liners. Vadose zone soils, defined as being from land surface to 1 foot above the water table, will be screened for vapors with an OVA-FID, following procedures for headspace analysis specified in Chapter 62-770.200(8), FAC. If soil contamination is identified above 50 ppm, for "excessively contaminated soil" (defined by Chapter 62-770.200(8), FAC) at any proposed DPT location, additional DPT soil borings will be advanced to assess the extent of soil contamination at each site. The soil borings will be advanced until the water table is encountered. It is anticipated that groundwater will be encountered within 1 to 10 feet of the ground surface. Prior to beginning each bore hole, the drilling crew will hand auger or post hole from the surface to 4 feet bls to ensure that no underground utilities are present. The expected approach at each DPT sample location, assuming the depth to water has been established, is as follows:

1. DPT crew will hand auger or post hole to 4 feet to clear utilities.

2. TtNUS personnel will collect vadose zone soil samples (over the 0- to 4-foot interval) from the hand auger cuttings at 1-foot intervals and screen with an OVA-FID.

3. While TtNUS personnel perform soil screening the DPT crew will advance the DPT sampling tool from 4 to 8 feet bls, remove the plastic sleeve containing the soil core and cut the sleeve open for inspection by the TtNUS geologist.

4. After the DPT soil sampler is removed, TtNUS or DPT personnel will use a water level indicator to determine if groundwater has been encountered and if so, the approximate depth to groundwater.

5. If groundwater is encountered at less than 4 feet bls, then the DPT crew will install a Geoprobe® retractable screen sampler and begin collecting a groundwater sample. No soil screening will be performed on the soil sample collected from 4 to 8 feet bls; however, the sample will be used to log lithologic data. A second hand auger soil boring will then be advanced next to the original boring and a sample collected from the interval with the highest OVA results for submittal to the mobile lab for screening.

6. If the water table is between 4 and 8 feet bls, the DPT crew will collect that soil sample, set it aside for the geologist to divide as necessary, and re-tool for groundwater sampling. If the water table is between 8 and 12 feet bls, then the DPT crew will collect the soil sample for that interval, set it aside for the geologist to divide as necessary, and then re-tool for groundwater sampling.

7. TtNUS personnel will consistently divide each 1-foot interval leaving approximately half of the interval undisturbed, and they will use the other half for OVA-FID screening. If excessively contaminated soil is identified, then the geologist will provide the mobile laboratory a sample from that depth for screening.

In accordance with Chapter 62-770.600(3)(e), FAC, soil samples will be collected from a minimum of three soil borings at each site for off-site laboratory analysis to confirm OVA results. The boring locations and sample intervals will be selected to coincide with samples that exhibit high, medium and low field screening results during the OVA-FID soil screening. The samples will be analyzed for used oil group constituents as defined in Chapter 62-770, FAC.

Each soil boring will be backfilled with Type 1 Portland Cement. The on-site geologist, in accordance with TtNUS SOP GH 1.5 (Borehole and Sample Logging), will maintain a complete log of each boring. A boring log form is included in Appendix F; at a minimum, the boring log will contain the following information:

- Sample Numbers and Types
- Sample Depths
- Soil Density or Cohesiveness
- Soil Color
- Unified Soil Classification System (USCS) Material Description
- OVA-FID Measurements

4.5.2 DPT Groundwater Investigation

As indicated previously, the initial round of DPT sampling locations (approximately four or five around each separator) will be screened for soil data. Likewise, these locations will be screened for potential groundwater contamination. If petroleum contamination is reported by the mobile laboratory, then DPT groundwater samples will be collected outward from the source area at the next set of planned DPT sample locations downgradient or sidegradient, as applicable, to delineate the contamination. Based on depth to the water table, the DPT groundwater sampler will be inserted approximately 3 to 4 feet into the water table. A single groundwater grab sample will be collected from the termination of each DPT boring for analysis by the mobile laboratory. The DPT sampler will be extended to a depth of 30 feet at the location(s) indicated on Figures 2-2 and Figure 2-4 to collect a discrete sample for vertical definition of the plume in that area. Likewise, if the vertical extent sample indicates contamination in excess of GCTLs, then additional samples will be collected every 20 feet until the vertical extent is defined.

The groundwater sample will be collected using a peristaltic pump and environmental-grade Teflon® tubing provided by the driller. The driller is expected to be using Geoprobe® Screen Point Samplers with 4-foot long stainless steel screens. Three screen volumes will be extracted at each location, and no water quality data will be collected.

4.6 DPT WITH MIP/SC GROUNDWATER INVESTIGATION – NFF

Prior to beginning each bore hole, the drilling crew will hand auger or post hole from the surface to four feet bls to ensure that no underground utilities are present. TtNUS plans to conduct DPT screening using MIP/SC. TtNUS will direct the DPT subcontractor to advance the MIP/SC probe at each planned DPT location shown on Figure 2-5 collecting soil conductivity and VOCs groundwater concentration data. The proposed grid may be expanded as indicated by incoming data so that the groundwater contamination may be delineated.

Following completion of the DPT-MIP/SC work, the DPT will be used to collect continuous soil cores from at least six locations. Those locations will be determined following the DPT-MIP/SC work and the locations will be based partially on soil conductivity data and partially on an even spatial distribution. The soil lithologic data will be correlated with the soil conductivity data to help in modeling the subsurface strata.

The groundwater flow data, MIP/SC data, and soil stratigraphic data will be analyzed to determine where and at what depth to collect DPT groundwater samples for mobile lab analysis. The locations will be chosen to confirm the MIPs data and determine the optimum number and location of permanent monitoring wells. The groundwater sample will be collected using a peristaltic pump and environmental-grade Teflon® tubing provided by the driller. The driller is expected to be using Geoprobe® Screen Point Samplers with 4-foot long stainless steel screens. Three screen volumes will be extracted at each location, and no water quality data will be collected.

4.7 MOBILE LABORATORY ACTIVITIES

The DPT mobile lab subcontractor will provide the sampling crew with adequate and appropriate bottleware for collection of both soil and groundwater samples. The mobile lab will analyze each sample for benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene and diesel range organics (DRO). The mobile lab will be responsible for the safe and appropriate management and disposal of all chemicals and reagents used by the mobile lab. The data generated by the mobile lab will be screening-quality data; however, it is anticipated that two separate runs may be required for each sample in order to collect reasonably accurate naphthalene and DRO results without compromising the BTEX results. No QA/QC samples will be collected for mobile laboratory screening.

4.8 PERMANENT MONITORING WELL INSTALLATION

The permanent groundwater monitoring wells will be installed and constructed in accordance with applicable guidelines from the following sources: SOUTHDIV (1998), St. Johns River Water Management District (1995), and the USEPA (1996). In some cases, site conditions, geologic settings, or unknown factors, may require slight modifications in well installation and/or construction methods. All 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.

Based on the groundwater mobile laboratory screening results, permanent groundwater monitoring wells will be installed. The exact location and number of permanent monitoring wells will be determined following an evaluation of the DPT data. It is anticipated that monitoring wells at the O/W separator sites will be installed to approximate depths of 15 feet and 35 feet as needed. Additionally, it is anticipated that wells will be installed to four approximate depth zones: 15 feet bls, 35 feet bls, 75 feet bls, and 120 feet bls. The actual depth may vary based on site conditions and the geologic setting. The location and depth of each well will also depend on the respective contaminant plume being delineated.

The shallow wells will monitor the top of the surficial aquifer; the intermediate wells will monitor the middle of the surficial aquifer, whereas the deep wells will monitor the bottom of the surficial aquifer. The top of the screened interval for the shallow monitoring wells will be placed approximately 2 to 4 feet above the water table, if depth to the water table allows it. Since the wells will only be installed in the surficial aquifer, these monitoring wells will be single-cased.

Permanent monitoring wells, planned for depths less than 60 feet bls, are intended for hollow stem auger installation. Permanent monitoring wells, planned for depths greater than 60 feet bls, are intended for mud rotary drilling installation. A complete Monitoring Well Log and Certificate of Conformance (Appendix F) will be recorded for each well installed.

The monitoring wells will be constructed of 2-inch ID, flush-threaded PVC well screen and compatibly threaded PVC well casing riser. PVC shall meet National Sanitation Foundation (NSF) Standard 14 as specified in USEPA (1996). Well screens for shallow monitoring wells will be 10 feet long with 0.010-inch machined slots. Intermediate and deep well screens will be 5 feet long with 0.010-inch machined slots. For all of the monitoring wells, a primary filter pack of clean, silica sand will be installed flush or just below the bottom of the well to about 2 feet above the top of the well screen. Sand passing U.S. Standard Sieve No. 20-30 will be used for the filter pack. Approximately 2 feet of U.S. Standard Sieve No. 30-65 sand will be poured on top of the primary filter pack to act as a seal. The annular space above the fine sand seal will be grouted with neat portland cement (Type I) from the top of the fine sand seal to within 1.5 feet of ground surface. The concrete used to form the pad will fill the remaining annular space. The concrete pad

and protective well cover may be installed for up to 24 hours following the installation of the cement grout seal. Figure 4-1 illustrates a typical flush mount monitoring well construction, and Figure 4-2 illustrates a typical monitoring well construction with above-grade casing. In keeping with the existing well construction at the sites, the O/W separator sites will be constructed as flush mount wells, and the NFF wells will be constructed as above-grade wells.

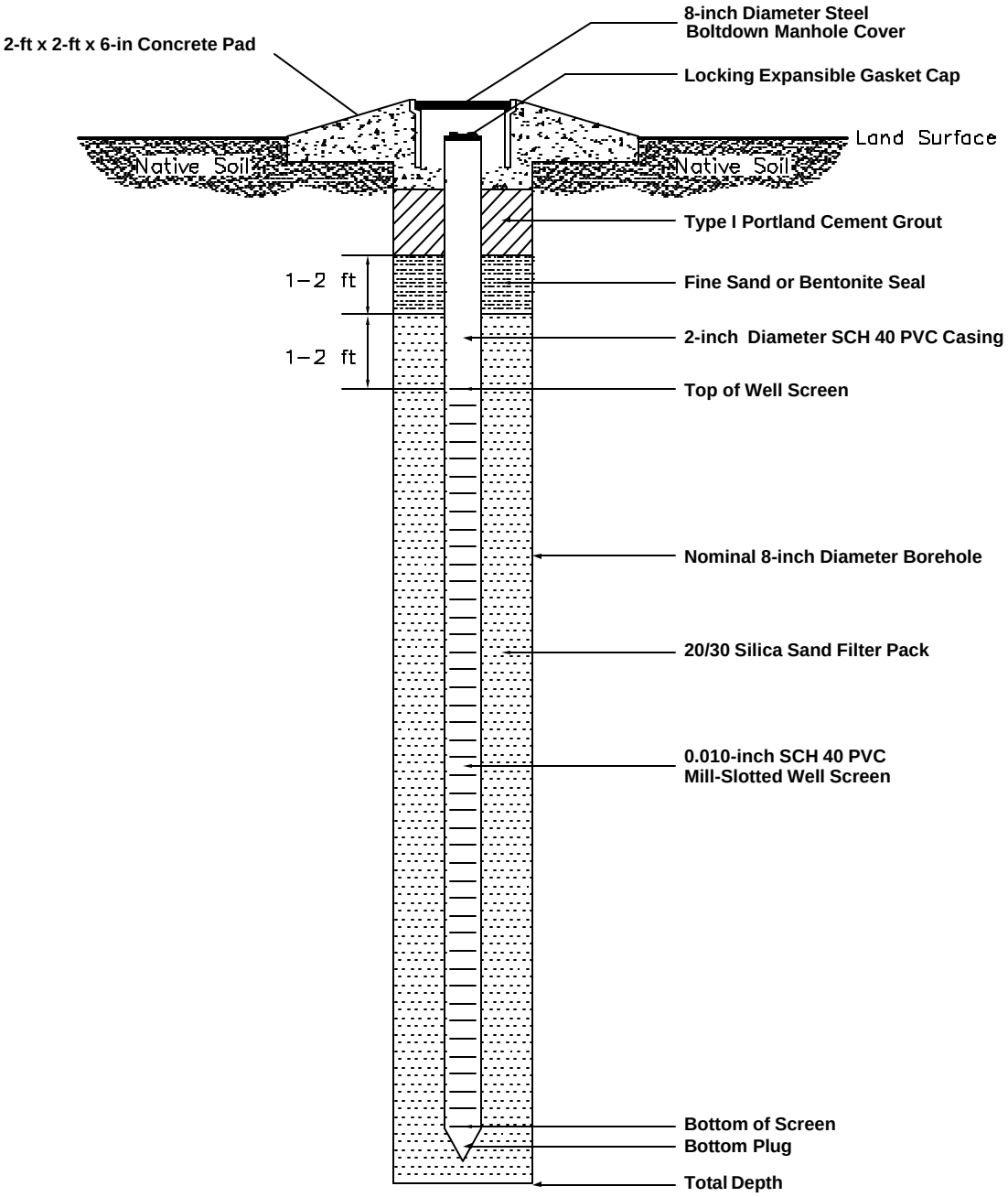
The following design details paraphrased from SOUTHDIV (1997) apply to the surface completion casing:

- A 5-foot minimum length of aluminum protective casing extending approximately 2.5 feet above ground surface and set into the protective apron.
- A protective casing ID at least 4 inches greater than the nominal diameter of the well riser.
- Aluminum-hinged cover or loose-fitting telescopic slip-joint-type cap.
- All protective casing covers to be locked at the time of installation with keyed-alike brass, corrosion-resistant locks.
- Approximately 6 inch clearance to be given between top of protective casing and top of well riser.
- In high traffic areas, install four steel or aluminum bumper posts. Each post should be radially located 4 feet from the well (immediately outside each corner of the concrete pad) and placed a minimum 2 feet bls, having a minimum of 3 feet above ground surface. The posts should be set into and filled with concrete. The bumper posts should be prepainted with yellow paint or painted with a brush.

4.9 MONITORING WELL DEVELOPMENT

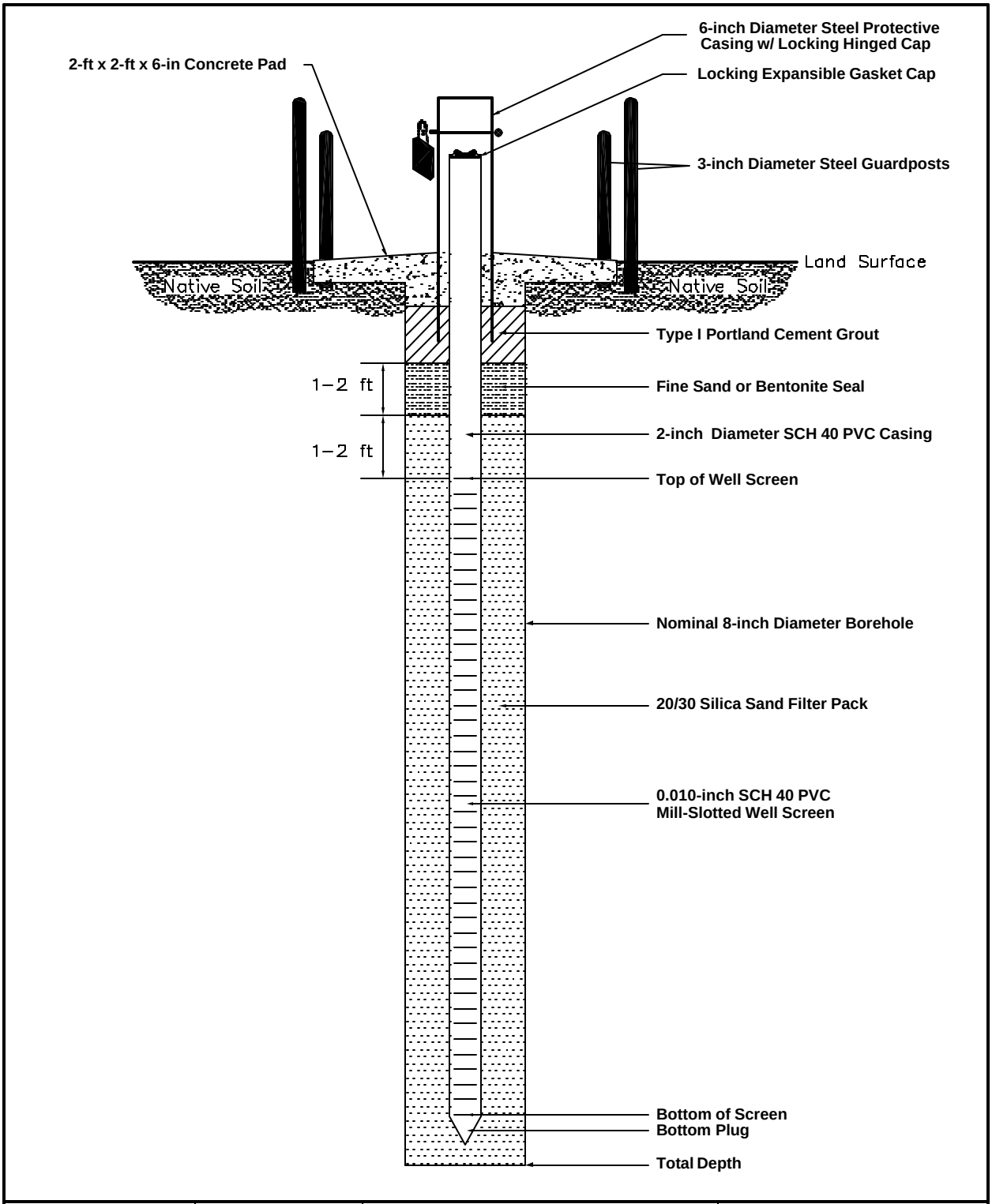
The monitoring wells will be developed no sooner than 24 hours after installation to remove fine sediment material from around the monitored interval of the well. Wells will be developed by bailing and surging, or by pumping, as determined by the field geologist. The pH, temperature, and specific conductance measurements will be collected from the development water. Shallow wells will be developed up to a maximum of one hour (deeper wells up to 2 hours) or until these measurements become stable and the development water is visibly clear. Water quality stabilization will be determined using the following criteria: temperature +/- 1.0°C (plus or minus one degree Celsius), pH +/- 0.1 standard unit, and specific conductivity +/- 10 percent. Water quality measurements and the volumes removed will be recorded for each well on the well development form (Appendix F).

S:\CADD\WELCON\MW_sh_fm



DRAWN BY LLK DATE 01/24/01			CONTRACT NO. 3996
CHECKED BY DATE			APPROVED BY DATE
COST/SCHED–AREA			APPROVED BY DATE
SCALE NOT TO SCALE			DRAWING NO. FIGURE 4–1 REV. 0

9:\CADD\WELCDN\MW_ah_pc



DRAWN BY LLK DATE 01/24/01		CONTRACT NO. 3996	
CHECKED BY DATE	TYPICAL MONITORING WELL DESIGN ABOVE GRADE NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	APPROVED BY DATE	
COST/SCHED–AREA		APPROVED BY DATE	
SCALE NOT TO SCALE		DRAWING NO. FIGURE 4–2	REV. 0

4.10 SPECIFIC CAPACITY (SPECAP) TESTING

SPECAP testing will be performed on three water table monitoring wells at the site. This work will be performed following installation and development of the new wells and preferably concurrent with the surveying of the new wells. The project manager will determine which wells to test.

The objective of the SPECAP tests is to determine the productivity or yield per unit of drawdown of the aquifer in which the well is screened and to estimate hydraulic conductivity and transmissivity. Although there is published information concerning formation hydraulic conductivities at NASCF, SPECAP tests are being conducted to verify and confirm the hydraulic conductivity values previously determined.

Specific capacity is defined as yield divided by drawdown and is normally expressed as gallons per minute per feet of drawdown. Both pumping rate and drawdown are measured simultaneously in the tested well after a given amount of time has elapsed. Dividing the yield rate by the stabilized drawdown, when both are measured simultaneously, will give the specific capacity. Specific capacity can vary with pumping duration; specific capacity decreases as pumping time increases. Additionally, specific capacity generally decreases as the discharge rate increases. Both of these responses are due to dewatering of the aquifer within the cone of depression. For a given amount of drawdown, the yield progressively becomes less as the saturated thickness of the aquifer is reduced. Specific capacity may also vary with yield as a function of the well efficiency.

The procedure for conducting a SPECAP test consisted of the following general steps:

1. Pumping with a peristaltic pump or submersible pump begins at a constant rate.

2. The yield rate and drawdown synoptically are measured at regular and frequent intervals.

3. Pumping continues until drawdown stabilizes (this is a subjective determination; generally measurements within 0.03 feet over a 10-minute interval are considered stable).

4. Pumping is terminated and water level recovery is measured.

5. Water levels are measured at frequent intervals during recovery to ensure original static water level is reached. If original level is not reached, then the water level measured when residual drawdown stabilizes is used as the static water level.

A datalogger may be used concurrent with manually measuring drawdown to ensure sufficient data for the calculation of aquifer parameters. If a datalogger is used, TtNUS' SOPs will be followed for their use.

Aquifer parameters will be calculated from the SPECAP test data using a computer program developed by Bradbury and Rothschild (1985) based on equations presented in Lohman (1972).

4.11 SURVEYING

TtNUS proposes to install a minimum of three temporary piezometers at each site for groundwater flow determination. Any existing monitoring wells at each site will be used in place of the temporary piezometers. The relative top of casing elevation and approximate horizontal location of the temporary piezometers (and existing monitoring wells) will be determined in the field for Phase I. At the completion of Phase I activities, each temporary piezometer will be removed and the remaining hole will be backfilled with Type 1 Portland Cement. The sample locations drilled through asphalt or concrete will be completed with similar material and finished flush to existing grade. At the field geologist's discretion, a pin flag may be placed just above the cement to assist in re-locating these sample locations for the surveyors.

During Phase II, the cement-filled Phase I sample locations, existing monitoring wells, and newly installed monitoring wells will be surveyed by a state-licensed land surveyor. This activity is planned concurrent with the SPECAP testing. The horizontal locations of these sample locations and wells will be surveyed in accordance with the North American Datum 1983 convention. The monitoring well top-of-casing elevations will be surveyed in accordance with the North American Vertical Datum 1988 convention. The field crew will also indicate for the surveyor on-site building features and other man-made structures to be surveyed.

4.12 EQUIPMENT DECONTAMINATION

The equipment involved in soil and groundwater assessment activities will be decontaminated prior to and during the respective field activities in general accordance with TtNUS' SOPs and the BWGWP (TtNUS, 1998).

The drilling subcontractor is responsible for decontamination of drilling equipment in accordance with the procedures described below. All decontamination activities will take place within a predetermined area on site on a temporary decontamination pad constructed by the driller.

Large Equipment. Large equipment (DPT rig, etc.) will be cleaned prior to use and between sample locations as outlined below. Any portion of the DPT rig that will be over the borehole or sampling location will be decontaminated prior to arriving at the site, between boreholes, and at the conclusion of the drilling program as described below.

- Prior to arrival onsite, inspect all equipment. If caked mud, rust, and/or paint are present that can not be removed by steam or high-pressure washing, the downhole equipment will be sandblasted prior to arrival on-site.

- Steam clean the equipment using a high-pressure steam cleaner. A brush may be used to remove soil and rust, if necessary.

- Inspect to assure that seals and gaskets are intact and that there are no residual oils, grease or hydraulic fluids that could drip into the sample location.

- Containerize all decontamination fluids.

Sampling Equipment: Drilling, sampling, and associated equipment that will come in contact with the downhole sampling medium will be cleaned as outlined below. This includes all equipment, such as trowels and bailers used for collecting samples.

- Rinse equipment with potable water. The steam cleaner may be used if desired.
- Scrub equipment with brush in a potable water/detergent solution. Liquinox is the only acceptable detergent that may be used.
- Rinse equipment in potable water.
- Rinse all equipment with pesticide grade isopropyl alcohol.
- All equipment must be allowed to air dry completely before use.
- Wrap dried equipment in aluminum foil until used.
- Containerize all decontamination fluids.

Personal Protective Equipment (PPE) and plastic sheeting used during DPT activities will be containerized as will the decontamination pad, when it is no longer needed. The driller will provide necessary supplies and equipment for this activity.

4.13 WASTE HANDLING

IDW will be handled in general accordance with Volume I of the BWGWP (TtNUS, 1998). The BWGWP includes procedures for management of IDW in Volume I. TtNUS anticipates using 55-gallon drums to contain the various wastes generated under this SAP. A drum inventory will be maintained on a log sheet like the example in Appendix G. Drums will be moved to the 90-day storage area daily (fenced compound adjacent to Bldg. 335).

IDW soil samples will be collected in general accord with the sampling frequency contained in Table A of Chapter 62-713, FAC, so that the soil waste can be characterized for proper disposal. The sample(s) will be collected following completion of the second phase of well installation. Chapter 62-713.510(4)(b), FAC, stipulates that the following test parameters shall be included for the IDW soil sample(s):

- Volatile organic halocarbons.
- Total recoverable hydrocarbons.
- Total analyses for arsenic, cadmium, chromium, and lead.
- For soils contaminated with used oil, analysis for total organic halogens shall also be required.

Since soil samples characteristic of high, medium, and low concentrations will be collected during Phase I activities at each O/W site for the first three items, only the fourth item will be collected during IDW sampling activities. Since no soil samples are planned for the NFF site (a KAG site), the first three items listed above will be collected for each IDW soil sample. Table 4-1 provides the soil IDW analytical methods, bottleware, preservation, and holding times. Table 4-2 lists the planned samples with identification numbers, basic sample locations, and required analyticals.

Characterization of aqueous IDW from each site will be made from the groundwater sampling analytical data for that site. The decontamination water will be categorized for disposal based on the highest concentrations observed from each of the sites. Plastic sheeting used during DPT and conventional drilling activities will be containerized as will the decontamination pad, when it is no longer needed. PPE will be bagged and disposed of in a waste receptacle. No QA/QC samples will be collected for IDW characterization.

Each drum will be assigned a unique codified identification number. The unique nomenclature established for this sampling event is as follows:

1		2		3		4
NNN	-	AAA	-	IDW	-	NNN
Site Number		Media				Drum Number

1 Site Number:
312 - 312 O/W
824 – 824 O/W
076 – NFF
BP – BP Wells
NS - NSAP

2 Media types:
SO – Industrial Soils
PP – PPE only
PW – PPE and Decontamination Water
DC – Decontamination Water
DV – Development Water
PU – Purge Water
MU – Soil and Water Mixtures (e.g., drilling mud or decontamination water and residual soil) Note: Residual soil must account for more than 1 inch in bottom of drum. If less than 1 inch deep in drum, then classify as DC.
CM – Cement and Water mixtures

3 IDW

4 NNN is sequentially ascending number beginning with 001.

TABLE 4-1

SOIL IDW ANALYTICAL REQUIREMENTS
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Analyses	Analytical Methods	Bottleware	Preservation	Holding Times[1]
VOH	SW-846 8260B	3 Encore Samplers	Cool to 4 degrees C	48 hours to lab preservation; 7 days to analysis
TRPH	FL-PRO	1 4-ounce amber glass jar with Teflon-lined cap	Cool to 4 degrees C	28 days to extraction; 40 days to analysis
EOX	SW846 9023	1 4-ounce amber glass jar with Teflon-lined cap	Cool to 4 degrees C	28 days to extraction; 40 days to analysis
Total Metals[2]	SW846 6010B[3]	1 8-ounce glass jar	Cool to 4 degrees C	180 days to analysis

Notes:
[1] Holding times are measured from the date/time of sample collection.
[2] Total Metals = total arsenic, total cadmium, total chromium and total lead.
[3] On chain of custody put asterisk next to method. In comments write "*Total As, Total Cd, Total Cr, and Total Pb."

TABLE 4-2

SOIL IDW SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Sample ID	Location	Analytical Methods			
		SW846 8260B	SW846 9023	FL-PRO[1]	SW846 6010B[2]
CEF-312-IDW-001	Composite of 312 O/W Soil IDW Drums		X		
CEF-824-IDW-001	Composite of 824 O/W Soil IDW Drums		X		
CEF-076-IDW-001	Composite of NFF Soil IDW Drums from Shallow Wells	X		X	X
CEF-076-IDW-002	Composite of NFF Soil IDW Drums from Upper Intermediate Wells	X		X	X
CEF-076-IDW-003	Composite of NFF Soil IDW Drums from Lower Intermediate Wells	X		X	X
CEF-076-IDW-004	Composite of NFF Soil IDW Drums from Deep Wells	X		X	X

Note:
[1] Florida - Petroleum Range Organics for total recoverable petroleum hydrocarbon.
[2] Perform total analyses for arsenic, cadmium, chromium, and lead.

5.0 ENVIRONMENTAL SAMPLING

This section outlines the environmental sampling program and describes the sampling procedures for the field investigations at Sites 312 O/W, 824 O/W, and NFF. The procedures in this section also apply to BP Wells and NSAP except as otherwise noted.

5.1 SUMMARY OF ENVIRONMENTAL SAMPLING

Additional DPT and monitoring well locations will be based on screening results. Proposed sampling locations are contingent upon utility location and clearance with current tenants of NASCF. Table 5-1 provides the soil analytical requirements for the used oil group that apply to 312 O/W and 824 O/W. Table 5-2 provides the soil analytical requirements for the KAG that apply to NFF. Similarly, Table 5-3 covers groundwater used oil group analytical requirements while Table 5-4 covers groundwater KAG requirements.

Unless directed by the Navy, sample turnaround time will be the standard 28 days for fixed-based laboratory samples.

5.2 SAMPLING PROCEDURES

The following sections describe sampling procedures that will be followed for the collection of sediment, surface water, subsurface soil, and groundwater.

5.2.1 Sediment Sampling

Sediment sampling is planned for only 312 O/W and the NFF. A total of two samples are planned for 312 O/W and four samples are planned along the creek at the NFF. Sediment samples locations are shown on Figures 2-2 and 2-5, respectively. Table 5-5 summarizes these samples. Samples are to be collected during dry weather conditions. Samples will be collected in accordance with the CompQAP.

The sediment samples at 312 O/W will be collected as grab samples using plastic, disposable trowels. Because disposable trowels will be used, decontamination of sampling equipment for sediment sampling will not be necessary.

The co-located surface water samples at the NFF site must be collected before collecting these sediment samples. Due to the depth and breadth of the ditch (or creek) at the NFF, the sediment samples will be collected from the bank closest to the NFF using stainless steel hand auger with multiple extensions. The

TABLE 5-1

SOIL USED OIL GROUP ANALYTICAL REQUIREMENTS
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Analyses	Analytical Methods	Bottleware	Preservation	Holding Times[4]
PPVO w/ TICs[1]	SW-846 8260B[5]	3 Encore Samplers	Cool to 4 degrees C	48 hours to lab preservation; 7 days to analysis
TRPH	FL-PRO	1 4-ounce amber glass jar with Teflon-lined cap	Cool to 4 degrees C	28 days to extraction; 40 days to analysis
PPEO w/ TICs[2]	SW846 8270C[5]	1 4-ounce amber glass jar with Teflon-lined cap	Cool to 4 degrees C	28 days to extraction; 40 days to analysis
Total Metals[3]	SW846 6010B[6]	1 8-ounce glass jar	Cool to 4 degrees C	180 days to analysis

Notes:
[1] PPVO w/ TICs = Priority Pollutant Volatile Organics with GC/MS peaks greater than 10 micrograms per liter.
[2] PPEO w/ TICs = Priority Pollutant Extractable Organics with GC/MS peaks greater than 10 micrograms per liter.
[3] Total Metals = total arsenic, total cadmium, total chromium and total lead.
[4] Holding times are measured from the date/time of sample collection.
[5] On chain of custody put asterisk next to method. In comment section write "*Report with TICs."
[6] On chain of custody put asterisk next to method. In comments write "*Total As, Total Cd, Total Cr, and Total Pb."

TABLE 5-2

SOIL KAG REQUIREMENTS
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Analyses	Analytical Methods	Bottleware	Preservation	Holding Times[5]
BTEX and MTBE[1]	SW-846 8260B[2]	3 Encore Samplers	Cool to 4 degrees C	48 hours to lab preservation; 7 days to analysis
TRPH	FL-PRO	1 4-ounce amber glass jar with Teflon-lined cap	Cool to 4 degrees C	28 days to extraction; 40 days to analysis
PAHs[3]	SW846 8270C[4]	1 4-ounce amber glass jar with Teflon-lined cap	Cool to 4 degrees C	28 days to extraction; 40 days to analysis

Notes:
[1] BTEX=benzene, toluene, ethylbenzene and total xylenes; MTBE=methyl-tert-butyl-ether.
[2] Record method on chain of custody with asterisk and write in comments "*Report only BTEX and MTBE"
[3] PAHs = polynuclear aromatic hydrocarbons.
[4] Record method on chain of custody with asterisk and comment "Report only 8310 compound list."
[5] Holding times are measured from the date/time of sample collection.

TABLE 5-3

GROUNDWATER USED OIL GROUP REQUIREMENTS
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Analyses	Analytical Methods	Bottleware	Preservation	Holding Times4
PPVO w/ TICs[1]	SW-846 8260B[5]	3 40-ml glass; Teflon-lined septum	Cool to 4 degrees C, pH < 2 with HCl	14 days to analysis
TRPH	FL-PRO	2 1-liter amber glass; Teflon-lined lid	Cool to 4 degrees C	7 days to extraction; 40 days to analysis
PPEO w/ TICs[2]	SW846 8270C[5]	2 1-liter amber glass; Teflon-lined lid	Cool to 4 degrees C, pH < 2 with H2SO4	7 days to extraction; 40 days to analysis
Total Metals[3]	SW846 6010B[6]	1 500-ml HDPE bottle	Cool to 4 degrees C, pH < 2 with HNO3	180 days to analysis

Notes:
[1] PPVO w/ TICs = Priority Pollutant Volatile Organics with GC/MS peaks greater than 10 micrograms per liter.
[2] PPEO w/ TICs = Priority Pollutant Extractable Organics with GC/MS peaks greater than 10 micrograms per liter.
[3] Total Metals = total arsenic, total cadmium, total chromium and total lead.
[4] Holding times are measured from the date/time of sample collection.
[5] On chain of custody put asterisk next to method. In comment section write "*Report with TICs."
[6] On chain of custody put asterisk next to method. In comments write "*Total As, Total Cd, Total Cr, and Total Pb."

TABLE 5-4

GROUNDWATER KAG REQUIREMENTS
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Analyses	Analytical Methods	Bottleware	Preservation	Holding Times[5]
PPVO[1]	SW-846 8260B	3 40-ml glass; Teflon-lined septum	Cool to 4 degrees C, pH < 2 with HCl	14 days to analysis
PAHs[2]	SW846 8270C[3]	2 1-liter amber glass; Teflon-lined lid	Cool to 4 degrees C	7 days to extraction; 40 days to analysis
TRPH	FL-PRO	2 1-liter amber glass; Teflon-lined lid	Cool to 4 degrees C, pH < 2 with H2SO4	7 days to extraction; 40 days to analysis
EDB[4]	EPA Method 504	3 40-ml glass; Teflon-lined septum	Cool to 4 degrees C, pH < 2 with HCl	14 days to analysis
Total Lead	SW846 6010B	1 500-ml HDPE bottle	Cool to 4 degrees C, pH < 2 with HNO3	180 days to analysis

Notes:
[1] PPVO = Priority Pollutant Volatile Organics.
[2] PAHs = polynuclear aromatic hydrocarbons.
[3] Record method on chain of custody with asterisk and write in comments "*Report only 8310 compound list."
[4] EDB = ethylene dibromide
[5] Holding times are measured from the date/time of sample collection.

TABLE 5-5

SEDIMENT SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Sample ID	Proposed Locations	Used Oil Analyses				KAG Analyses		
		SW846 8260B	SW846 8270C	FL-PRO	SW846 6010B	SW846 8260B	SW846 8270C	FL-PRO
CEF-312-SD-C001-01	CEF-312-C001	X	X	X	X			
CEF-312-SD-C002-01	CEF-312-C002	X	X	X	X			
CEF-076-SD-C001-01	CEF-076-C001					X	X	X
CEF-076-SD-C002-01	CEF-076-C002					X	X	X
CEF-076-SD-C003-01	CEF-076-C003					X	X	X
CEF-076-SD-C004-01	CEF-076-C004					X	X	X
CEF-076-DU-C-01	CEF-076-C002					X	X	X
CEF-076-MD-C-01	CEF-076-C004					X	X	X

Notes
Proposed locations to be assigned in the field.
Refer to Table 5-1 and 5-2 for details of analytical methods, bottleware, preservation and holding times.

actual sample location should be about 1 foot from the edge of bank. The equipment used for sample collection will be decontaminated in accordance with Section 4.11.

When applicable, decontamination fluids will be disposed of as described in Section 4.12. The pertinent field data will be recorded on a Soil/Sediment Sample Log Sheet (included in Appendix H) and the field logbook.

5.2.2 Subsurface Soil Sampling

At 312 O/W and 824 O/W, approximately 30 soil borings may be required to be advanced to the groundwater table. Approximately 8 to 10 are pre-planned for each site as shown by Figures 2-2 and 2-4, respectively, with an option to add borings as necessary.

The subsurface soil samples will be collected in general accordance with the CompQAP and methodologies described in the TtNUS SOPs SA-1.3 (Soil Sampling), GH-1.5 (Borehole and Sample Logging) and GH-1.3 (Soil and Rock Drilling Methods).

Subsurface soil samples will be collected using a stainless steel hand auger for the first 4-feet of every soil boring with subsequent 4-foot intervals collected using DPT. Four soil samples will be collected from each soil boring at 1-foot intervals for OVA-FID screening as described in Chapter 62-770, FAC. Also, as described in Section 2.0, samples will be collected for mobile laboratory screening.

The subsurface soil samples for fixed-based laboratory analyses will include three samples from each site representing a high, medium, and low OVA-FID reading. Table 5-6 summarizes these samples. These samples may be retrieved with disposable plastic sleeves supplied by the DPT crew; or, the samples may be collected using stainless steel hand augers and/or disposable plastic trowels. Upon sample retrieval, the soil to be analyzed for volatile constituents will first be placed into Encore samplers and sealed and placed in a cooler full of ice. The soil to be analyzed for other parameters (i.e., other organics, metals, and TRPH) will then be placed into the required containers, sealed, and placed in a cooler of ice. The pertinent field data will be recorded on a Soil/Sediment Sample Log Sheet (included in Appendix H) and the field logbook.

5.2.3 Surface Water Sampling

In accordance with the CompQAP, surface water samples will be collected using Teflon® bailers. TtNUS anticipates using single-use, disposable, certified clean bailers shipped in plastic, which will not require decontamination prior to use. Only the NFF site is expected to require surface water samples, and four

TABLE 5-6

SOIL SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Sample ID[1]	Proposed Locations	Used Oil Analyses			
		SW846 8260B	SW846 8270C	FL-PRO	SW846 6010B
CEF-312-SB-B001-0X	CEF-312-B001	X	X	X	X
CEF-312-SB-B002-0X	CEF-312-B002	X	X	X	X
CEF-312-SB-B003-0X	CEF-312-B003	X	X	X	X
CEF-824-SB-B001-0X	CEF-824-B001	X	X	X	X
CEF-824-SB-B002-0X	CEF-824-B002	X	X	X	X
CEF-824-SB-B003-0X	CEF-824-B003	X	X	X	X
CEF-312-DU-B-01	CEF-312-B002	X	X	X	X
CEF-824-MD-B-01	CEF-824-B001	X	X	X	X

Note:
[1] "X" on suffix of Sample ID represents bottom of sampled depth (e.g., 02 = 1 to 2 foot depth interval).
Proposed locations to be assigned in the field.
Refer to Table 5-1 for details of analytical methods, bottleware, preservation and holding times.

samples will be collected. These samples will be collected (before taking the co-located sediment samples) in general accord with the CompQAP as grab samples. The sampler will collect the sample from the upper 1 to 2 feet of the water body taking care not to disturb the underlying sediment. Table 5-7 summarizes these samples. The sampling data will be recorded on Surface Water Sample Log Sheet (included in Appendix H) and the field logbook.

5.2.4 Groundwater Sampling

The objective of this section is to provide guidance for the proper sampling equipment and techniques for groundwater sample collection in Phase II. The Phase I groundwater sampling is discussed under Section 4.0, DPT Groundwater Investigation. The Phase II groundwater sampling shall be conducted in general accordance with the CompQAP. Groundwater samples will be collected using low-flow sampling techniques.

TtNUS estimates that five shallow monitoring wells and one intermediate monitoring well may be sampled at each of the O/W sites: 312 O/W and 824 O/W. Ten shallow monitoring wells, 20 intermediate monitoring wells, and 10 deep monitoring wells may be sampled at the NFF. In accordance with the FDEP MOP approval order for the BP Wells site, two shallow monitoring wells will be sampled. TtNUS will sample five monitoring wells at the NSAP; however, after the first sampling round, only four wells will be sampled quarterly in accordance with the FDEP approved order. Monitoring well sampling locations and analyses are summarized on Tables 5-8 and 5-9. The procedures for collecting the groundwater samples are discussed in the following paragraphs.

It is anticipated that groundwater samples from monitoring wells will be collected with dedicated medical grade flexible silicon and rigid Teflon® tubing, and a peristaltic pump. Prior to obtaining a groundwater sample from a permanent monitoring well, the static water level in the well will be measured to within 0.01-foot accuracy from the marked location on the top of the well riser pipe. A headspace reading will be obtained in the well's riser pipe using a FID or PID. And, new plastic sheeting will be placed around the monitoring well prior to sampling to protect the dedicated Teflon® tubing from contacting the ground surface.

The permanent monitoring wells will be purged and sampled using low-flow purging techniques in general accordance with SOP-SA-1.1 (Groundwater Sample Acquisition). The tubing intake for the peristaltic pump will be at mid-screen. Initially, the pumping rate will be set at approximately 0.5 liters per minute, and it will be adjusted to attain negligible drawdown of 0.3 feet or less. The pumping rate may be further reduced if turbidity is greater than 5 nephelometric turbidity units (NTU) after the other field parameters have stabilized. Sample collection order and sample bottle filling are covered in the CompQAP.

TABLE 5-7

SURFACE WATER SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATION AT NORTH FUEL FARM AND OTHER SITES

Sample ID	Proposed Locations	KAG Analyses				
		SW846 8260B	SW846 8270C	FL-PRO	SW846 6010B	EPA Method 504
CEF-076-SW-W001-01	CEF-076-W001	X	X	X	X	X
CEF-076-SW-W002-01	CEF-076-W002	X	X	X	X	X
CEF-076-SW-W003-01	CEF-076-W003	X	X	X	X	X
CEF-076-SW-W004-01	CEF-076-W004	X	X	X	X	X
CEF-076-MD-W-01	CEF-076-W001	X	X	X	X	X

Note:
Proposed locations to be assigned in the field.
Refer to Table 5-4 for details of analytical methods, bottleware, preservation and holding times.

TABLE 5-8

GROUNDWATER (USED OIL GROUP) SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES

Sample ID	Proposed Locations	Used Oil Group Analyses			
		SW846 8260B	SW846 8270C	FL-PRO	SW846 6010B
CEF-312-GW-N01S-01	CEF-312-03S	X	X	X	X
CEF-312-GW-N02S-01	CEF-312-04S	X	X	X	X
CEF-312-GW-N03S-01	CEF-312-05S	X	X	X	X
CEF-312-GW-N04S-01	CEF-312-06S	X	X	X	X
CEF-312-GW-N05S-01	CEF-312-07S	X	X	X	X
CEF-312-GW-N06I-01	CEF-312-08I	X	X	X	X
CEF-824-GW-N01S-01	CEF-824-02S	X	X	X	X
CEF-824-GW-N02S-01	CEF-824-03S	X	X	X	X
CEF-824-GW-N03S-01	CEF-824-04S	X	X	X	X
CEF-824-GW-N04S-01	CEF-824-05S	X	X	X	X
CEF-824-GW-N05S-01	CEF-824-06S	X	X	X	X
CEF-824-GW-N06I-01	CEF-824-07I	X	X	X	X
CEF-312-DU-N-01	TBD	X	X	X	X
CEF-824-DU-N-01	TBD	X	X	X	X
CEF-312-MD-N-01	TBD	X	X	X	X

Notes:
TBD = To be determined.
Proposed locations are subject to change, and they will be assigned in the field as needed.
Refer to Table 5-3 for details of analytical methods, bottleware, preservation and holding times.

TABLE 5-9

GROUNDWATER (KAG) SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES
PAGE 1 OF 2

Sample ID	Proposed Locations	KAG Analyses				
		SW846 8260B	SW846 8270C	FL-PRO	SW846 6010B	EPA Method 504
CEF-076-GW-N01S-01	CEF-076-81S	X	X	X	X	X
CEF-076-GW-N02S-01	CEF-076-85S	X	X	X	X	X
CEF-076-GW-N03S-01	CEF-076-89S	X	X	X	X	X
CEF-076-GW-N04S-01	CEF-076-93S	X	X	X	X	X
CEF-076-GW-N05S-01	CEF-076-97S	X	X	X	X	X
CEF-076-GW-N06S-01	CEF-076-101S	X	X	X	X	X
CEF-076-GW-N07S-01	CEF-076-105S	X	X	X	X	X
CEF-076-GW-N08S-01	CEF-076-109S	X	X	X	X	X
CEF-076-GW-N09S-01	CEF-076-113S	X	X	X	X	X
CEF-076-GW-N10S-01	CEF-076-117S	X	X	X	X	X
CEF-076-GW-N11I-01	CEF-076-82I	X	X	X	X	X
CEF-076-GW-N12I-01	CEF-076-86I	X	X	X	X	X
CEF-076-GW-N13I-01	CEF-076-90I	X	X	X	X	X
CEF-076-GW-N14I-01	CEF-076-94I	X	X	X	X	X
CEF-076-GW-N15I-01	CEF-076-98I	X	X	X	X	X
CEF-076-GW-N16I-01	CEF-076-102I	X	X	X	X	X
CEF-076-GW-N17I-01	CEF-076-106I	X	X	X	X	X
CEF-076-GW-N18I-01	CEF-076-110I	X	X	X	X	X
CEF-076-GW-N19I-01	CEF-076-114I	X	X	X	X	X
CEF-076-GW-N20I-01	CEF-076-118I	X	X	X	X	X

Notes:
TBD = To be determined.
Even numbered intermediate monitoring wells represent upper intermediate zone set at about 35 feet bls.
Odd numbered intermediate monitoring wells represent lower intermediate zone set at about 75 feet bls.
Proposed locations are subject to change, and they will be assigned in the field as needed.
Refer to Table 5-4 for details of analytical methods, bottleware, preservation and holding times.

TABLE 5-9
GROUNDWATER (KAG) SAMPLING LOCATIONS AND ANALYSES
UST INVESTIGATIONS AT NORTH FUEL FARM AND OTHER SITES
PAGE 2 OF 2

Sample ID	Proposed Locations	KAG Analyses				
		SW846 8260B	SW846 8270C	FL-PRO	SW846 6010B	EPA Method 504
CEF-076-GW-N21I-01	CEF-076-83I	X	X	X	X	X
CEF-076-GW-N22I-01	CEF-076-87I	X	X	X	X	X
CEF-076-GW-N23I-01	CEF-076-91I	X	X	X	X	X
CEF-076-GW-N24I-01	CEF-076-95I	X	X	X	X	X
CEF-076-GW-N25I-01	CEF-076-99I	X	X	X	X	X
CEF-076-GW-N26I-01	CEF-076-103I	X	X	X	X	X
CEF-076-GW-N27I-01	CEF-076-107I	X	X	X	X	X
CEF-076-GW-N28I-01	CEF-076-111I	X	X	X	X	X
CEF-076-GW-N29I-01	CEF-076-115I	X	X	X	X	X
CEF-076-GW-N30I-01	CEF-076-119I	X	X	X	X	X
CEF-076-GW-N31D-01	CEF-076-84D	X	X	X	X	X
CEF-076-GW-N32D-01	CEF-076-88D	X	X	X	X	X
CEF-076-GW-N33D-01	CEF-076-92D	X	X	X	X	X
CEF-076-GW-N34D-01	CEF-076-96D	X	X	X	X	X
CEF-076-GW-N35D-01	CEF-076-100D	X	X	X	X	X
CEF-076-GW-N36D-01	CEF-076-104D	X	X	X	X	X
CEF-076-GW-N37D-01	CEF-076-108D	X	X	X	X	X
CEF-076-GW-N38D-01	CEF-076-112D	X	X	X	X	X
CEF-076-GW-N39D-01	CEF-076-116D	X	X	X	X	X
CEF-076-GW-N40D-01	CEF-076-120D	X	X	X	X	X
CEF-076-DU-N-01	TBD	X	X	X	X	X
CEF-076-DU-N-02	TBD	X	X	X	X	X
CEF-076-DU-N-03	TBD	X	X	X	X	X
CEF-076-DU-N-04	TBD	X	X	X	X	X
CEF-076-MD-N-01	TBD	X	X	X	X	X
CEF-076-MD-N-02	TBD	X	X	X	X	X

Notes:
TBD = To be determined.
Even numbered intermediate monitoring wells represent upper intermediate zone set at about 35 feet bls.
Odd numbered intermediate monitoring wells represent lower intermediate zone set at about 75 feet bls.
Proposed locations are subject to change, and they will be assigned in the field as needed.
Refer to Table 5-4 for details of analytical methods, bottleware, preservation and holding times.

During purging, water quality parameters (pH, temperature, specific conductance, turbidity, and dissolved oxygen) will be measured and recorded every 5 to 10 minutes until the parameters have stabilized and the minimum purge volume has been removed. The minimum purge volume with negligible drawdown (0.3 feet or less) is three saturated screen length volumes. Stabilization of the above parameters is defined as follows: temperature ±1.0ºC, pH ±0.1 units, specific conductance ±10 percent. It is a goal to purge the permanent wells until the turbidity is below 5 NTU. If the wells are purged dry, the water level in the well will be allowed to recover to a level sufficient for sample acquisition (approximately 80 percent); then a sample will be collected. In the event that recovery is slow, samples will be collected within 10 hours of purging or as soon as possible after the water level has recovered to approximately 80 percent of its static level.

The pertinent field and sampling data will be recorded using the Groundwater Sample Log Sheet and Low Flow Purge Data Sheet, attached in Appendix H, and the field notebook.

5.3 SAMPLE HANDLING

5.3.1 Sample Containers, Preservation, Holding Times, and Analyses

Sample handling includes the proper selection of sample containers and the preservation and allowable holding times for the required analyses. The CompQAP (Section 4.4 of the FDEP SOPs) summarizes the sample handling and requirements for this investigation.

5.3.2 Sample Nomenclature For DPT

Any samples collected using DPT equipment will be assigned a unique codified sample identification number. The unique nomenclature established for this activity is as follows:

1		2		3		4
CEF-NNN-DP	-	AA	-	EEE	-	NN
Site Location and Site Number and Technology		Media		Sample Location		Sample Depth or Round

1 CEF- Cecil Field
312 - 312 O/W
824 – 824 O/W
076 – NFF
DP - DPT

2 Media types:
SD - Sediment
SB - Soil Boring/Surface/Subsurface Soil
GW – Groundwater

3 Sampling location:
EEE represents an ascending sequential number starting with the first sample collected as 001, second sample as 002, etc.

4 NN is used for soil borings to indicate bottom of depth interval sampled, as follows:
01 = Sample collected from bottom of 0 to 1 foot interval bls.
02 = Sample collected from bottom of 1 to 2 foot interval bls.

NN is also used for DPT wells to indicate depth sampled:
1 = Groundwater sample at shallow, water table interval (approx. 15 feet)
2 = Groundwater sample at upper intermediate interval (approx. 35 feet)
3 = Groundwater sample at lower intermediate interval (approx. 75 feet)
4 = Groundwater sample at deep interval (approx. 110 feet)

5.3.3 Sample Nomenclature For Activities Other Than DPT

Each sample will be assigned a unique codified sample identification number. The unique nomenclature established for this sampling event is as follows:

1		2		3		4
CEF-NNN	-	AA	-	EEEE	-	NN
Site Location and Site Number		Media		Sample Location		Sample Depth or Round

1 CEF- Cecil Field
312 - 312 O/W
824 – 824 O/W
076 – NFF

2 Media types:
SD - Sediment
SB - Soil Boring/Surface/Subsurface Soil
SW – Surface Water
GW – Groundwater
DU – Duplicate
MD – Matrix Spike/Matrix Spike Duplicate
WB – Source Water Blank

3 Sampling location broken down by media type:
For sediment sampling EEEE = ANNN with A as letter C for sediment, and NNN as an ascending sequential number starting with 001.

For soils EEEE = ANNN with A as the letter B for soil boring and NNN as an ascending sequential number starting with 001.

For surface waters EEEE = ANNN with A as the letter W for surface water and NNN as an ascending sequential number starting with 001.

For newly installed monitoring wells EEEE = ANNA with the first A as N (for newly installed well), NN as an ascending sequential number starting with 01, and the second A

as the depth designator (S for shallow, U for upper intermediate, L for lower intermediate or D for deep well).

For existing monitoring wells EEEE = AEEA with the first A as E (for existing well) and EEA as the existing well identification number.

For DU and MD samples, EEEE = AXXX with A as the media type and XXX left blank.

And for source water blank EEEE = NNNN as an ascending sequential number starting with 0001.

4 NN is used for soils and sediments to indicate bottom of depth interval sampled, as follows:
01 = Sample collected from bottom of 0 to 1 foot interval bls.
02 = Sample collected from bottom of 1 to 2 foot interval bls.
03 = Sample collected from bottom of 2 to 3 foot interval bls, etc.

NN is used for surface water and groundwater samples to indicate the round sampled:
01 = Round one
02 = Round two, etc.

NN is used for DU and MD samples to indicate an ascending sequential number starting with 01.

NN is not used for source water blanks.

5.3.4 Sample Documentation, Packaging, and Shipping

Matrix-specific sample logsheets will be maintained for each sample collected. In addition, sample collection information will be recorded in field notebooks. Further description of sample documentation is provided in the BWGWP under SOP Number SA-6.3 (Field Documentation) contained in Appendix C of the BWGWP Project Operations Plan (POP).

Samples will be packaged and shipped according to the CompQAP with amplification of company specific policies contained in the BWGWP POP and SOP Number SA-6.1 (Non-Radiological Sample Handling) contained in Appendix C of the BWGWP POP.

5.3.5 Sample Custody and Shipment

Sample custody procedures are designed to provide proper documentation of sample acquisition and integrity. Sample custody will be maintained and documented at all times. Custody begins at the time of collection and ends at the time of disposal by the laboratory. The procedures for custody and shipment are described in the CompQAP and further amplified in Section 4.0 of the BWGWP Quality Assurance Project Plan (QAPP) and SOP Number SA-6.1 (Non-Radiological Sample Handling) contained in Appendix C of the BWGWP POP.

6.0 PROJECT MANAGEMENT ORGANIZATION

TtNUS will be responsible for management and implementation of the various investigations for NASCF described in this SAP. TtNUS will coordinate activities with program personnel and current tenants of NASCF when appropriate.

6.1 PROJECT CONTACTS AND MANAGEMENT

Throughout the duration of the investigation activities, work at NASCF will be coordinated through SOUTHDIV, NASCF personnel, and current tenants. The primary contacts are as follows:

1. SOUTHDIV Engineer in Charge
   Mr. Nick Ugolini
   (843) 820-5896

2. NASCF Caretaker Site Officer
   Mr. Dave Kruzicki
   (904) 778-5620 (office phone)
   (904) 545-0195 (mobile)

3. City of Jacksonville
   Mr. Mark Roberts
   (904) 573-0336

4. Jacksonville Port Authority, Flight Operations
   Mr. Izzy Bonilla
   (904) 573-1608

5. Jacksonville Port Authority, Facilities Supervisor
   Mr. Roy Craigue
   (904) 573-1607

The Caretaker Site Officer's (CSO) work hours have been reduced to part-time, approximately 8 a.m. to 2 p.m. on Tuesdays and Wednesdays. The CSO should be contacted in the event of an emergency. Otherwise, his main support function for TtNUS, the signing of waste manifests, should be coordinated and handled during his work hours. Mr. Roberts provides liaison support with tenants on the Main Station Area, and he will help to resolve access issues or other problems with those tenants only as necessary. TtNUS expects to work within the security guidelines of the tenants at NASCF. The JPA Flight Operations Manager will be contacted prior to any flightline-related work, and the JPA Facilities Supervisor will be contacted regarding digging permits for the flightline area or for access issues to JPA properties.

The project will be staffed with personnel from the TtNUS Jacksonville, Florida office. During field activities, TtNUS will provide a senior geologist acting as the FOL.

Mr. Paul Calligan is the Task Order Manager (TOM) for CTO-0168 and will be the primary point of contact. He is responsible for cost and schedule control as well as technical performance and will provide senior level review and oversight during field activities. Mr. Calligan will be the primary point of contact for the FOL. His phone number is (850) 385-9899, and his fax number is (850) 385-9860.

6.2 PROJECT PERSONNEL RESPONSIBILITIES

A description of responsibilities of individual project team members is provided below.

The responsibilities of the Task Order Manager (TOM) are provided in the BWGWP.

The FOL will be responsible for coordinating all site personnel and field activities. The FOL will:

- Act as liaison between the TOM, field team members, Site Safety Officer (SSO), and Site QA/QC Officer.
- Supervise all subcontractors.
- Oversee the mobilization and demobilization of all equipment, personnel, and subcontractors, and ensure the availability and maintenance of all field sampling and monitoring equipment and materials.
- Oversee the completion of all site documentation.
- Assume custody of all samples and ensure the proper handling and shipment of all samples.
- Resolve all logistical, weather, personnel, and equipment problems that may arise and initiate field change requests after consultation with the TOM, when necessary.

A Professional Geologist (PG) certified in the State of Florida will provide direction for the DPT borings, well installation activities and review of boring logs. Mr. Mervin Dale (Florida PG No. 1917) of TtNUS has been tentatively identified for the project.

6.3 CONTINGENCY PLAN

In the event of problems that may be encountered during site activities, the SOUTHDIV point of contact will be notified immediately, followed by the TtNUS TOM and the NASCF point of contact. The project manager will determine a course of action that will not adversely effect either the schedule or the budget. All contingency plans will be approved through the SOUTHDIV point of contact before being implemented.

7.0 QA/QC SYSTEM

The FDEP UST rule Chapter 62-770.400, FAC, QA Requirements, stipulates that all sampling and analyses under this rule shall be performed in accordance with Chapter 62-160, FAC, QA. That rule indicates that UST sites under Chapter 62-770, FAC belong to Category 3. Category 3 is an FDEP QA category that requires all parties involved with sample collection and analysis shall have an FDEP-approved CompQAP that addresses all the sampling protocols and analytical tests required by the specific activity. Therefore, TtNUS' CompQAP number 980038 will be followed for guidance regarding sampling protocols and analytical tests.

7.1 EXTERNAL (FIELD) QC SAMPLES

In addition to periodic calibration of field equipment and appropriate documentation, QC samples will be collected or generated during environmental sampling activities. QC samples will be collected in accordance with the "Proposal for Reduction of QA Sample Collection and Data Validation" from the NASCF Installation Restoration and Base Realignment and Closure programs, which is summarized in Table 7-1 below.

TABLE 7-1

Quality Control Sample Frequency

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 HLA QA reduction memo or CompQAP for explanations of QC sample types.

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

7.2 CORRECTIVE ACTIONS

In the event there are discrepancies in field activities from the established procedures and/or requirements or modifications to this proposed SAP, the procedures established shall be informally documented on field data sheets or field logs where appropriate. If the action can not be resolved by on site personnel or the FOL and intervention is required by off site management personnel, then a "Field Task Modification Request Form" will be completed. A copy of the form is provided in Appendix I.

REFERENCES

ABB-ES (ABB Environmental Services, Inc.), 1994. *Base Realignment and Closure Environmental Baseline Survey Report, Naval Air Station Cecil Field, Jacksonville, Florida.* Prepared for SOUTHDIV, North Charleston, South Carolina. November.

CT (Columbia Technologies), 2000. *Investigation of a Gasoline Plume Using Membrane Interface Probe (MIP) and Electrical Conductivity (EC) Technologies, Naval Supply Corps School, Athens, Georgia.* Prepared for TtNUS, Aiken, South Carolina. October.

Golder and Associates, 1999. *Due Diligence Investigation for Proposed BP Kaman Facility*, NAS Cecil Field, Jacksonville, Florida. December.

Halford, Keith J., 1998. *Ground-Water Flow in the Surficial Aquifer System and Potential Movement of Contaminants from Selected Waste-Disposal Sites at Cecil Field Naval Air Station, Jacksonville, Florida:* United States Geological Survey Water-Resources Investigations Report 97-4278.

HLA (Harding Lawson Associates), 1998. *Sampling and Analysis Outline and Report, Facility 312LS, Naval Air Station, Cecil Field, Jacksonville, Florida*. Prepared for SOUTHDIV, North Charleston, South Carolina. September.

HLA, 1999a. *Confirmatory Sampling Report, Building 312, Oil-Water Separator 312-OW, Naval Air Station Cecil Field, Jacksonville, Florida.* Prepared for SOUTHDIV, North Charleston, South Carolina. June.

HLA, 1999b. *Confirmatory Sampling Report, Building 824, Oil-Water Separator 824-OW, Naval Air Station Cecil Field, Jacksonville, Florida.* Prepared for SOUTHDIV, North Charleston, South Carolina. April.

TtNUS (Tetra Tech NUS, Inc.), 1998. *Base-wide Generic Work Plan Volumes 1 and 2, Naval Air Station Cecil Field, Jacksonville, Florida.* Prepared for SOUTHDIV, North Charleston, South Carolina. October.

TtNUS, 2000. *Site Assessment Report for BP Wells Area, Naval Air Station Cecil Field, Jacksonville, Florida.* Prepared for SOUTHDIV, North Charleston, South Carolina. August.

TtNUS, 2001a. *Tetra Tech NUS, Inc. Plan of Action No. JG01, UST Investigations at North Fuel Farm and Other Sites at Naval Air Station Cecil Field, Jacksonville, Florida.* Prepared for SOUTHDIV, North Charleston, South Carolina. January.

TtNUS, 2001b. *Site Assessment Report For North-South Apron Plume, Naval Air Station Cecil Field, Jacksonville, Florida.* Prepared for SOUTHDIV, North Charleston, South Carolina. February.

SOUTHDIV (Southern Division), 1997. *Monitoring Well Design, Installation, Construction, and Development Guidelines (Interim Final)*. North Charleston, South Carolina. March.

St. Johns River Water Management District, 1995. *Chapter 40C-3, Florida Administrative Code, Water Wells (Revised).* March.

USEPA (United States Environmental Protection Agency), Region 4, 1996. *Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM)*, Athens, GA. May.

Appendix A

MONA Order – BP Wells

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

August 31, 2000

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commanding Officer
Mr. Nick Ugolini, Code 1843
SOUTHNAVFACENGCOM
Post Office Box 190010
North Charleston, SC 29419-9010

RE: Site Assessment Report and Monitoring Only Proposal for BP Wells Area, Naval Air Station Cecil Field, Florida.

Dear Mr. Ugolini:

I have reviewed the Site Assessment Report and Monitoring Only Proposal for Natural Attenuation dated August 2000 (received August 22, 2000), submitted for this site. Based upon my review and comments, the enclosed Monitoring Only Plan for Natural Attenuation was signed by Mr. Doug A. Jones, Chief, Bureau of Waste Cleanup.

If I can be of any further assistance with this matter, please contact me at (850) 921-9991.

Sincerely,

Michael J. Deliz

Michael J. Deliz, P.G.
Remedial Project Manager

31-AUG-00
Date

MICHAEL J. DELIZ
LICENSE
NO. 1481
STATE OF FLORIDA
PROFESSIONAL GEOLOGIST

CC: Debbie Vaughn-Wright, USEPA
John Flowe, City of Jacksonville
Scott Glass, SOUTHNAVFACENGCOM
Mark Speranza, TtNUS, Pittsburgh

TJB B JJC JJC ESN ESN

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

August 31, 2000

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commanding Officer
Mr. Nick Ugolini, Code 1843
SOUTHNAVFACENGCOM
Post Office Box 190010
North Charleston, South Carolina 29419-9010

Subject: Natural Attenuation Monitoring Plan Approval Order
BP Wells Area
Naval Air Station Cecil Field, Florida

Dear Mr. Ugolini:

The Bureau of Waste Cleanup has completed the review of the Site Assessment Report Addendum and Natural Attenuation Monitoring Plan dated August 2000 (received August 22, 2000) submitted for this site. Pursuant to Rule 62-770.690, Florida Administrative Code (F.A.C.), the Department of Environmental Protection approves the Natural Attenuation Monitoring Plan. Pursuant to Rule 62-770.690(7), F.A.C., you are required to complete the monitoring program outlined below. The first sampling event should be performed within 60 days of receipt of this Natural Attenuation Monitoring Plan Approval Order (Order). Water-level measurements should be made immediately prior to each sampling event. The analytical results (laboratory report), chain of custody, cumulative summary table of the analytical results, site map(s) illustrating the most recent analytical results, and the water-level elevation information (cumulative summary table and most recent flow interpretation map), should be submitted to the Department within 60 days of sample collection.

Monitoring Wells	Contaminants of Concern	Frequency	Duration
MWCEF-BP1S and CEF-BP-6S	Xylenes, 1,2,4-Trimethylbenzene, and 1,3,5- Trimethylbenzene	Semi-annual	Five Years

If concentrations of chemicals of concern in any of the designated wells increase above the action levels listed below, the well or wells must be resampled no later than 30 days after the initial positive results are known. If the results of the resampling confirm the initial sampling results, then a proposal must be submitted, as described in Rule 62-770.690(7)(f), F.A.C.

Contaminated well:
CEF-BP-1S: 200 µg/l Xylene, 100 µg/l 1,2,4-Trimethylbenzene, and 100 µg/l 1,3,5-Trimethylbenzene
Perimeter well:
CEF-BP-6S: 20 µg/l Xylene, 10 µg/l 1,2,4-Trimethylbenzene, and 10 µg/l 1,3,5-Trimethylbenzene

The approved Remedial Action by Natural Attenuation monitoring period is 5 years. "Milestone" objectives should be established if monitoring is projected to take greater than one year. The following are the "milestone" objectives that will be used for annual evaluation of remediation progress by natural attenuation. An explanation of the progress relative to these milestone objectives, and the need for corrective action (if applicable), should be provided in the annual evaluation:

Xylene	CEF-BP-1S
End of year 1	100 µg/l
End of year 2	80 µg/l
End of year 3	55 µg/l
End of year 4	30 µg/l
End of year 5	<20 µg/l

1,2,4-Trimethylbenzene	CEF-BP-1S
End of year 1	45 µg/l
End of year 2	40 µg/l
End of year 3	30 µg/l
End of year 4	20 µg/l
End of year 5	<10 µg/l

1,3,5-Trimethylbenzene	CEF-BP-1S
End of year 1	16 µg/l
End of year 2	15 µg/l
End of year 3	14 µg/l
End of year 4	12 µg/l
End of year 5	<10 µg/l

If the applicable No Further Action criteria in Rule 62-770.680, F.A.C., are met at the end of the monitoring period, a Site Rehabilitation Completion Report, summarizing the monitoring program and containing documentation supporting the opinion that the cleanup objectives have been achieved, should be submitted as required in Rule 62-770.690(8), F.A.C. If the applicable No Further Action criteria in Rule 62-770.680, F.A.C., are not met following five years of

monitoring, then a report summarizing the monitoring program should be submitted, including a proposal as described in Rule 62-770.690(7)(g), F.A.C..

Legal Issues

The Department's Order shall become final unless a timely petition for an administrative proceeding (hearing) is filed under Sections 120.569 and 120.57, Florida Statutes (F.S.), within 21 days of receipt of this Order. The procedures for petitioning for a hearing are set forth below.

Persons affected by this Order have the following options:

If you choose to accept the above decision by the Department about the Site Assessment Report Addendum and Natural Attenuation Monitoring Plan you do not have to do anything. This Order is final and effective as of the date on the top of the first page of this Order.

If you disagree with the decision, you may do one of the following:

1. File a petition for administrative hearing with the Department's Office of General Counsel within 21 days of receipt of this Order; or

2. File a request for an extension of time to file a petition for hearing with the Department's Office of General Counsel within 21 days of receipt of this Order. Such a request should be made if you wish to meet with the Department in an attempt to informally resolve any disputes without first filing a petition for hearing.

Please be advised that mediation of this decision pursuant to Section 120.573, Florida Statutes (F.S.), is not available.

How to Request an Extension of Time to File a Petition for Hearing

For good cause shown, pursuant to Rule 62-110.106(4), F.A.C., the Department may grant a request for an extension of time to file a petition for hearing. Such a request must be filed (received) in the Department's Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from Commanding Officer, SOUTHNAVENGCOM, shall mail a copy of the request to Commanding Officer, SOUTHNAVENGCOM at the time of filing. Timely filing a request for an extension of time tolls the time period within which a petition for administrative hearing must be made.

How to File a Petition for Administrative Hearing

A person whose substantial interests are affected by this Order may petition for an administrative hearing under Sections 120.569 and 120.57, F.S. The petition must contain the

information set forth below and must be filed (received) in the Department's Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from Commanding Officer, SOUTHNAVENGCOM, shall mail a copy of the petition to Commanding Officer, SOUTHNAVENGCOM at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S.

Pursuant to Section 120.54(5)(b)4.a., F.S. (1998, Supp.), and Rule 28-106.201, F.A.C., a petition for administrative hearing shall contain the following information:

a) The name, address, and telephone number of each petitioner, the name, address, and telephone number of the petitioner's representative, if any, the site owner's name and address, if different from the petitioner, the FDEP facility number, and the name and address of the facility;
b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
c) An explanation of how each petitioner's substantial interests are or will be affected by the Department's action or proposed action;
d) A statement of the material facts disputed by the petitioner, or a statement that there are no disputed facts;
e) A statement of the ultimate facts alleged, including a statement of the specific facts the petitioner contends warrant reversal or modification of the Department's action or proposed action;
f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the Department's action or proposed action; and
g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Department's action or proposed action.

This Order is final and effective as of the date on the top of the first page of this Order. Timely filing a petition for administrative hearing postpones the date this Order takes effect until the Department issues either a final order pursuant to an administrative hearing or an order responding to supplemental information provided pursuant to meetings with the Department.

Judicial Review

Any party to this Order has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within 30 days after this Order is filed with the clerk of the Department (see below).

Questions

Any questions regarding the Department's review of your Site Assessment Report Addendum and Natural Attenuation Monitoring Plan should be directed to Michael J. Deliz, P.G. at (850) 921-9991. Questions regarding legal issues should be referred to the Department's Office of General Counsel at (850) 488-9314. Contact with any of the above does not constitute a petition for administrative hearing or request for an extension of time to file a petition for administrative hearing.

Sincerely,

Douglas A. Jones, Chief
Bureau of Waste Cleanup
Division of Waste Management

DAJ/mjd

cc: Scott Glass, SOUTHNAVFACENGCOM
Mark Speranza, TtNUS, Pittsburgh

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to
§120.52 Florida Statutes, with the
designated Department Clerk, receipt
of which is hereby acknowledged.

Minnie L Robinson — August 31, 2000
Clerk — Date

Appendix B

MONA Order – NSAP

M.Oak

Department of Environmental Protection

Jeb Bush
Governor

Twin Towers Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

March 16, 2001

Mr. Nick Ugolini
Code 1843 (UST RPM)
Southern Division
Naval Facilities Engineering Command
Post Office Box 190010
North Charleston, South Carolina 29419-9010

RE: Site Assessment Report, North-South Apron Plume, Naval Air Station Cecil Field, Jacksonville, Florida

Dear Mr. Ugolini:

I have completed the review of the Site Assessment Report (SAR) and Monitoring Only Proposal (MOP) for the North-South Apron Plume, Naval Air Station Cecil Field, dated February 2001 (received March 1, 2001), prepared and submitted by Tetra Tech NUS, Inc. The SAR provides adequate evidence that natural attenuation at this site will reduce contaminant concentrations to below groundwater cleanup target levels in five years. I have attached a Monitoring Only Plan Approval Order signed by Douglas A. Jones specifying the actions to be taken in monitoring the site.

I also recommend that monitoring well CEF-M18-01S be resampled and analyzed for VOCs during the first quarter of monitoring to verify that the chlorinated hydrocarbons detected in September 2000, but not in January or November 2000, have not reappeared.

If I can be of any further assistance with this matter, please contact me at (850) 488-3693.

RECEIVED
APR 17 2001
TETRA TECH NUS
JACKSONVILLE FL

Sincerely,

David P. Grabka
Remedial Project Manager

cc: Scott Glass, Southern Division
Debbie Vaughn-Wright, USEPA Region 4

Mark Speranza, TetraTech NUS, Pittsburgh
Sam Ross, CH2M Hill Constructors, Inc.
Mike Fitzsimmons, FDEP Northeast District

TJB TB JJC JJC ESN ESN

Department of
Environmental Protection

Jeb Bush
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

March 16, 2001

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Nick Ugolini
Code 1843 (UST RPM)
Southern Division
Naval Facilities Engineering Command
Post Office Box 190010
North Charleston, South Carolina 29419-9010

Subject: Natural Attenuation Monitoring Plan Approval Order
North-South Apron Plume
Cecil Field Naval Air Station
Jacksonville, Duval County

Dear Mr. Ugolini:

The Bureau of Waste Cleanup has completed the review of the Site Assessment Report and Natural Attenuation Monitoring Plan dated February 2001 (received March 1, 2001), submitted for the petroleum product discharge discovered at this site. Pursuant to Rule 62-770.690, Florida Administrative Code (F.A.C.), the Department of Environmental Protection (Department) approves the Natural Attenuation Monitoring Plan . Pursuant to Rule 62-770.690(7), F.A.C., you are required to complete the monitoring program outlined below. The first sampling event should be performed within 60 days of receipt of this Natural Attenuation Monitoring Plan Approval Order (Order). Water-level measurements should be made immediately prior to each sampling event. The analytical results (laboratory report), chain of custody, cumulative summary table of the analytical results, site map(s) illustrating the most recent analytical results, and the water-level elevation information (cumulative summary table and most recent flow interpretation map), should be submitted to the Department within 60 days of sample collection.

The monitoring wells to be sampled, the sampling parameters, and the sampling frequency are as follows:

Monitoring Wells	Contaminants of Concern	Frequency	Duration
CEF-M18-02I, CEF-M18-03I, CEF-M18-04I, CEF-M18-05I	BTEX	Quarterly	Five years

The approved Remedial Action by Natural Attenuation monitoring period is five years. The sampling frequency will be evaluated following the submittal of the first annual report to determine whether semiannual or annual sampling may be appropriate.

The following are the "milestone" objectives that will be used for annual evaluation of remediation progress by natural attenuation. An explanation of the progress relative to these milestone objectives, and the need for corrective action (if applicable), should be provided in the annual evaluation:

	CEF-M18-02I	CEF-M18-03I	CEF-M18-04I
Benzene			
End of year 1	5 µg/l	5 µg/l	5 µg/l
End of year 2	4 µg/l	4 µg/l	4 µg/l
End of year 5	<1 µg/l	<1 µg/l	<1 µg/l
Xylenes			
End of year 1	65 µg/l	65 µg/l	65 µg/l
End of year 2	55 µg/l	55 µg/l	55 µg/l
End of year 5	<20 µg/l	<20 µg/l	<20 µg/l

If concentrations of contaminants of concern in any of the designated wells increase above the action levels listed below, the well or wells must be resampled no later than 30 days after the initial positive results are known. If the results of the resampling confirm the initial sampling results, then a proposal must be submitted to the Department, as described in Rule 62-770.690(7)(f), F.A.C.

Contaminated wells:
CEF-M18-02I, CEF-M18-03I and CEF-M18-04I: 100 µg/l Benzene; 200 µg/l Total Xylenes

Perimeter well (temporary point of compliance):
CEF-M18-04I: 1 µg/l Benzene; 20 µg/l Total Xylenes

If the applicable No Further Action criteria in Rule 62-770.680, F.A.C., are met at the end of the monitoring period, a Site Rehabilitation Completion Report, summarizing the monitoring program and containing documentation supporting the opinion that the cleanup objectives have been achieved, should be submitted as required in Rule 62-770.690(8, F.A.C. If the applicable No Further Action criteria in Rule 62-770.680, F.A.C., are not met following five years of

monitoring, then a report summarizing the monitoring program should be submitted, including a proposal as described in Rule 62-770.690(7)(g), F.A.C.

Legal Issues

The Department's Order shall become final unless a timely petition for an administrative proceeding (hearing) is filed under Sections 120.569 and 120.57, Florida Statutes (F.S.), within 21 days of receipt of this Order. The procedures for petitioning for a hearing are set forth below.

Persons affected by this Order have the following options:

If you choose to accept the above decision by the Department about the Site Assessment Report you do not have to do anything. This Order is final and effective as of the date on the top of the first page of this Order.

If you disagree with the decision, you may do one of the following:

(1) File a petition for administrative hearing with the Department's Office of General Counsel within 21 days of receipt of this Order; or

(2) File a request for an extension of time to file a petition for hearing with the Department's Office of General Counsel within 21 days of receipt of this Order. Such a request should be made if you wish to meet with the Department in an attempt to informally resolve any disputes without first filing a petition for hearing.

Please be advised that mediation of this decision pursuant to Section 120.573, F.S., is not available.

How to Request an Extension of Time to File a Petition for Hearing

For good cause shown, pursuant to Rule 62-110.106(4), F.A.C., the Department may grant a request for an extension of time to file a petition for hearing. Such a request must be filed (received) in the Department's Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from Commanding Officer, Southern Division Naval Facilities Engineering Command, shall mail a copy of the request to Commanding Officer, Southern Division Naval Facilities Engineering Command at the time of filing. Timely filing a request for an extension of time tolls the time period within which a petition for administrative hearing must be made.

How to File a Petition for Administrative Hearing

A person whose substantial interests are affected by this Order may petition for an administrative hearing under Sections 120.569 and 120.57, F.S. The petition must contain the

information set forth below and must be filed (received) in the Department's Office of General Counsel at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, within 21 days of receipt of this Order. Petitioner, if different from Commanding Officer, Southern Division Naval Facilities Engineering Command , shall mail a copy of the petition to Commanding Officer, Southern Division Naval Facilities Engineering Command at the time of filing. Failure to file a petition within this time period shall waive the right of anyone who may request an administrative hearing under Sections 120.569 and 120.57, F.S.

Pursuant to Section 120.54(5)(b)4.a., F.S. (1998, Supp.), and Rule 28-106.201, F.A.C., a petition for administrative hearing shall contain the following information:

(a) The name, address, and telephone number of each petitioner, the name, address, and telephone number of the petitioner's representative, if any, the site owner's name and address, if different from the petitioner, the FDEP facility number, and the name and address of the facility;
(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
(c) An explanation of how each petitioner's substantial interests are or will be affected by the Department's action or proposed action;
(d) A statement of the material facts disputed by the petitioner, or a statement that there are no disputed facts;
(e) A statement of the ultimate facts alleged, including a statement of the specific facts the petitioner contends warrant reversal or modification of the Department's action or proposed action;
(f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the Department's action or proposed action; and
(g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Department's action or proposed action.

This Order is final and effective as of the date on the top of the first page of this Order. Timely filing a petition for administrative hearing postpones the date this Order takes effect until the Department issues either a final order pursuant to an administrative hearing or an order responding to supplemental information provided pursuant to meetings with the Department.

Judicial Review

Any party to this Order has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The

notice of appeal must be filed within 30 days after this Order is filed with the clerk of the Department (see below).

Questions

Any questions regarding the Department's review of your Site Assessment Report should be directed to David P. Grabka at (850) 488-3693. Questions regarding legal issues should be referred to the Department's Office of General Counsel at (850) 488-9314. Contact with any of the above does not constitute a petition for administrative hearing or request for an extension of time to file a petition for administrative hearing.

Sincerely,

Douglas A. Jones, Chief
Bureau of Waste Cleanup
Division of Waste Management

DAJ/dpg

cc: Mike Fitzsimmons, FDEP Northeast District Office
Scott Glass, Southern Division
Debbie Vaughn-Wright, USEPA Region 4
Mark Speranza, Tetra Tech NUS, Pittsburgh
Sam Ross, CH2M Hill Constructors, Inc.
File

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to
§120.52 Florida Statutes, with the
designated Department Clerk, receipt
of which is hereby acknowledged.

Minnie L Morrison — 3/21/01
Clerk (or Deputy Clerk) — Date

Mr. Nick Ugolini
North-South Apron Plume
Cecil Field Naval Air Station

P.G. CERTIFICATION

SAR/MOP for North-South Apron Plume

I hereby certify that in my professional judgement, the components of this Site Assessment Report and Monitoring Only Plan for the North-South Apron Plume, Cecil Field Naval Air Station, Jacksonville, Florida, satisfy the requirements set forth in Chapter 62-770, F.A.C., and that the geological interpretations in this report provide reasonable assurances of achieving the Assessment objectives stated in Chapter 62-770, F.A.C.

____ I personally completed this review.

X This review was conducted by David P. Grabka working under my supervision.

TIMOTHY J. BAHR
LICENSE
NO. 1209
STATE OF
FLORIDA
PROFESSIONAL GEOLOGIST

Timothy J. Bahr, P.G.
Professional Geologist Supervisor
Technical Review Section

3/16/01
Date

Appendix C

JETC and 334 O/W

Site Specific DPT Investigation Work Plan

SITE SPECIFIC DPT INVESTIGATION WORK PLAN
JET ENGINE TEST CELL
NAS CECIL FIELD

BACKGROUND

Summary of Current Monitoring Program

The modified Monitoring Only For Natural Attenuation (MONA) (HLA, 2000) for the Jet Engine Test Cell (JETC) required sampling of the following monitoring wells: CEF-334-1S, CEF-334-6S, CEF-339-28S (source), CEF-339-29S (source), CEF-339-30S, CEF-811-17S, CEF-811-18S, and CEF-811-21S. At Tetra Tech NUS' (TtNUS) recommendation, the Base Closure Team agreed to add the following wells to the sampling program: CEF-334-2Sa, CEF-811-8S, CEF-811-16S, and CEF-811-31S (Figure 1).

Water level measurements were recorded on October 16, 2000 at approximately 24 monitoring wells on site. The depth to water ranged from 3.55 to 4.59 feet (btoc). Figure 2 indicates groundwater flow to the southeast.

This plan describes the approach for evaluating the JETC and 334OW. The plan consists of a DPT groundwater investigation to determine monitoring well locations, installation of additional monitoring wells, and sampling of new and existing monitoring wells.

Results For Area North Of Building 339

Of the eight wells sampled in October 2000, only CEF-339-28S and CEF-811-16S exceeded Groundwater Cleanup Target Levels (GCTLs). By comparison, Figure 1 shows that GCTLs were exceeded in four wells the previous quarter (July 2000).

Results For Area South Of Building 339

Four monitoring wells were sampled south of Bldg. 339. During the July 2000 event, the concentrations of compounds of concern (COCs) in three of the four monitoring wells exceeded at least one GCTL. As of the last sampling round in November 2000, GCTLs were exceeded in only the sample from monitoring well (CEF-334-2Sa), and the concentrations appeared to be about the same as the previous results.

Conclusions And Recommendations

Southeasterly groundwater flow has been confirmed for the site, and two contaminant plumes appear to exist at JETC. Figure 1 illustrates those two plumes, which are hereafter referred to as the northern and southern plumes. Recommendations for these plumes and the area between are as follows:

- It appears that the flanks of the northern plume require delineation, so DPT sample points are planned sidegradient to that plume. The vertical extent of contamination for the area north of Building 339, which includes the northern plume, has been addressed in previous investigations.
- This plan attempts to confirm the idea of two separate plumes with several sampling locations planned between Buildings 334 and 339 and immediately north of Building 339.
- The southern plume is not delineated downgradient to the south and southeast, so several DPT sampling locations are planned to address that area south of Building 334. Though deep wells exist for the northern portion of the site, the southern plume requires vertical delineation. So, a deep DPT point is planned for the heart of the southern plume.

Based on these concerns, the following DPT Investigation Work Plan was generated.

INVESTIGATION WORK PLAN

Introduction

The direct push technology (DPT) groundwater screening, well installation and groundwater sampling activities and procedures described in this work plan will be performed in general accord with the U.S. EPA Region 4 Environmental Investigation Standard Operating Procedures and Quality Assurance Manual (EISOPQAM) and the Base-Wide Generic Work Plan for Naval Air Station (NAS) Cecil Field. The Base-Wide Generic Work Plan contains standard operating procedures (SOP) in Volume II, Project Operations Plan. Those SOPs will be followed unless otherwise indicated in this work plan.

Health And Safety

Health and safety will be conducted in accordance with TtNUS policy and the site health and safety plan (HASP). Prior to beginning drilling, utilities must be located or cleared at each location in accordance with TtNUS SOP HS1.0.

Personnel protection equipment and other waste trash (e.g. disposable trowels) will not be considered hazardous and will be disposed in a municipal landfill. Such trash will be collected in a plastic bag and disposed in a suitable trash receptacle.

Proposed Schedule

Tentatively, the DPT and well installation work are planned for the last week of April 2001, well installation for early May 2001, and the groundwater-sampling event is planned for late May 2001.

DPT Activities

A set of synoptic groundwater levels will be recorded on Attachment A for the site's monitoring wells prior to beginning DPT work to establish general depth to the water table for the site and groundwater flow.

DPT Soil Investigation

Approximately 25 DPT sample locations are anticipated. Only 17 of the 25 are pre-planned with the remaining sample locations subject to determination by the field geologist based on field observations. Soil samples will be collected from the vadose zone and screened with an organic vapor analyzer (OVA) with flame ionization detector. Filtered and unfiltered screening will be performed to provide corrected OVA data. Since source removals have been performed for known sources at the JETC, no soil samples are planned for mobile or fixed laboratory analyses.

The DPT locations will be labeled and assigned by the field geologist sequentially beginning with the identification number: CEF-JETC-DPT-001.

DPT Groundwater Investigation

The first round of DPT sampling locations, as shown by Figure 3, includes 17 points. Except for the location adjacent to monitoring well CEF-334-2Sa, the samples from those locations will be water table samples. Based on depth to the water table, the DPT groundwater sampler will be inserted approximately 3 to 4 feet into the water table. A single groundwater grab sample will be collected from the termination of each DPT boring for analysis by the mobile laboratory. The DPT sampler will be extended to a depth of 30 feet at the location adjacent to CEF-334-2Sa to collect a discrete sample for vertical definition of the plume in that area. If any of the water table locations indicate groundwater contamination exceeding GCTLs, then another DPT sample will be collected from a new point approximately 25 feet downgradient or sidegradient as necessary. Likewise, if the vertical extent sample indicates contamination in excess of GCTLs, then additional samples will be collected every 15 feet until the vertical extent is defined.

The DPT groundwater samples will be labeled CEF-JETC-TW-001, CEF-JETC-TW-002, etc. The numbering will be sequential. The field geologist will assign these to coincide with the DPT location number. No QA/QC samples will be required for mobile lab sampling.

The groundwater sample will be collected using a peristaltic pump and environmental-grade Teflon tubing provided by the driller. The driller is expected to be using Geoprobe™ Screen Point Samplers with 4-foot long stainless steel screens. Three screen volumes will be extracted at each location, and no water quality data will be collected.

Mobile Lab Activities

The mobile lab will analyze each sample for benzene, toluene, ethylbenzene, total xylenes (BTEX), naphthalene and diesel range organics (DRO). The mobile lab will be responsible for the safe and appropriate management and disposal of all chemicals and reagents used by the mobile lab. The data generated by the mobile lab will be screening-quality data; however, it is anticipated that two separate runs may be required for each sample in order to collect reasonably accurate naphthalene and DRO results without compromising the BTEX results.

Data Evaluation

The DPT data and recommendations for well locations will be submitted to the FDEP. It is assumed that the FDEP will review and comment on the data and recommendations within a week. Following approval of the well locations, TtNUS personnel will re-mobilize to the site for the well installation.

Monitoring Well Installation

The monitoring wells will be screened from approximately 5 to 15 feet below ground surface. The depth will be adjusted to account for water table depth and to ensure the screen intersects the water table. Each screen will be 10-foot long with 0.010-inch slots. Well construction materials will consist of certified-clean 2-inch inside diameter, flush-threaded, polyvinyl chloride (PVC) screen and riser. Wells will be developed no earlier than 24 hours after installation with a submersible pump. In addition to the newly approved monitoring wells, monitoring well CEF-811-16S will be replaced since it was recently abandoned and removed as part of a soil source removal by the remedial action contractor. The new well will be designated CEF-811-16SR.

Groundwater Sampling

Quarterly monitoring of JETC has been postponed pending the results of the site assessment. The wells that are sampled as part of the MONA will also be sampled when the new wells, based on the DPT work, are sampled. Synoptic water levels will be collected from the wells listed on Attachment A and the new wells prior to beginning purging activities. The wells will be purged using the low flow technique and sampled using disposable Teflon bailers.

The list of existing wells and proposed wells that will be sampled is provided with sample identification numbers and analyses for each location on Table 1. The proposed wells are subject to change based on results of the DPT work and only represent an estimate of expected needs. Sampling handling requirements, the bottleware required, preservation, and holding time requirements for the analysis proposed for this sampling event are identified in Table 2. Analytical results will be reported on a 21-day turn around basis. QA/QC samples will be collected in accordance with Table 3.

As agreed upon by the BCT, formal data validation has been eliminated from the installation restoration program at NAS Cecil Field. However, the analytical data packages generated by the analytical laboratory will be reviewed by TtNUS personnel to eliminate false positives and false negative results.

The laboratory contracted to do this work is as follows:

ACCUTEST SOUTHEAST
4405 Vineland Road, Suite C-15
Orlando, Florida 32881
Attention: Linda Williams
Phone (407) 425-6700 Fax: (407) 425-0707

Specific Capacity Testing

Specific capacity testing (SPECAP) will be performed on three water table monitoring wells at the site. This work will be performed following installation and development of the new wells and preferably concurrent with the surveying of the new wells. The project manager will determine which wells to test.

The objective of the SPECAP tests is to determine the productivity or yield per unit of drawdown of the aquifer in which the well is screened and to estimate hydraulic conductivity and transmissivity. Although there is published information concerning formation hydraulic conductivities at NAS Cecil Field, SPECAP tests are being conducted to verify and confirm the hydraulic conductivity values previously determined.

Specific capacity is defined as yield divided by drawdown and is normally expressed as gallons per minute/feet of drawdown. Both pumping rate and drawdown are measured simultaneously in the tested well after a given amount of time has elapsed. Dividing the yield rate by the stabilized drawdown, when both are measured simultaneously, gives the specific capacity. Specific capacity can vary with pumping duration; specific capacity decreases as pumping time increases. Additionally, specific capacity generally decreases as the discharge rate increases. Both of these responses are due to dewatering of the aquifer within the cone of depression. For a given amount of drawdown, the yield progressively becomes less as

the saturated thickness of the aquifer is reduced. Specific capacity may also vary with yield as a function of the well efficiency.

The procedure for conducting a SPECAP test consisted of the following general steps:

1. Pumping with a peristaltic pump begins at a constant rate.
2. The yield rate and drawdown synoptically are measured at regular and frequent intervals,
3. Pumping continues until drawdown stabilizes (this is a subjective determination; generally measurements within 0.03 feet over a 10-minute interval are considered stable).
4. Pumping is terminated and water level recovery is measured.
5. Water levels are measured at frequent intervals during recovery to ensure original static water level is reached; if not, the water level measured when residual drawdown stabilizes is used as the static water level.

A datalogger may be used concurrent with manually measuring drawdown to ensure sufficient data for the calculation of aquifer parameters. If a datalogger is used, TtNUS' SOPs will be followed for their use. Aquifer parameters will be calculated from the SPECAP test data using a computer program developed by Bradbury and Rothschild (1985) based on equations presented in Lohman (1972).

General Decontamination

The drilling subcontractor is responsible for decontamination of all equipment in accordance with the procedures described below. All decontamination activities will take place within a predetermined area on site on a temporary decontamination pad constructed by the driller.

Large Equipment. Large equipment (DPT rig, etc.) will be cleaned prior to use and between sample locations as outlined below. Any portion of the DPT rig that will be over the borehole or sampling location will be decontaminated prior to arriving at the site, between boreholes, and at the conclusion of the drilling program as described below.

1. Prior to arrival onsite, inspect all equipment. If caked mud, rust, and/or paint are present that can not be removed by steam or high-pressure washing, the downhole equipment will be sandblasted prior to arrival on-site.
2. Steam clean the equipment using a high-pressure steam cleaner. A brush may be used to remove soil and rust, if necessary.
3. Inspect to assure that seals and gaskets are intact and that there are no residual oils, grease or hydraulic fluids that could drip into the sample location.
4. Containerize all decontamination fluids.

Sampling Equipment: Drilling, sampling, and associated equipment that will come in contact with the downhole sampling medium will be cleaned as outlined below. This includes all equipment, such as trowels and bailers used for collecting samples.

1. Rinse equipment with potable water. The steam cleaner may be used if desired.
2. Scrub equipment with brush in a potable water/detergent solution. Liquinox is the only acceptable detergent that may be used.
3. Rinse equipment in potable water.
4. Rinse all equipment with pesticide grade isopropyl alcohol.
5. All equipment must be allowed to air dry completely before use.
6. Wrap dried equipment in aluminum foil until used.
7. Containerize all decontamination fluids.

PPE and plastic sheeting used during DPT activities will be containerized as will the decontamination pad, when it is no longer needed. The driller will provide necessary supplies and equipment for this activity.

Surveying

Concurrent with the SPECAP testing, a registered land surveyor will survey horizontal and top of casing elevations of the newly installed permanent monitoring wells. The field crew will indicate new well locations and building features to be surveyed. Specifically, the corners of the three existing buildings on site, the corners of other man-made features (e.g., air tank pads and square manholes), and the centers of manhole covers should be indicated to the surveyors.

IDW

The Base-Wide Generic Work Plan includes procedures for management of investigation-derived wastes in Volume I. It is anticipated that 55-gallon drums will be used, which will be labeled sequentially as follows: JETC-01, JETC-02, etc. A drum inventory will be maintained on a log sheet like the example in Attachment B. Drums will be moved to the 90-day storage area daily (fenced compound adjacent to Bldg. 335).

A composite soil sample will be collected for characterization to determine proper disposal. This sample will be collected immediately following completion of the second phase of well installation. The sample will consist of VOA (SW846 8021B), PAH (SW846 8310), TRPH (FL PRO), and the eight RCRA metals. The bottleware for this event are as follows: three encore samplers and three 4-ounce glass jars. The sample will be labeled: CEF-JETC-IDW-001. Characterization of aqueous IDW will be made from the groundwater sampling analytical data. No QA/QC samples will be collected for IDW characterization.

Table 1

JETC
Sampling Locations and Analyses

Sample ID	Location	E or P[1]	Analyses				
			SW846 8021B[2]	SW846 8310	FL-PRO[3]	504[4]	Total Lead[5]
CEF-334-GW-1S-03	CEF-334-1S	E	X	X	X		
CEF-334-GW-2Sa-03	CEF-334-2Sa	E	X	X	X		X
CEF-334-GW-6S-03	CEF-334-6S	E	X	X	X		
CEF-339-GW-28S-03	CEF-339-28S	E	X	X	X		
CEF-339-GW-29S-03	CEF-339-29S	E	X	X	X		
CEF-339-GW-30S-03	CEF-339-30S	E	X	X	X		
CEF-811-GW-8S-03	CEF-811-8S	E	X	X	X		
CEF-811-GW-16S-03	CEF-811-16S	E	X	X	X		
CEF-811-GW-17S-03	CEF-811-17S	E	X	X	X		
CEF-811-GW-18S-03	CEF-811-18S	E	X	X	X		
CEF-811-GW-21S-03	CEF-811-21S	E	X	X	X		
CEF-811-GW-31S-03	CEF-811-31S	E	X	X	X		
CEF-334-GW-32S-01	CEF-334-32S	P	X	X	X	X	X
CEF-334-GW-33S-01	CEF-334-33S	P	X	X	X	X	X
CEF-334-GW-34S-01	CEF-334-34S	P	X	X	X	X	X
CEF-334-GW-35S-01	CEF-334-35S	P	X	X	X	X	X
CEF-334-GW-36D-01	CEF-334-36D	P	X	X	X	X	X
FL-SMW-8-03	FL-SMW-8	E	X	X	X		
FL-SMW-10-03	FL-SMW-10	E	X	X	X		
CEF-JETC-DU01-GW-03	CEF-811-8S	N/A	X	X	X		
CEF-JETC-DU02-GW-03	CEF-339-28S	N/A	X	X	X		

Note:
[1] E=existing or P=proposed as of March 2001.
[2] Include MTBE on the chain of custody.
[3] Florida - Petroleum Range Organics for total recoverable petroleum hydrocarbon.
[4] 504 = EPA Method 504 for ethylene dibromide.
[5] Use EPA Method 6010B.
Proposed well locations to be assigned by field geologist as the wells are installed.
N/A = not applicable.

Table 2

JETC
Groundwater Analytical Requirements

Analysis	Analytical Method	Bottleware	Preservation	Holding Time[1]
VOCs	SW-846 8021B[2]	3 40-ml glass; Teflon-lined septum	Cool to 4 degrees C, pH < 2 with HCl	14 days to analysis
PAHs	SW-846 8310	2 1-liter amber glass; Teflon-lined lid	Cool to 4 degrees C	7 days to extraction; 40 days to analysis
TRPH	FL-PRO	2 1-liter amber glass; Teflon-lined lid	Cool to 4 degrees C, pH < 2 with H2SO4	7 days to extraction; 40 days to analysis
EDB	EPA Method 504	3 40-ml glass; Teflon-lined septum	Cool to 4 degrees C, pH < 2 with HCl	14 days to analysis
Total Lead	SW846 6010B	1 500-ml HDPE	Cool to 4 degrees C, pH < 2 with HNO3	180 days to analysis

Notes:
[1] Holding times are measured from the date/time of sample collection
[2] Field crew to note on COC to "report MTBE also."

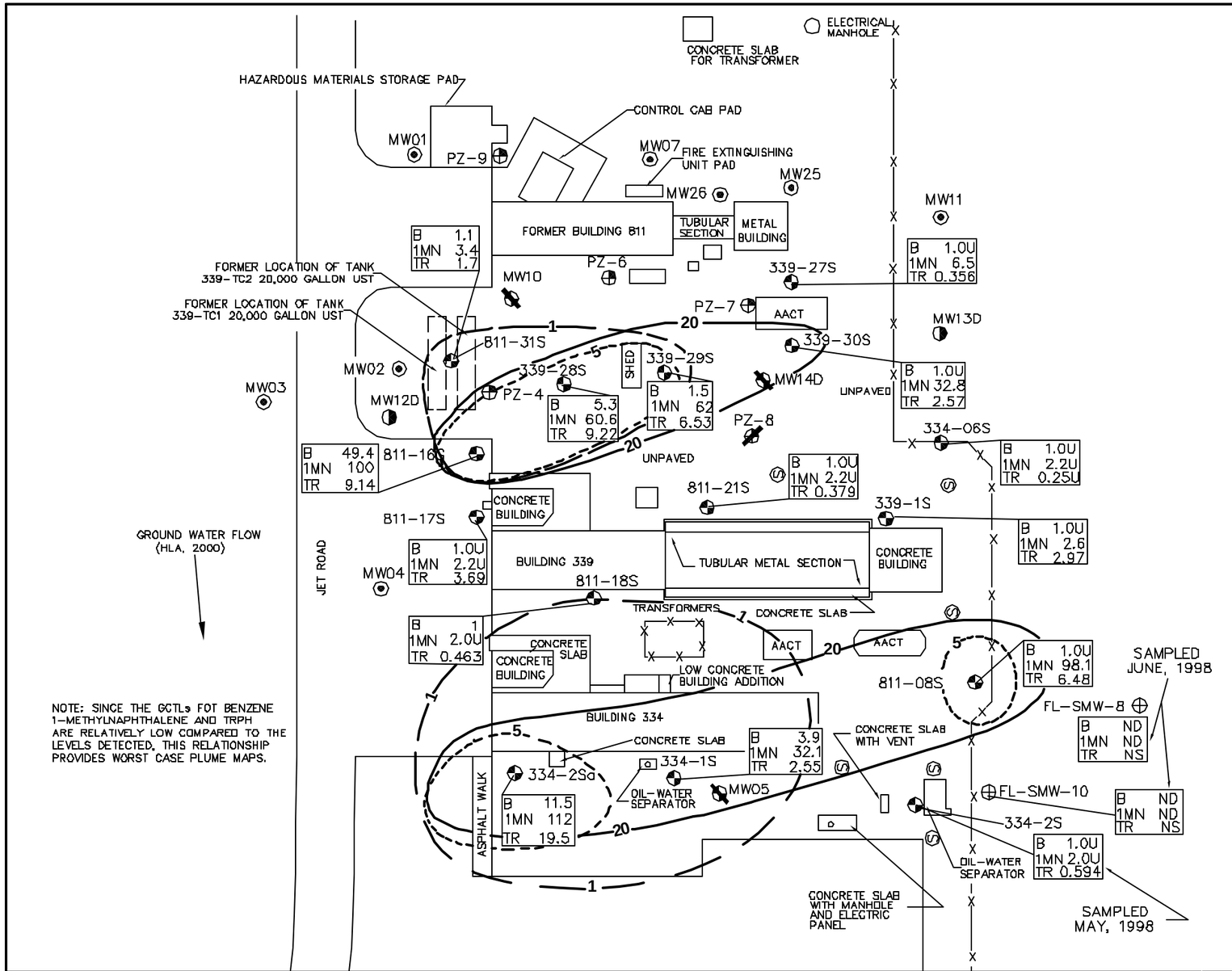
Table 3

JETC
QA/QC Sample Requirements

Type of Samples	Frequency	Samples to be Collected
Field Duplicate	1/10 sample/matrix	2
Lab MS/MSD	1/20 sample/matrix	1[(1)]

Notes:
[1] MS/MSD is a laboratory QA/QC requirement, separate samples not required, only additional volume (2x).

S:\NAVY\SITES\CT0108\0394GT01



LEGEND

		GCTL
BENZENE	B 5.3	1
1-METHYLNAPHTHALENE	1MN 3.4	20
TRPH	TR 4.52	5
UNDETECTED	U	
NOT DETECTED	ND	
NOT SAMPLED	NS	

ANALYTICAL VALUES REPORTED IN MICROGRAMS PER LITER (µg/L) EXCEPT TRPH REPORTED IN MILLIGRAMS PER LITER (mg/L)

5 — — — — — 5 mg/L TRPH CONTOUR

1 ——— ——— 1 MICROGRAM PER LITER (µg/l) BENZENE CONTOUR

20 ——— 20 µg/L 1-METHYLNAPHTHALENE CONTOUR

ALL CONTOUR LOCATIONS APPROXIMATED

334-06S — SHALLOW MONITORING WELL LOCATION (WELL I.D. PRECEDED BY "CEF-" IN REPORT)

FL-SMW-8 — SHALLOW MONITORING WELL LOCATION (WELL INSTALLED FOR NORTHROP GRUMMAN)

PZ-8 — PIEZOMETER LOCATION AND DESIGNATION

SANITARY SEWER MANHOLE

MW01 — SHALLOW MONITORING WELL LOCATION AND DESIGNATION

MW10 — DESTROYED MONITORING WELL LOCATION AND DESIGNATION

MW12D — DEEP MONITORING WELL LOCATION AND DESIGNATION

AST ABOVEGROUND STORAGE TANK

UST UNDERGROUND STORAGE TANK

AACT ABOVEGROUND AIR COMPRESSOR TANK(S)

—X— TYPICAL CHAIN-LINK FENCE WITH BARBED WIRE OVERHANG

0 25 50
APPROXIMATE SCALE in FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

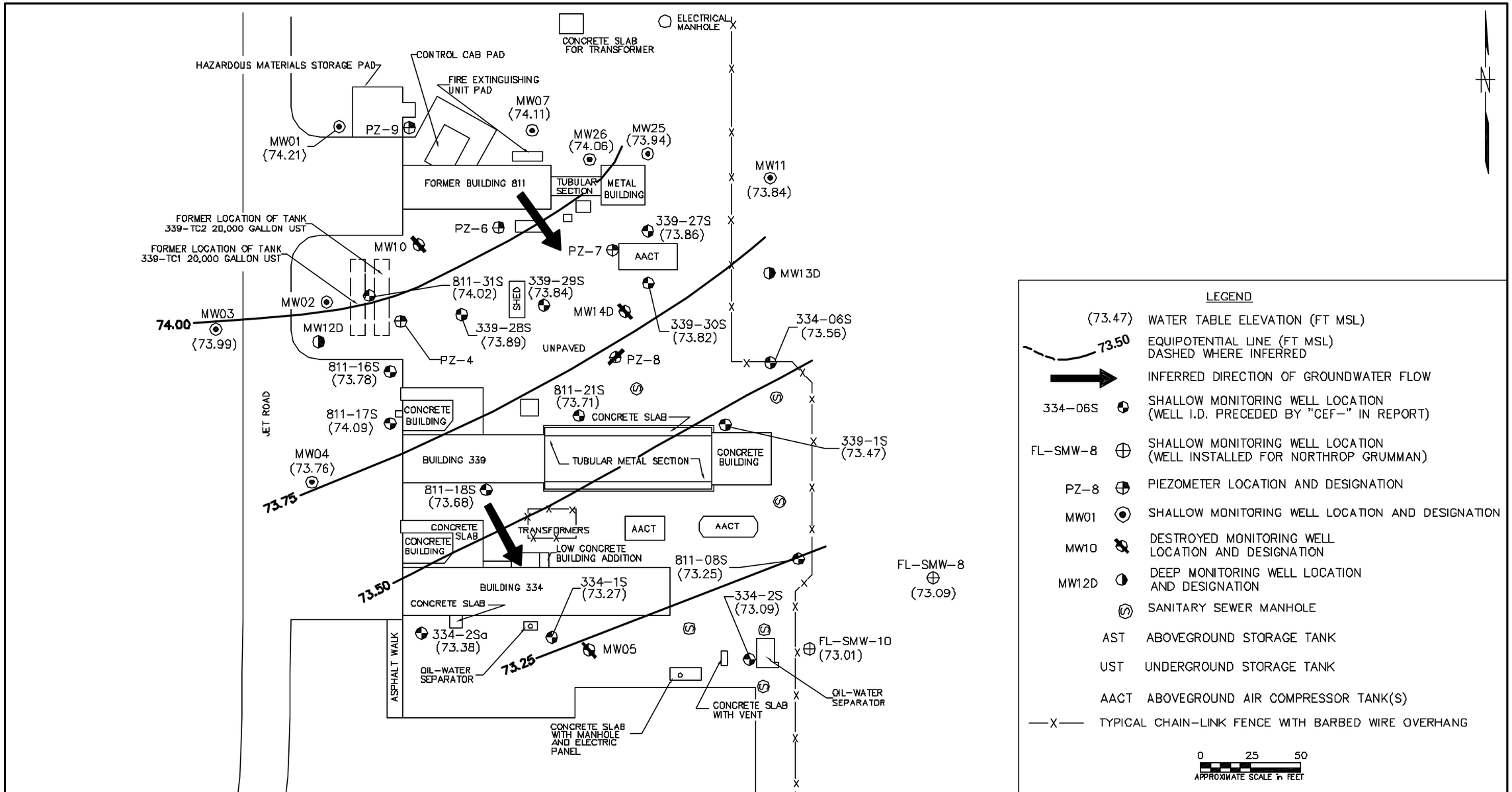
DRAWN BY CW DATE 8/17/00
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

SITE PLAN SHOWING CONTAMINANT PLUMES
JULY 2000
DPT INVESTIGATION WORKPLAN
JET ENGINE TEST CELL
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. N3996
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 1 REV. 0

FORM CADD NO. SDIV_BH.DWG – REV 0 – 1/20/98

S:\NAVY\SITES\CT0108\0394gf02



LEGEND

(73.47)	WATER TABLE ELEVATION (FT MSL)
73.50	EQUIPOTENTIAL LINE (FT MSL) DASHED WHERE INFERRED
	INFERRED DIRECTION OF GROUNDWATER FLOW
334-06S	SHALLOW MONITORING WELL LOCATION (WELL I.D. PRECEDED BY "CEF-" IN REPORT)
FL-SMW-8	SHALLOW MONITORING WELL LOCATION (WELL INSTALLED FOR NORTHROP GRUMMAN)
PZ-8	PIEZOMETER LOCATION AND DESIGNATION
MW01	SHALLOW MONITORING WELL LOCATION AND DESIGNATION
MW10	DESTROYED MONITORING WELL LOCATION AND DESIGNATION
MW12D	DEEP MONITORING WELL LOCATION AND DESIGNATION
	SANITARY SEWER MANHOLE
AST	ABOVEGROUND STORAGE TANK
UST	UNDERGROUND STORAGE TANK
AACT	ABOVEGROUND AIR COMPRESSOR TANK(S)
—X—	TYPICAL CHAIN-LINK FENCE WITH BARBED WIRE OVERHANG

0 25 50
APPROXIMATE SCALE in FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

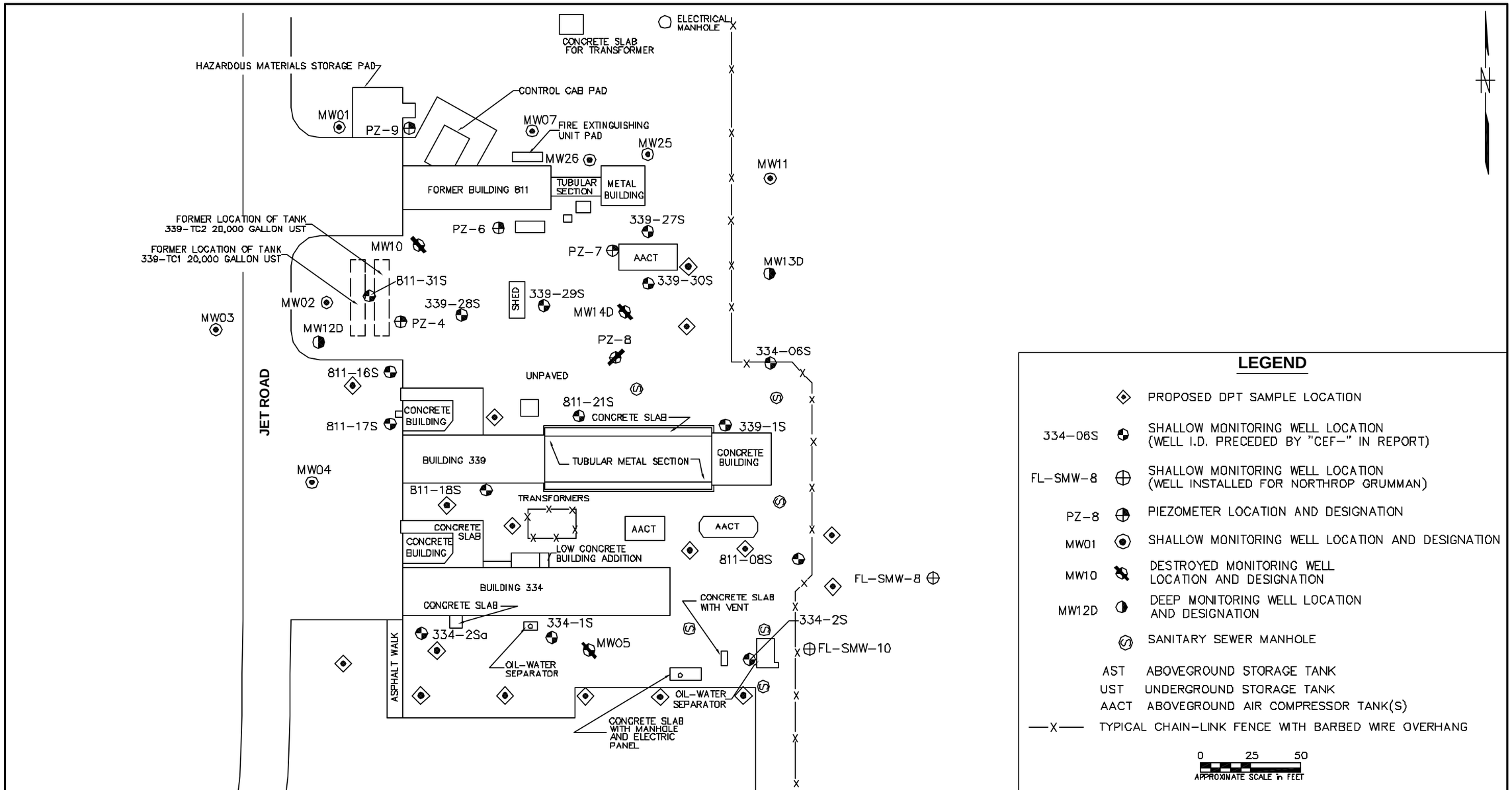
DRAWN BY CW DATE 11/14/00
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

GROUNDWATER ELEVATIONS
OCTOBER 16, 2000
DPT INVESTIGATION WORKPLAN
JET ENGINE TEST CELL
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. N3996
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 2 REV. 0

FORM CADD NO. SDIV_BH.DWG – REV 0 – 1/20/98

S:\PROJECTS\NASCF\CT0108\CADD\3996PW01



LEGEND

	PROPOSED DPT SAMPLE LOCATION
334-06S	SHALLOW MONITORING WELL LOCATION (WELL I.D. PRECEDED BY "CEF-" IN REPORT)
FL-SMW-8	SHALLOW MONITORING WELL LOCATION (WELL INSTALLED FOR NORTHROP GRUMMAN)
PZ-8	PIEZOMETER LOCATION AND DESIGNATION
MW01	SHALLOW MONITORING WELL LOCATION AND DESIGNATION
MW10	DESTROYED MONITORING WELL LOCATION AND DESIGNATION
MW12D	DEEP MONITORING WELL LOCATION AND DESIGNATION
	SANITARY SEWER MANHOLE
AST	ABOVEGROUND STORAGE TANK
UST	UNDERGROUND STORAGE TANK
AACT	ABOVEGROUND AIR COMPRESSOR TANK(S)
—X—	TYPICAL CHAIN-LINK FENCE WITH BARBED WIRE OVERHANG

0 25 50
APPROXIMATE SCALE in FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY LLK DATE 3/29/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

PROPOSED DPT SAMPLE LOCATIONS
DPT INVESTIGATION WORKPLAN
JET ENGINE TEST CELL
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. N3996
APPROVED BY DATE
APPROVED BY DATE
DRAWING NO. FIGURE 3 REV. 0

FORM CADD NO. SDIV_BH.DWG – REV 0 – 1/20/98

ATTACHMENT A

GROUNDWATER LEVEL MEASUREMENT SHEET

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NAS Cecil Field **Project No.:**
Location: JETC **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)*	Comments
CEF-334-1S			77.58	13.85				
CEF-334-2S			77.26					
CEF-334-2Sa			77.65	15.00				
CEF-334-6S			78.02	12.85				
CEF-339-1S			78.06	12.80				
CEF-339-27S			78.36	14.05				
CEF-339-28S			78.19	14.00				
CEF-339-29S			78.29	14.54				
CEF-339-30S			77.84	14.00				
CEF-811-8S			77.8	13.70				
CEF-811-16SR			77.87	15.10				
CEF-811-17S			77.91	14.62				
CEF-811-18S			78.09	14.85				
CEF-811-21S			77.71	14.98				
CEF-811-31S			78.29	14.95				
MW-01			78.37					
MW-03			78.2					
MW-04			77.86					
MW-07			77.98					
MW-25			78.11					
MW-26			78.38					
MW-11			78.18					
FL-SMW-8			76.98					
FL-SMW-10			76.56					

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NAS Cecil Field **Project No.:**

Location: JETC **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)*	Comments
CEF-334-32S								
CEF-334-33S								
CEF-334-34S								
CEF-334-35S								
CEF-334-36D								

* All measurements to the nearest 0.01 foot

ATTACHMENT B

IDW DRUM INVENTORY SHEET

CTO168 (N3996) IDW DRUM INVENTORY					
Location	**Drum Number**	**Content**	**Origin**	**Gallons**	**Date Generated**

Appendix D

Water Level Forms

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: Cecil Field **Project No.:** N3996

Location: Bldg. 312 O/W **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)*	Comments
CEF-312LS-1Sa								
CEF-312-Unknown								
CEF-312-02								
CEF-312LS-1S								
CEF-312-03S								
CEF-312-04S								
CEF-312-05S								
CEF-312-06S								
CEF-312-07S								
CEF-312-08I								

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: Cecil Field **Project No.:** N3996

Location: Bldg. 824 O/W **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)*	Comments
CEF-824-1S								
CEF-824-02S								
CEF-824-03S								
CEF-824-04S								
CEF-824-05S								
CEF-824-06S								
CEF-824-07I								
CEF-824-PZ1								
CEF-824-PZ2								
CEF-824-PZ3								

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: NAS Cecil Field **Project No.:** N3996

Location: North Fuel Farm - Fac. 76 **Personnel:**

Weather Conditions: **Measuring Device:**

Tidally Influenced: Yes ____ No __X__ **Remarks:**

Well or Piezometer Number CEF-76-	Date	Time	Elevation of Reference Point (feet)*	Total Well Depth (feet)*	Water Level Indicator Reading (feet)*	Thickness of Free Product (feet)*	Groundwater Elevation (feet)*	Comments
11			79.34	23.20				
21			79.62	11.76				
30			76.77	12.50				
39D			79.68	61.50				
40D			78.45	56.00				
47I			78.64	73.00				
51D			79.48	110.00				
53I			79.10	80.00				
58I			79.00	75.00				
63S			79.56	47.30				
64I			79.37	77.65				
65D			79.48	120.00				
67I			78.70	90.00				
69S			79.55	38.20				
70I			79.54	73.00				
71D			79.38	85.00				
75S	N/A	N/A	N/A	65.00	N/A	N/A	N/A	Abandoned
76I	N/A	N/A	N/A	92.70	N/A	N/A	N/A	Abandoned
77D	N/A	N/A	N/A	120.00	N/A	N/A	N/A	Abandoned
80D				120.00				

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: Cecil Field **Project No.:** N3996

Location: BP Wells **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)*	Comments
CEF-BP1-1S			76.30	14.72				
CEF-BP1-2S			76.80	14.48				
CEF-BP1-3S			77.40	14.57				
CEF-BP1-4S			77.30	14.75				
CEF-BP1-5I				34.39				
CEF-BP1-6S				14.2				
CEF-308LN-1S			72.97	13.78				

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: Cecil Field **Project No.:** N3996

Location: North-South Apron Plume (MB18) **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)*	Comments
CEF-M18-MW-01S			75.89	15				
CEF-M18-MW-02S			76.02	15				
CEF-M18-MW-02I			75.78	35				
CEF-M18-MW-03I			75.13	35				
CEF-M18-MW-04I			74.66	35				
CEF-M18-MW-05I			73.42	35				

* All measurements to the nearest 0.01 foot

Tetra Tech NUS, Inc.

GROUNDWATER LEVEL MEASUREMENT SHEET

Project Name: Cecil Field **Project No.:** N3996

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)*	Comments

* All measurements to the nearest 0.01 foot

Appendix E

JPA Dig Permit Form

DIG PERMIT/REQUEST

1. Costs associated with utility locates will be the responsibility of the requestor.

2. The requestor is responsible for the repair of any utilities damaged during the digging operation. Hand digging to locate lines is recommended.

3. The JPA Cecil Field Aviation does not accept any financial responsibility associated with repairs due to any other damage associated with this request.

4. Contact "Sunshine State One Call Center" to coordinate all your utility locates. The service is free of charge.

REQUESTOR (NAME): _____ PHONE NUMBER: _____

COMPANY: _____ REQUEST DATE: _____

LOCATION(S): _____

PURPOSE: _____

_____

UTILITY LOCATED AND/OR AREA SCREENED (Sunshine State One Call Center: 1-800-432-4770)

	Yes/No
GAS:	____/____
ELECTRICAL:	____/____
WATER:	____/____
SEWAGE:	____/____
CABLE:	____/____
TELEPHONE:	____/____
STORMWATER:	____/____

CARETAKER REVIEW (BLDG. 1; corner of Authority Ave. and Skillside St.)

ENVIRONMENTAL: _____
(signature/date)

CARETAKER SITE OFFICER: _____
(signature/date)

_____ Recommend Approval/Disapproval Date: _____
Aviation Facilities Coordinator

_____ Approved/Disapproved Date: _____
Facility Manager

COMMENTS: _____

_____.

Phone Numbers:
Aviation Facilities Coordinator: Roy Craigue- 573-1607 (W); 393-4179 (Beeper)
Facilities Manager: Ken Melchiorre- 573-1604 (W); 504-5286 (Cell Phone)

Enclosure (2)

Appendix F

Drilling Forms

EQUIPMENT CALIBRATION LOG

INSTRUMENT NAME/MODEL : _____ PROJECT NAME :

MANUFACTURER : _____ PROJECT NUMBER :

CALIBRATION DATE	INITIAL SETTINGS	STANDARDS USED	PROCEDURE	ADJUSTMENTS MADE	FINAL SETTINGS	SIGNATURE	COMMENTS

BORING LOG

Tetra Tech NUS, Inc.

Page ___ of ___

PROJECT NAME: NAS CECIL FIELD
BORING NO.: CEF-
PROJECT NUMBER: **N3996**
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 co[illegible]er 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 X No Well I.D. #:

Tetra Tech NUS, Inc.

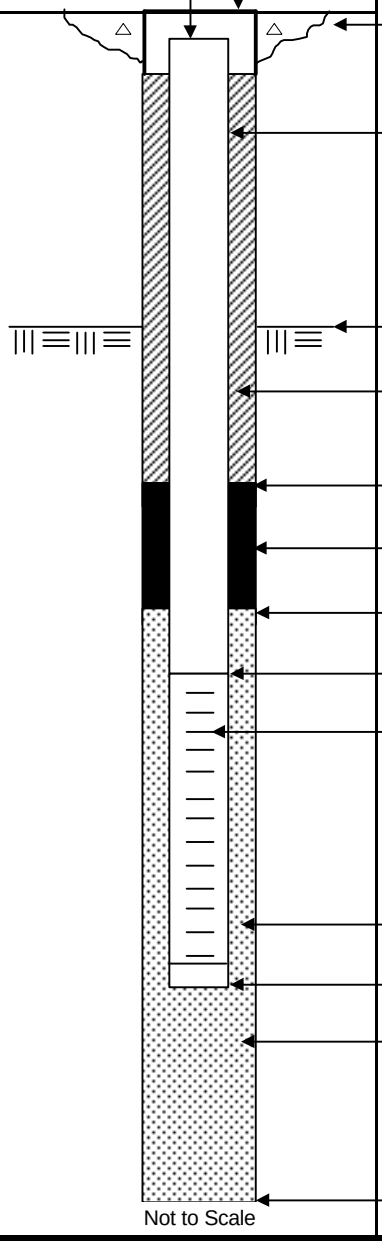
WELL No.: _____

MONITORING WELL SHEET

PROJECT:	NAS CECIL FIELD	DRILLING Co.:	_____	BORING No.:	_____
PROJECT No.:	N3996	DRILLER:	_____	DATE COMPLETED:	_____
SITE:	_____	DRILLING METHOD:	_____	NORTHING:	_____
GEOLOGIST:	_____	DEV. METHOD:	_____	EASTING:	_____

Ground Elevation =

Datum:



Not to Scale

Elevation / Depth of Top of Riser: ____ / ____

Elevation / Height of Top of Surface Casing: ____ / ____

I.D. of Surface Casing: _____

Type of Surface Casing: _____

Type of Surface Seal: _____

I.D. of Riser: _____

Type of Riser: _____

Borehole Diameter: _____

Elevation / Depth Top of Rock: ____ / ____

Type of Backfill: _____

Elevation / Depth of Seal: ____ / ____

Type of Seal: _____

Elevation / Depth of Top of Filter Pack: ____ / ____

Elevation / Depth of Top of Screen: ____ / ____

Type of Screen: _____

Slot Size x Length: _____

I.D. of Screen: _____

Type of Filter Pack: _____

Elevation / Depth of Bottom of Screen: ____ / ____

Elevation / Depth of Bottom of Filter Pack: ____ / ____

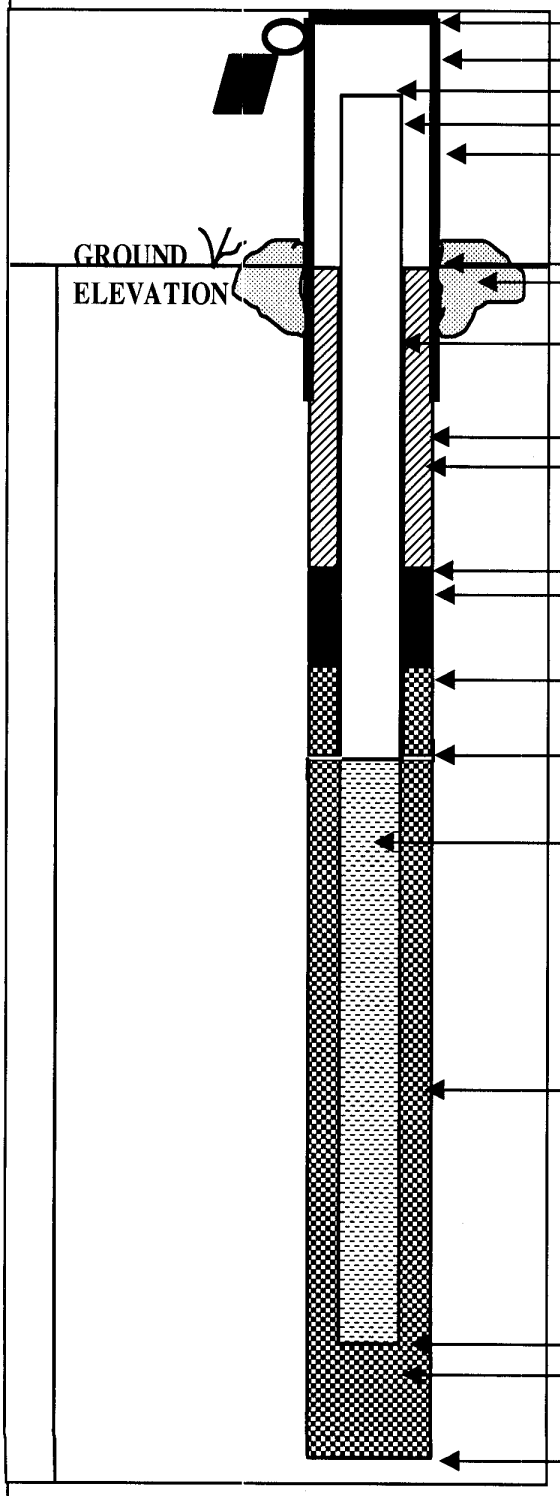
Type of Backfill Below Well: _____

Elevation / Total Depth of Borehole: ____ / ____

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

Well: _____ Depth to Bottom (ft.): _____ Responsible Personnel: _____
Site: _____ Static Water Level Before (ft.): _____ Drilling Co.: _____
Date Installed: _____ Static Water Level After (ft.): _____ Project Name: NAS CECIL FIELD
Date Developed: _____ Screen Length (ft.): _____ Project No.: N3996
Dev. Method: _____ Pump Specific Capacity: _____ N/A
Pump Type: _____ Submersible Casing ID (in.): __ 2

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.)

Appendix G

IDW Drum Manifest Form

CTO168 (N3996) IDW DRUM INVENTORY					
Location	**Drum Number**	**Content**	**Origin**	**Gallons**	**Date Generated**

Appendix H

Sampling Forms

Tetra Tech NUS, Inc.

SURFACE WATER SAMPLE LOG SHEET

Project Site Name: NAS CECIL FIELD
Project No.: N3996

[] Stream
[] Spring
[] Pond
[] Lake
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

SAMPLING DATA:

	Color	pH	S.C.	Temp.	Turbidity	DO	Salinity	Other
Date:	Visual	Standard	mS/cm	Degrees C	NTU	mg/l	%	NA
Time:								
Depth:								
Method:								

SAMPLE COLLECTION INFORMATION:

Analysis	Preservative	Container Requirements	Collected

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: NAS CECIL FIELD
Project No.: N3996

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Date:			
Time:			
Method:			
Monitor Reading (ppm):			

COMPOSITE SAMPLE DATA:

Date:	Time	Depth	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	LAB

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

Tetra Tech NUS, Inc.

GROUNDWATER SAMPLE LOG SHEET

Project Site Name: _____
Project No.: N3996

[ ] Domestic Well Data
[ ] 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	Salinity %	Other
Method: Low Flow Peristaltic								

PURGE DATA

Date:	Time	pH	S.C.	Temp (°C)	Turbidity	DO	Salinity	ORP
Method: Low Flow Peristaltic	See Low Flow Purge Data Sheet							
Monitor Reading (ppm):								
Well Casing Diameter:								
Well Casing Material:								
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: **NAS Cecil Field** **WELL ID.:**
PROJECT NUMBER: **DATE:**

Time (Hrs.)	Water Level (Ft. below TOC)	Flow (mL/Min.)	pH (S.U.)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temp. (Celsius)	Comments

SIGNATURE(S): _____ **PAGE___OF___**

Appendix I

Field Task Modification Request Form

TETRA TECH NUS
FIELD TASK MODIFICATION REQUEST FORM

Project/Installation Name _____ CTO & Project Number _____ Task Mod. Number _____

Modification To (e.g. Work Plan) _____ Site/Sample Location _____ Date _____

Activity Description: _____

Reason for Change: _____

Recommended Disposition: _____

Field Operations Leader (Signature) _____ Date _____

Approved Disposition:

Project/Task Order Manager (Signature) _____ Date _____

Distribution:

Program/Project File –
Project/Task Order Manager –
Field Operations Leader –

Other: _____