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CONTAMINATION ASSESSMENT PLAN FOR NORTH FUEL FARM AREA SITES NTC ORLANDO FL

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ABB ENVIRONMENTAL

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

UNIT IDENTIFICATION CODE: N60200

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FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense (DOD) initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

One of these programs is the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Underground Storage Tank (UST) program. This program complies with Subtitle I of the Resource Conservation and Recovery Act (RCRA) and the Hazardous and Solid Waste Amendment (HSWA) of 1984. In addition, the UST program complies with all appropriate State and local storage tank regulations as they pertain to each naval facility.

The UST program includes the following activities:

- contamination assessment planning,
- site field investigations,
- preparation of contamination assessment reports,
- remedial (Corrective) action planning,
- implementation of the remedial action plans, and
- tank and pipeline closures.

The Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) manages the Navy UST program and the Florida Department of Environmental Protection (FDEP, formerly Florida Department of Environmental Regulation [FDER]) oversees the Navy UST program at NAS Cecil Field.

Questions regarding the UST program at NAS Cecil Field should be addressed to Mr. Bryan Kizer, Code 184PDC, at (803) 743-0896.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
bls	below land surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CA	contamination assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CARA	Contamination Assessment Report Addendum
CompQAP	Comprehensive Quality Assurance Plan
CTO	contract task order
°C	degrees Celsius
EDB	ethylene dibromide
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FID	flame ionization detector
FOL	Field Operations Leader
GC	gas chromatograph
gpm	gallons per minute
HSA	hollow stem auger
ID	inside diameter
mg/ℓ	milligrams per liter
msl	mean sea level
MTBE	methyl tert-butyl ether
µg/ℓ	micrograms per liter
NAS	Naval Air Station
NFF	North Fuel Farm
NFFA	North Fuel Farm Area
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbons
PCA	Preliminary Contamination Assessment
PCAP	Preliminary Contamination Assessment Plan
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
QA/QC	quality assurance and quality control
RAP	Remedial Action Plan

GLOSSARY (Continued)

SOPs	standard operating procedures
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SPT	standard penetration test
TRPH	total recoverable petroleum hydrocarbons
USCGS	U.S. Coastal and Geodetic Survey, 1927 North American Datum
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
VOA	volatile organic aromatic

1.0 INTRODUCTION

ABB Environmental Services, Inc. (ABB-ES), has been contracted by the Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to prepare a Contamination Assessment Plan (CAP) for the North Fuel Farm Area (NFFA) sites at the U.S. Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. The base is located in southwestern Duval County at the junction of Highway 228 (Normandy Boulevard) and 103rd Street (Figure 1-1). The CAP outlines a strategy for the contamination assessment field (CA) investigation and sampling program that will provide data to characterize and estimate the vertical and horizontal extent of soil and groundwater contamination at the NFFA sites. Data obtained in October and November 1994 for the Preliminary Contamination Assessment Plan (PCAP) was used to propose locations for monitoring wells and corresponding screen intervals to estimate the horizontal and vertical extent of contamination on the east side of the North Fuel Farm (NFF) site. The CAP also describes the field investigation activities necessary to address comments to the Contamination Assessment Report (CAR) submitted in July 1994 for the NFFA sites so that addenda to the previously submitted CARs can be completed. A copy of Florida Department of Environmental Protection's comments is included in Appendix A, FDEP Correspondences. The CAP includes a site description, background information, discussion of investigative methodologies, and a schedule for implementing the CA.

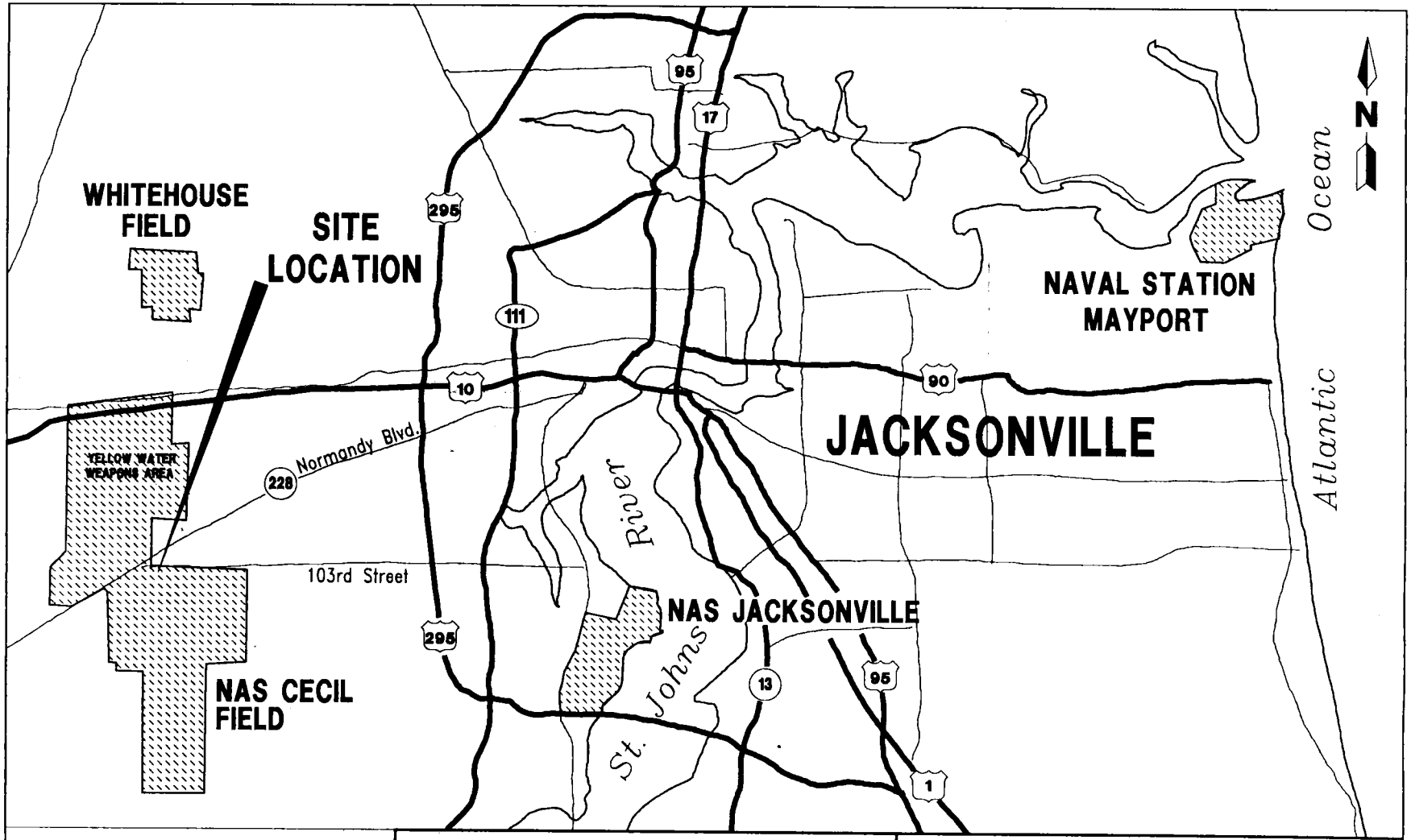

FIGURE 1-1
FACILITY LOCATION MAP

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

2.0 BACKGROUND, SITE DESCRIPTION, AND HISTORY

2.1 BACKGROUND. The NFFA is located at the northeast corner of "A" Avenue and Loop Road at NAS Cecil Field (Figure 2-1) and includes the NFF site, Truck Stand site, JP-5 spill site, and seven dam and pond sites along Sal Taylor Creek (AVORD Dam, North Containment Pond, AVORD-Perimeter Road, Gate 10 Dam, Alpha Dam, Possum Dam, and Gate 14 Dam). During the time the NFF has been in operation, several releases of jet fuel (JP-5) have been reported. The most recent major release occurred on February 9 and 10, 1991, when an estimated 913,000 gallons of JP-5 jet fuel was released from Tank 76E and entered Sal Taylor Creek. JP-5 was observed at the seven dam and pond sites along Sal Taylor Creek where the released fuel pooled and collected.

The Truck Stand, Facility 372, is located directly southeast of the NFF. Soil and groundwater contamination at the Truck Stand site is associated with fuel releases that occurred during tanker truck refueling operations. Site investigations were conducted and CARs were submitted for the NFF and Truck Stand sites in June and May 1991, respectively. The FDEP requested additional soil and groundwater data be acquired at the NFF and Truck Stand sites and reported as addenda to the CARs. FDEP also requested that the JP-5 spill site be assessed and that the CARs for the JP-5 spill site and the affected sites along Sal Taylor Creek be submitted together with the CAR addenda for the NFF and Truck Stand sites (hereafter referred to as the NFFA sites). The CAR and Contamination Assessment Report Addenda (CARA) for the NFFA sites were submitted to the FDEP in July 1994.

Supplemental field investigations performed at the NFF site in February and March 1994 indicated that petroleum contamination in samples from the existing vertical extent monitoring well (CEF-076-28D) exceeded the FDEP target cleanup level for benzene. Intermediate and deep groundwater monitoring wells (CEF-076-39D, CEF-076-40D and CEF-076-41D) were installed near and downgradient to well CEF-076-28D to obtain additional data on the extent of groundwater contamination. Petroleum contamination detected in all samples from four monitoring wells indicated that contamination appeared to be migrating at depths ranging from approximately 35 feet to 100 feet below land surface (bls). Analytical results of groundwater samples from shallow monitoring wells (15 feet bls) in this area (CEF-076-6, CEF-076-21, and CEF-076-29) were below detection limits. Groundwater analytical results of samples from monitoring wells CEF-076-28D, CEF-076-39D, and CEF-076-40D indicate that the horizontal and vertical extent of petroleum contamination detected in the intermediate zone of the surficial aquifer (35 feet to 100 feet bls) has not been adequately assessed.

Tank maintenance and repair records that were made available to ABB-ES during the supplemental investigation indicated that holes in three of the NFF tanks (76, 76A, and 76C) had been discovered and repaired approximately 1 or 2 years after the tanks had been put into service. Based on this information and aquifer test data, ABB-ES estimated that large quantities of fuel had leaked from these tanks 35 to 40 years ago and migrated approximately 500 feet to 800 feet downgradient from the NFF.

After discussing the circumstances at the NFF site with the FDEP, it was agreed that the CAR and the Remedial Action Plan for the NFF site should be submitted separately from the other NFFA sites.

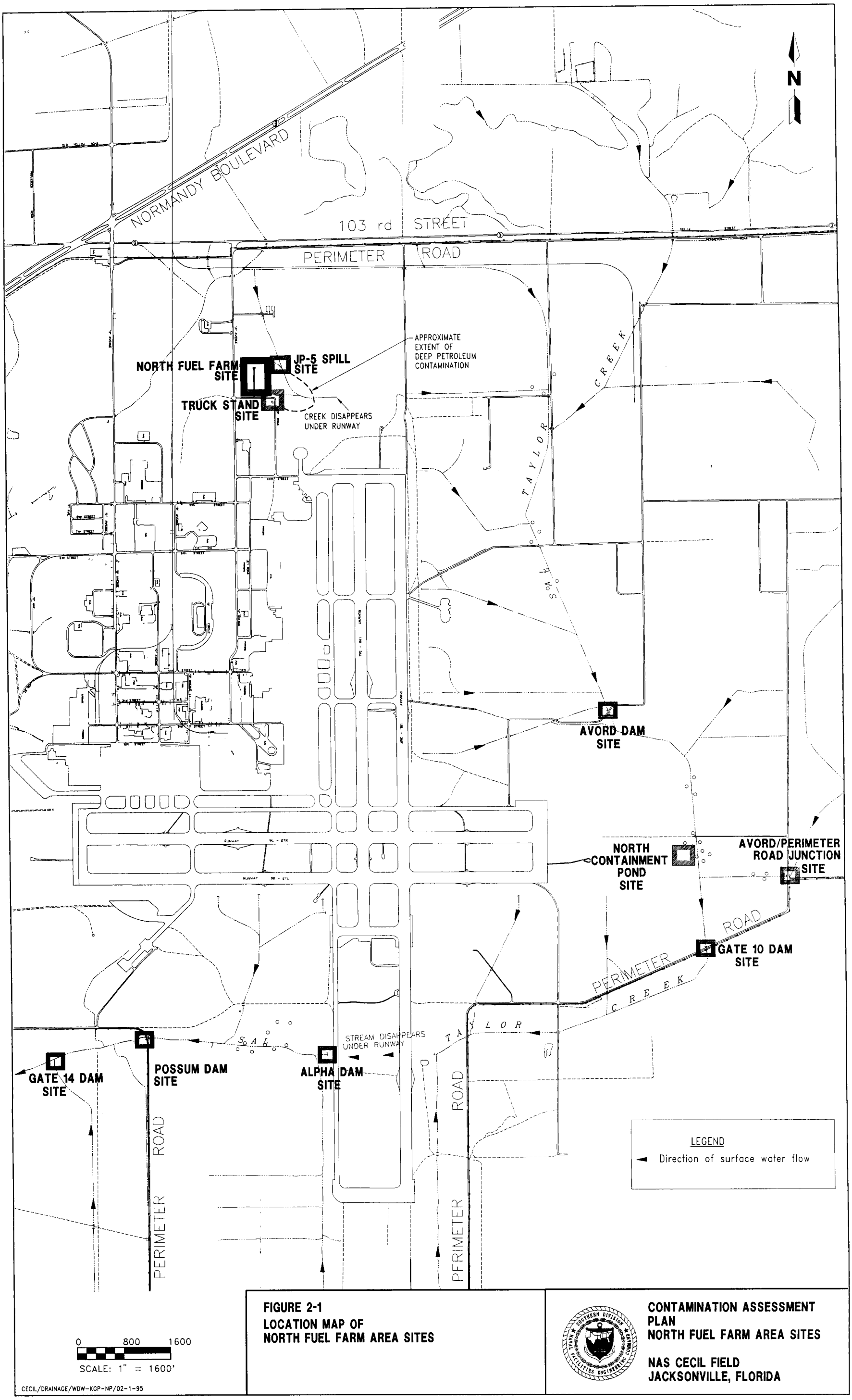

FIGURE 2-1
LOCATION MAP OF
NORTH FUEL FARM AREA SITES

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

From October 4 through November 11, 1994, ABB-ES performed a preliminary contamination assessment (PCA) at the NFF to address the horizontal and vertical extent of petroleum contamination detected in the intermediate zone of the surficial aquifer using Hydropunch™ technology. The findings of the PCA were presented to the FDEP in the form of a Technical Memorandum in December 1994. This CAP presents the site location, summarizes previous investigations, and describes the proposed field investigation to be implemented at the NFF and the other NFFA sites.

2.2 SITE DESCRIPTION AND HISTORY

2.2.1 North Fuel Farm Site The NFF site is located at the northeast corner of "A" Avenue and Loop Road. A location map of the NFF and the other NFFA sites is presented on Figure 2-1. The fuel farm consists of six 595,000-gallon, interior-lined, asphalt-coated, steel, earth-mounded tanks that contain JP-5 jet fuel. The tanks are numbered Tanks 76 and 76A through Tank 76E. Tanks 76 and 76A were installed in 1952; the other tanks were installed in 1954. The associated piping is corrosion-resistant-coated steel and is cathodically protected. In 1987 each tank was relined, and overfill protection (high level alarms) was installed. Each tank has impressed-current-type corrosion protection. In addition, Tank 76 is equipped with an automatic shut-off system. The tanks are gauged daily.

ABB-ES was contracted by SOUTHNAVFACENGCOM in 1991 to conduct a CA to characterize and assess the vertical and horizontal extent of contamination at the NFF and to submit a CAR to the FDEP. Thirty-seven soil borings, 26 shallow monitoring wells, and 4 deep monitoring wells were installed at the site. Soil and groundwater samples were collected and analyzed for petroleum constituents of the kerosene analytical group as defined in Chapter 62-770, Florida Administrative Code (FAC). In June 1992 ABB-ES submitted a CAR for the NFF site to the FDEP. The NFF CAR stated the following.

- Free product was observed in seven of the monitoring wells at the NFF. The maximum free product thickness was 6.0 feet. Contamination detected in water samples exceeded Chapter 62-770, FAC, regulatory standards for total volatile organic aromatics (VOA), benzene, total naphthalenes, and total recoverable petroleum hydrocarbons (TRPH).

- Excessively contaminated soil was detected in the area between the tank farm and "A" Avenue. Excessively contaminated soil was detected at depths ranging from 0 to 5.5 feet bls.

- There are two potable wells on the base within a ¼-mile radius of the site. Neither well is expected to be impacted by petroleum contamination from the site.

- The sources of the contamination appear to be leaks and spills from the tanks and an oil-water separator (which is currently being used as a containment tank) at the NFF.

- Groundwater and soil contamination at the NFF exceeds Chapter 62-770, FAC, regulatory levels.

- The contaminant plume, based on free product measurement and laboratory analytical results for total VOA, is entirely on Navy property. The vertical extent of the contamination exceeds 89 feet bls. The contaminant plume has migrated downgradient (radially) from the source area (the NFF). Based on the NFF CA results, ABB-ES recommended that a RAP be prepared to address the petroleum contamination at the site. FDEP reviewed the NFF CAR and recommended that additional soil borings and monitoring wells be installed and sampled to better delineate the extent of soil contamination and free product at the site. FDEP also recommended that the 913,000-gallon JP-5 fuel spill at the NFF be assessed and that the comments to the NFF CAR be incorporated into the CAR for the 913,000-gallon release. A copy of the FDEP comments for the NFF CAR is included in Appendix A, FDEP Correspondence.

ABB-ES field personnel returned to the NFF in January 1994 and installed three shallow monitoring wells (CEF-076-31, CEF-076-32, and CEF-076-34) and one two-stage deep monitoring well (CEF-076-33D). The additional monitoring wells were installed at the request of the FDEP (see the September 1992 CAR comments letter [Appendix A]).

ABB-ES field personnel returned to the NFF in May 1994 for two purposes: (1) to further delineate the extent of free petroleum product west of the tank farm and east of "A" Avenue and (2) to verify unusually high benzene concentrations detected in samples from deep monitoring well CEF-076-28D. Five shallow monitoring wells (CEF-076-35 through CEF-076-38 and CEF-076-42) were installed west of the tank farm and east of "A" Avenue. No free petroleum product was detected in samples from any of the five free product delineation wells.

The concentration of benzene in a sample from monitoring well CEF-076-28D was 750 parts per billion (ppb) in February 1994. The well was resampled on May 5, 1994, because it was determined that contamination from above the screen interval (80 feet to 90 feet bls) was drawn into the well during purging. Well CEF-076-28D was purged at a lower flow rate to reduce the possibility of contamination being drawn into the screen from above. The concentration of benzene on May 5, 1994 was 43 ppb. Two intermediate double-cased wells (CEF-076-39D and CEF-076-40D) and one double-cased deep well (CEF-076-41D) were installed to obtain additional data on the extent of groundwater contamination near and downgradient from well CEF-076-28D. Wells CEF-076-39D and CEF-076-40D were advanced to 65 feet bls and 55 feet bls, respectively. Deep well CEF-076-41D was advanced to 118.5 feet bls. Six-inch polyvinyl chloride (PVC) surface casing was set in intermediate monitoring wells CEF-076-39D and CEF-076-40D and deep well CEF-076-41D at depths of 30 feet bls and 105 feet bls, respectively.

Following installation of wells CEF-076-39D, CEF-076-40D, and CEF-076-41D, groundwater samples were collected from all accessible monitoring wells associated with the NFF site. A total of 33 groundwater samples were collected in February and May 1994 and analyzed using U.S. Environmental Protection Agency (USEPA) methods for kerosene analytical compounds as defined in Chapter 62-770, FAC. Samples from monitoring well CEF-076-39D contained 7,400 ppb benzene and 12,900 ppb total benzene, toluene, ethylbenzene, and xylenes (BTEX); samples from monitoring well CEF-076-40D contained 6,800 ppb benzene and 12,600 ppb total BTEX; and samples from monitoring well CEF-076-41D contained 2.3 ppb benzene and 3.4 total BTEX.

Groundwater samples were not collected from monitoring wells CEF-076-02, CEF-076-15, CEF-076-16, CEF-076-17, and CEF-076-23 because free product was present in those wells at the time of sample collection. At the request of FDEP, however, groundwater samples were collected from shallow monitoring wells CEF-076-01 and CEF-076-04 that contained free product. The groundwater samples were collected below the free petroleum product-groundwater interface using a sampling method recommended by the FDEP.

The following is a brief summary of the February and May 1994 extent of petroleum contamination field investigations at the NFF site. Free product was observed and measured in seven NFF site monitoring wells. The maximum free product thickness was 5.03 feet. The greatest concentrations of contaminants detected in groundwater samples from wells not containing free product are as follows: total VOA concentrations were 12,900 ppb, benzene was 7,400 ppb, total naphthalenes were 1,260 ppb, and TRPHs were 15.2 parts per million (ppm). Chapter 62-770, FAC, regulatory standards for total VOA, benzene, total naphthalenes, and TRPH are 50 ppb, 1 ppb, 100 ppb, and 5 ppm, respectively.

In October and November 1994, ABB-ES personnel returned to the NFF to conduct a preliminary assessment of the extent of groundwater contamination detected in monitoring wells CEF-076-28D, CEF-076-39D, and CEF-076-40D. The objective of the PCA was to collect and analyze groundwater samples to estimate the horizontal and vertical extent of groundwater contamination associated with fuel leaks from Tanks 76A and 76C. A Hydropunch™ sampler was used at nine locations to collect groundwater samples at 20-foot depth intervals from land surface to approximately 100 feet bls. Groundwater samples were sent to an FDEP approved laboratory for analyses using USEPA Method 602 for BTEX. A Technical Memorandum presenting the findings of the PCA was prepared and submitted to SOUTHNAVFACENGCOM, the Navy, and FDEP on December 16, 1994. A site map of the NFF, Truck Stand, and JP-5 Fuel Spill Area showing all monitoring wells and Hydropunch™ sample locations is presented on Figure 2-2.

2.2.2 **Truck Stand Site** The Truck Stand site, Facility 372, is located on Loop Road south of the NFF and is used as a loading station for the flightline refueling tank trucks. The Truck Stand site consists of a control building (Building 372), a bermed concrete pumping station area (truck stand), an asphalt parking area, and a retention pond (Figure 2-2). Tank trucks approach the refueling area from the north, refuel, and then travel south on Loop Road to the flightline. The tank trucks approach the truck stand both from Loop Road and from the grassy area adjacent to Building 372.

The truck stand facility was identified as a potentially contaminated site in December 1990 while a CA was being conducted by ABB-ES at the NFF. Field sampling teams noticed surficial soil staining around the truck stand and detected a strong petroleum odor in the soil around the facility. Two initial soil borings were taken from the site for analyses in December 1990. Organic vapor analyzer (OVA) readings of soil samples collected at each boring site indicated soil contamination at the truck stand. It was determined that a CA, separate from the NFF investigation, should be conducted at the truck stand.

ABB-ES was contracted by SOUTHNAVFACENGCOM in 1991 to conduct a CA to characterize and assess the vertical and horizontal extent of contamination at the Truck Stand site and submit a CAR to the FDEP. The field investigation at the Truck Stand site resumed in June 1991. Fifty-one soil samples were collected from 36

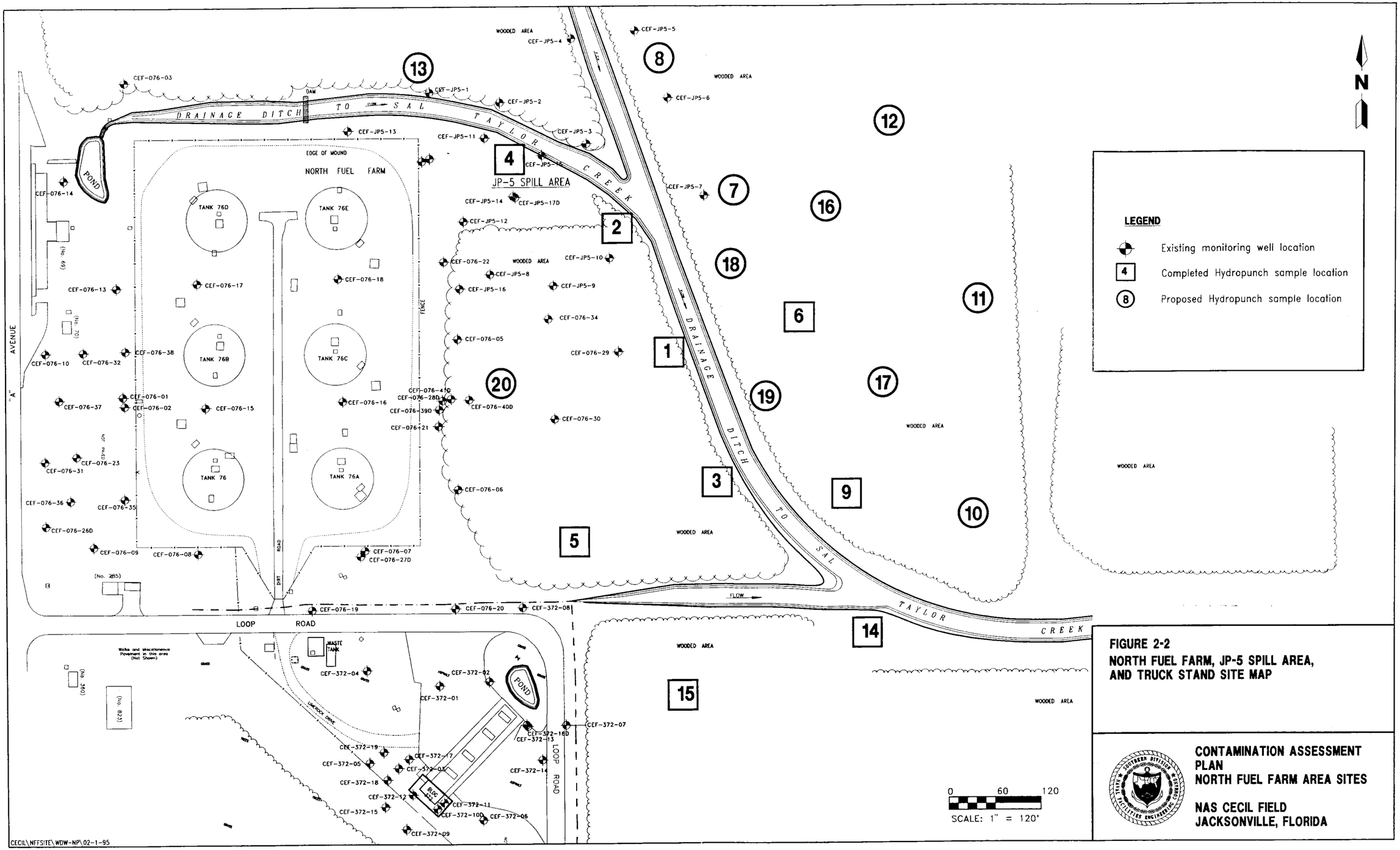

FIGURE 2-2
NORTH FUEL FARM, JP-5 SPILL AREA, AND TRUCK STAND SITE MAP

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

CECIL\NFFSITE\WDW-NP\02-1-95

boreholes sites for analysis by either an OVA or a field gas chromatograph (GC). Ten groundwater quality monitoring wells were installed at the site (CEF-372-01 through CEF-372-10D). Soil and groundwater samples were collected and analyzed for petroleum constituents of the kerosene analytical group as defined by Chapter 62-770, FAC. A CAR was prepared for the Truck Stand site and submitted to the FDEP in May 1992. The Truck Stand site CAR stated the following.

- Petroleum contamination in excess of the State cleanup target level of 50 ppm, as identified by OVA headspace analyses, was detected at two soil sample locations at the site. At the Truck Stand retention pond, the greatest OVA reading of 400 ppm was detected just northeast of the pond at sample location SB-9. In the western part of the site, near Building 372, the greatest OVA reading of 1,400 ppm was detected at sample location SB-19.

- Free product was detected in monitoring well CEF-372-02 at a thickness of 0.18 foot.

- The groundwater sample from monitoring well CEF-372-03 had a total xylenes concentration of 73 micrograms per liter ($\mu g/\ell$) and a total VOA concentration of 75 $\mu g/\ell$. Although there is no State regulatory standard for xylenes, the recommended guidance concentration is 50 $\mu g/\ell$. The regulatory standard for total VOA concentration is 50 $\mu g/\ell$. The total naphthalene and TRPH concentrations from the same sample are 158 $\mu g/\ell$ and 10 milligram per liter (mg/ℓ), respectively. Regulatory standards are 100 $\mu g/\ell$ and 5 mg/ℓ, respectively.

- Groundwater contaminants identified during the CA include ethylbenzene, toluene, xylenes, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

- The vertical extent of petroleum contamination, as defined by the deep well CEF-372-10D, does not appear to exceed 78 feet bls.

- The shallow water table aquifer beneath the site was encountered at depths between 2 and 4 feet bls. The overall direction of groundwater flow at the site is south to southeast. Water of the shallow water table aquifer is considered Class G-II groundwater.

- The contaminant distribution indicates that the soil quality at the site and the groundwater quality of the shallow aquifer beneath the site have been adversely impacted by petroleum constituents in two areas. These are the retention pond area and the area west of and adjacent to Building 372. Concentrations of petroleum constituents in the soil and groundwater are in excess of regulatory standards. Soil in the area between the pond and Building 372 has also been impacted, but OVA data do not indicate excessive contamination. The distribution of contamination is such as to suggest that the contamination is the result of fuel spills and subsequent runoff to the retention pond and infiltration of the soil at the site.

Because petroleum constituent concentrations in the groundwater and soil beneath the site exceed Chapter 62-770, FAC, target levels for groundwater and kerosene contaminated soils, ABB-ES recommended that a RAP be prepared to address the contamination.

ABB-ES also recommended that corrective measures such as education and awareness programs be implemented to prevent future loss of fuel and other related substances during daily operations at the Truck Stand site. Corrective measures were recommended to properly retain and recover spilled or improperly discharged fuel and other substances. Such measures included construction of physical devices at all active areas of the Truck Stand site so that fuel and other related substances cannot enter the retention pond or the soil at the site. Such devices would include an oil-water separator and barriers. Barriers should be permanent, impervious, and bermed. An example of such a barrier would be a concrete, not asphalt, floor with berm at the tank truck refueling area, parking lot, and all traffic areas.

FDEP reviewed the Truck Stand site CAR and recommended that surface water and sediment samples from the site retention pond should be collected and analyzed for kerosene analytical group compounds, and that additional soil borings and monitoring wells be installed and sampled to better delineate the extent of soil contamination and free product at the site. FDEP agreed that the comments to the Truck Stand site CAR should be incorporated in a CARA and submitted with the NFFA site CARs (the sites associated with the 913,000-gallon JP-5 release).

ABB-ES field personnel returned to the Truck Stand site in January and May 1994 and measured the headspace by OVA in samples from 39 additional soil borings (SB-31 through SB-70), and installed and sampled 7 shallow monitoring wells (CEF-372-11 through CEF-372-15 and CEF-372-17 through CEF-372-19), and one two-stage deep well (CEF-372-16D). A CARA for the Truck Stand site was submitted to the FDEP as part of the NFFA site assessment in July 1994. FDEP reviewed the Truck Stand site CARA and requested supplemental soil borings, monitoring wells, and piezometers to more accurately delineate the soil, groundwater, and free product. A copy of the FDEP's December 1, 1994, comments to the NFFA sites is included in Appendix A, FDEP Correspondence.

2.2.3 JP-5 Spill Site and Sal Taylor Creek Sites The JP-5 spill area is located adjacent to Tank 76E on the northeast corner of the NFF (Figures 2-1 and 2-2). On February 10, 1991, approximately 913,000 gallons of JP-5 jet fuel overflowed from Tank 76E. The fuel flowed down the slope on the west side of the tank into a small drainage ditch that discharges into Sal Taylor Creek. The main area affected by the JP-5 release is where the fuel spread along the ground surface between Tank 76E and the drainage ditch. The JP-5 Spill Site also includes a low-lying area northeast of Tank 76E where the fuel accumulated after it backed up in the drainage ditch and overflowed the bank.

The Sal Taylor Creek sites are areas where the JP-5 release accumulated at dams, containment ponds, or other structures along the creek. Specific sites include the Aviation Ordnance (AVORD) Dam, North Containment Pond, a concrete conduit at the junction of the AVORD area and Perimeter Road (hereafter referred to as the AVORD-Perimeter Road Site), Gate 10 Dam, Alpha Dam, Possum Dam, and Gate 14 Dam. These sites were identified by the NAS Cecil Field On-Scene Coordinator and Navy On-Scene Commander in his spill response report dated April 10, 1991. The spill response report documents the date and time the release occurred, the Fuel Farm personnel's estimate of the quantity of JP-5 released, the Navy's assessment of how far down Sal Taylor Creek the JP-5 flowed, the areas where the fuel accumulated along the creek, the methods employed to recover the fuel, and the quantities of fuel recovered. The report also documents the names of individuals, regulatory agencies, contractors, and others contacted by the Navy to report

the release, conduct emergency response, and assess the effects of the release. A copy of the spill response report is attached in Appendix B, Site Background Information and Documentation.

At the request of SOUTHNAVFACENGCOM, ABB-ES initiated a soil boring program to provide a preliminary assessment of the extent of soil and groundwater contamination at the JP-5 Spill and Sal Taylor Creek sites. From July 18 to August 27, 1991, ABB-ES advanced 411 soil borings at the sites and analyzed soil samples from each boring using the OVA headspace techniques described in Chapter 62-770, FAC (formerly Chapter 17-770, FAC). Soil samples were also collected from borings spaced approximately 500 feet apart along the creek bank between the Sal Taylor Creek sites. Saturated soil samples from many of the borings were screened for petroleum compounds using a portable GC.

ABB-ES conducted a soil boring and shallow monitoring well installation and sampling program to provide a more recent assessment of the extent of soil and groundwater contamination at the JP-5 Spill and Sal Taylor Creek sites. From May 27 to June 5 1992, ABB-ES advanced 87 soil borings at the sites and analyzed soil samples from each boring using OVA headspace techniques. Soil samples were also collected from borings spaced approximately 500 feet apart along the creek bank between the Sal Taylor Creek sites. Permanent shallow monitoring wells were installed at the JP-5 Spill Site east of Tank 76E and several of the Sal Taylor Creek sites. Groundwater samples from all of the monitoring wells were screened for petroleum compounds using a portable GC.

SOUTHNAVFACENGCOM, FDEP, and ABB-ES representatives met on January 4, 1993, to discuss the proposed scope of work for the 1993 CA at the NFFA sites. The FDEP comments to the North Fuel Farm and Truck Stand site CARs and the 1991 and 1992 soil and groundwater data were reviewed and discussed. Issues concerning the JP-5 Spill Site and the seven downstream sites along Sal Taylor Creek were also addressed at the meeting. These issues included:

- spacing and location of soil borings at the JP-5 spill and seven sites along Sal Taylor Creek, and along the bank of Sal Taylor Creek between the seven sites;

- including figures in the JP-5 Spill site CAR and the CARs for the seven downstream sites showing the extent of contamination from the initial field investigation and each subsequent investigation to provide a perspective of contaminant plume migration at each location; and

- considerations that the seven sites along Sal Taylor Creek are located in a wetlands habitat. All parties agreed that RAP construction activities would likely pose a greater potential to damage the wetlands than would the JP-5 released from the NFF. In consideration of this possibility, it was felt that a risk assessment conducted under Chapter 62-770.630 (5) (a,b), FAC, guidelines could possibly be a more cost-effective approach rather than undertaking an RAP. This action would be conducted on a case-by-case basis and totally subject to FDEP approval.

In 1993 and 1994, ABB-ES field personnel returned to the JP-5 Spill Site and the seven Sal Taylor Creek sites affected by the 913,000-gallon fuel spill. Soil borings sampled in 1991 are designated in this CAP with the letter "B." Soil

borings sampled in 1992 are designated with the letters "XB." The following is an outline of field work performed at each site from 1991 through 1994.

JP-5 Fuel Spill Area. Forty-seven soil borings were advanced in 1991 (B-1 through B-47). Fifty-three soil borings were advanced (XB-35 through XB-87) and 11 monitoring wells were installed (CEF-JP5-1 through CEF-JP5-11) in 1992. Thirty-seven soil borings were advanced (93A-1 through 93A-37), and five shallow monitoring wells (CEF-JP5-12 through CEF-JP5-16) and one two-stage deep well (CEF-JP5-17D) were installed in 1993.

AVORD Dam Site. Five soil borings were advanced in 1991 (B109 through B112 and B120), 4 borings in 1992 (XB-83 through XB-86), 11 borings in 1993 (93B-1 through 93B-11), and 4 borings in 1994 (93B-12 through 93B-15). Seven monitoring wells were also installed in 1994 (CEF-AVD-01 through CEF-AVD-07).

North Containment Pond. Twenty-five soil borings were advanced in 1991 (P2-1 through P2-25), 7 borings in 1992 (XB-13 through XB-19), 33 borings in 1993 (93C-1 through 93C-33), and 2 borings in 1994 (93C-34 and 93C-35). Eight monitoring wells were installed in 1994 (CEF-NCP-01 through CEF-NCP-08).

AVORD-Perimeter Road. Twelve soil borings were advanced in 1991 (B195 through B206), 7 borings in 1992 (XB-6 through XB-12), and 17 borings in 1993 (93D-1 through 93D-17). Two monitoring wells were installed in 1992 (CEF-AVD-01 and CEF-AVD-02) and 3 monitoring wells were installed in 1994 (CEF-AVD-03 through CEF-AVD-05).

Gate-10 Dam Site. Forty-three soil borings were advanced in 1991 (B155 through B277), 15 borings in 1992 (XB-20 through XB-34), 53 borings in 1993 (93E-1 through 93E-53), and 7 borings in 1994 (93E-54 through 93E-60). Twelve shallow monitoring wells were installed in 1994 (CEF-G10-01 through CEF-G10-12).

Alpha Dam Site. Twenty-eight soil borings were advanced in 1991 (B279 through B305 and B406), 5 borings in 1992 (XB-1 through XB-5), 52 borings in 1993 (93F-1 through 93F-52), and 39 borings in 1994 (93F-53 through 93F-91). Two shallow monitoring wells were installed in 1992 (CEF-ALP-01 and CEF-ALP-02) and five shallow monitoring wells were installed in 1994 (CEF-ALP-03 through CEF-ALP-07).

Possum Dam Site. Thirty-eight soil borings were advanced in 1991 (B347 through B384), 13 borings in 1992 (SB-46 through XB-58), 38 borings in 1993 (93G-1 through 93G-38), and 5 borings in 1994 (93G-39 through 93G-43). Four monitoring wells were installed in 1992 (CEF-POS-01 through CEF-POS-4) and three monitoring wells were installed in 1994 (CEF-POS-05 through CEF-POS-07).

Gate-14 Dam Site. Thirteen soil borings were advanced in 1991 (B385 through B397), 10 borings in 1992 (XB36 through XB-45), 15 borings in 1993 (93H-1 through 93H-15), and 2 borings in 1994 (93H-16 and 93H-17). Four shallow monitoring wells were installed in 1992 (CEF-G14-01 through CEF-G14-04) and two monitoring wells were installed in 1994 (CEF-G14-05 and CEF-G14-06).

Sal Taylor Creek. Fifty-four soil borings were advanced along the creek bank of Sal Taylor Creek (93I-1 through 93I-54) at approximately 500-foot intervals and shortened to 250-foot intervals when significant soil contamination was detected. In addition, surface water and surface water sediment samples were taken immediately upstream, downstream, and at the dam or containment pond for each

site. The samples were collected and analyzed for kerosene analytical group constituents in accordance with Chapter 62-770, FAC, guidelines.

In July 1994, the CARs for the JP-5 Fuel Spill and Sal Taylor Creek Sites (NFFA) were submitted to the FDEP. FDEP reviewed the CARs for the NFFA and requested additional work at the NFFA sites in their letter dated December 1, 1994 (Appendix A).

3.0 SITE CONDITIONS

3.1 REGIONAL PHYSIOGRAPHY. Duval County lies within the northern, or proximal zone, geomorphic province. It is characterized by continuous high ground forming a broad upland that extends eastward to the Eastern Valley and westward continuously into the Western Highland of Florida (Scott, 1978). NAS Cecil Field is situated on the Duval upland, which is essentially a relict marine terrace. Elevations range from 20 to 30 feet above mean sea level (msl) at the toe to greater than 70 feet above msl at the crest of the upland scarp. Elevations continue to increase westward across the upland becoming greater than 100 feet above msl at its western limit, the base of the Trail Ridge (White, 1970).

3.2 SITE-SPECIFIC PHYSIOGRAPHY. Topography at the NFF has been altered greatly due to the mounding of earth around the storage tanks. Elevations range from approximately 76 to 98 feet above msl. Sediments of the area consist typically of sand and clayey sand (ABB-ES, 1992). Due to the presence of the earth-mounded tanks, surface drainage flows radially away from the fuel farm. General surface drainage in the surrounding area of the fuel farm is to the east.

3.3 REGIONAL HYDROGEOLOGY. In northeastern Florida, the distribution of sediments is controlled by the Peninsular Arch and the Southeast Georgia Embayment. More than 1,500 feet of Eocene Age and younger sediments were deposited in the region.

The underlying unconsolidated geologic sequence consists of flat-lying deposits of sand, silt, and clay overlying a thick sequence of marine carbonates. The three discernible underlying geologic units in the region are: (1) the surficial deposits, which form a unit approximately 40 to 100 feet thick and are of Late Miocene to Recent Age; (2) the Hawthorn Group, which is approximately 300 feet thick and of middle Miocene Age; and (3) the marine carbonate sequences of the Floridan aquifer system, which are of Eocene Age and comprise a unit greater than 1,000-feet thick.

The Ocala Group is composed of Eocene Age limestone formations, which are the principal consolidated formations near NAS Cecil Field. The Eocene Age limestone formations in Duval County slope northeastward and form an irregular trough or basin, which extends from south-central Duval County northeastward into northeastern Nassau County.

3.3.1 Shallow Aquifer The surficial deposits consist of sediments of upper Miocene Age and younger, and comprise the shallow aquifer. Surficial deposits can be divided into undifferentiated sediments of Pleistocene and Recent Age and sediments of upper Miocene and Pliocene Age. These sediments were deposited in lagoon and estuarine environments. The Pleistocene and Recent Age sediments extend from the surface to about 40 feet bls. These highly variable sediments include quartz sand, shelly sand, coquina, silt, clay, and shell beds. Iron oxide-cemented (rusty red color hardpan) fine-grained sand sediment is common in the upper part of the surficial deposits. Upper Miocene and Pliocene sediments consist of interbedded silty clay and clayey sand, sand, shell, and soft friable limestone prevalent at the base of these deposits. The contact between the upper Miocene and Pliocene deposits and the underlying Hawthorn Group is an unconform-

ity identified by a coarse phosphatic sand and gravel bed (Leve, 1968). When coarse-grained phosphatic sand and gravel are not present, the contact is phosphatic sandy clay or clayey sand, dolostone, or a magnesium-rich clay.

The shallow aquifer beneath Duval County is composed of a series of permeable zones separated by confining or semi-confining beds. The groundwater flow direction in the water table zone tends to reflect the surface topography of the area. Groundwater in this zone generally flows from higher to lower topographic areas or discharge areas (e.g., springs or streams that intersect the water table). Throughout much of NAS Cecil Field, the water table zone generally flows southeast toward the St. Johns River.

The shallow aquifer is recharged by local precipitation. The average annual precipitation for Duval County is 52 to 54 inches. Water level hydrography indicates that 10 to 16 inches of rainfall recharges the shallow aquifer annually (Fairchild, 1972). Discharge of the shallow aquifer occurs by evapotranspiration, seepage into surface water bodies, downward leakage into the underlying Hawthorn Group (intermediate artesian aquifer), and well pumpage.

3.3.2 **Intermediate Artesian Aquifer** The Hawthorn Group lies unconformably above the Crystal River Formation within the Ocala Group. Lithologically, the Hawthorn Group is quite variable and consists of calcareous, phosphatic sandy clay, and clayey sand interbedded with thin discontinuous lenses of phosphatic sand, phosphatic sandy limestone, limestone, and dolostone. The limestone and dolostone lenses are thicker and more prevalent near the base of the Hawthorn.

Phosphate is present throughout Hawthorn Group sediments, comprising one of the primary lithologic constituents. The most common carbonate components of the Hawthorn Group are dolomite and dolosilt. Clay minerals associated with the Hawthorn Group sediments are smectite, illite, palygorskite, and kaolinite.

The Hawthorn Group serves as a confining layer that separates the shallow aquifer from the underlying Floridan aquifer system; however, in Duval County, permeable sand and limestone layers within the Hawthorn's confining clay layers form the secondary or intermediate artesian aquifer. Water levels indicate that groundwater flow in the intermediate artesian aquifer in the NAS Cecil Field area is towards the east (Fairchild, 1972).

3.3.3 **Floridan Aquifer System** The marine carbonate sequences that make up the Floridan aquifer system beneath NAS Cecil Field consist of the following formations in descending order:

- the Ocala Limestone, which consists of the Crystal River Formation, the Williston Formation, and the Inglis Formation;
- the Avon Park Limestone;
- the Lake City Limestone; and
- the Oldsmar Limestone.

These formations range in age from the Late Eocene Crystal River Formation to the Early Eocene Oldsmar Limestone.

The Crystal River Formation is a white to cream, chalky, massive fossiliferous limestone and is the youngest Eocene formation underlying NAS Cecil Field. The

Williston Formation, which lies conformably between the overlying Crystal River Formation and the underlying Inglis Formation, is a tan to buff granular limestone. The Inglis Formation, of late Eocene Age, is a tan to buff calcitic limestone very similar in appearance and composition to the Williston Formation (Leve, 1968).

The Avon Park Limestone, of middle Eocene Age, unconformably underlies the Ocala Limestone. It consists of alternating beds of tan, hard, massive dolomite and brown to cream, granular, calcitic limestone. The Lake City Limestone unconformably underlies the Avon Park Limestone and is also Eocene in age. Lithologically, it consists of alternating beds of white to brown, chalky to granular limestone with lignite bands, and gray to tan dolomite. Below the Lake City Limestone is the Oldsmar Limestone of early Eocene Age. It consists of a cream to brown, soft, granular limestone and cherty, glauconitic, massive to finely crystalline dolomite (Leve, 1968).

The Floridan aquifer system is the principal source of freshwater in northeast Florida. Recharge to the Floridan aquifer system is predominantly by direct rainfall along the Ocala Uplift where the limestone of the aquifer outcrops at land surface. In northeast Florida, there is an area of recharge that encompasses western Clay and Putnam Counties and eastern Bradford and Alachua Counties, as close as 30 miles southwest of NAS Cecil Field. Permeable sand and gravel facies of the Hawthorn Group outcrop in this area, which appears to be hydraulically connected to the Floridan aquifer system. The top of the Floridan aquifer system in the vicinity of NAS Cecil Field occurs at a depth ranging from 275 to 400 feet bls (Causey, 1978). The groundwater in the Floridan aquifer system in this vicinity is moving northeastward toward the cone of depression in Jacksonville caused by heavy pumpage (Leve, 1968).

3.4 SITE-SPECIFIC HYDROGEOLOGY. The Holocene to Pliocene undifferentiated deposits that contain the surficial aquifer are of variable thickness at NAS Cecil Field. At the NFF, these deposits are approximately 90 feet thick. From land surface to approximately 50 feet bls, the sediments are typically fine- to very fine-grained, brown to tan, quartz sand and silt. From 50 to approximately 90 feet bls the sediments become silty to clayey, gray to green, quartz sands with intermittent, olive green clay stringers, beginning at 60 feet bls. At approximately 90 feet bls, the deposits are characteristically gray to green sand with shell fragments. It is likely these latter deposits constitute the base of Pliocene Age deposits or the uppermost parts of the Miocene Age Coosawhatchie Formation. A dolomite layer forms the base of the surficial aquifer at the site and is typically encountered at approximately 95 feet bls.

Measured depth to water varied across the site from 2 to 4 feet bls in the shallow wells and from 4 to 8 feet bls in the intermediate and deep wells. Clay lenses and other low permeability layers form a semi-confining unit, separating the surficial aquifer into upper and lower zones. The upper and lower water bearing zones, (UZS and LZS, respectfully) (ABB-ES, 1994a) account for the difference in water level depths between the shallow and the deep wells. The water table surface approximately parallels topography; thus, groundwater flow direction in the shallow wells is radial around the tank farm. The groundwater flow direction in the lower zone of the surficial aquifer is apparently toward the east and southeast; however, only four deep wells, screened at various depth intervals, have been installed.

4.0 POTABLE WELL SURVEY

A potable well survey was conducted to identify potable water sources within a ¼-mile radius of the NFF site. NAS Cecil Field currently uses five onsite wells for all potable water. These wells are numbered PS-1 through PS-5. Table 4-1 lists the construction and operation information for these wells. No surface water bodies in the area are used as potable water sources (Envirodyne Engineers, 1985). No private potable wells are within 1 mile of this site (Geraghty & Miller, 1983).

Table 4-1
Potable Well Data

Contamination Assessment Plan
North Fuel Farm Area Sites
NAS Cecil Field, Jacksonville, Florida

Well	Date Installed	Depth (feet)	Static Level (feet)	Drawdown (feet)	Yield (gpm)
PS-1	1941	887	30	8	450
PS-2	1945	907	33	13	525
PS-3	1950	950	33	11	500
PS-4	1956	1,303	34	15	1,000
PS-5	1956	1,350	35	15	1,000

Source: Geraghty & Miller, 1986

Note: gpm = gallons per minute.

Potable water wells PS-4 and PS-5 are located within ¼ mile and downgradient of the NFF. These wells have total depths of 1,303 and 1,350 feet, respectively. Both wells produce from the Floridan aquifer system.

5.0 PROPOSED FIELD ASSESSMENT PLAN

All work performed and methodologies and equipment used during the course of this CA will be in accordance with the ABB-ES, FDEP-approved, Comprehensive Quality Assurance Plan (CompQAP) and applicable ABB-ES Standard Operating Procedures (SOPs) approved by the Board of Technical Directors. Applicable SOP's will be available onsite throughout the duration of this CA.

Soil Borings. Soil borings will be advanced to the top of the water table by ABB-ES personnel. A soil sample from each borehole, retrieved at various depth intervals, will be placed in a 16-ounce soil jar for headspace analysis using an OVA following FDEP procedures as outlined in Chapter 62-770, FAC, and ABB-ES's SOP on soil boring procedures.

Monitoring Well Construction. Monitoring wells will be installed using a drill rig with hollow-stem augering or mud rotary capabilities. Soil samples will be collected from each monitoring well borehole prior to well installation using a standard penetration test (SPT) split-spoon sampler. Soil samples from the SPT will be described using the Musell Color Chart and Unified Soil Classification System descriptions for grain size, grading, and other textural characteristics. Soil quality samples will be collected at various intervals to the bottom of the borehole. Samples will be analyzed using a GC calibrated to detect BTEX to the part per billion detection level. This screening procedure will allow for the judicious placement of monitoring wells and screen interval depths during the investigation.

Shallow water-table monitoring wells installed during the investigation will be constructed of Schedule 40 PVC casing with flush-threaded joints and 0.010-inch slotted screen. Each shallow water-table well will be constructed of 2-inch PVC with a 10-foot screen section placed at a depth that should encompass seasonal water table fluctuations. Intermediate and deep vertical extent monitoring wells will be installed by placing 6-inch, Schedule 40 PVC surface casing into the borehole at various depths. A 2-inch Schedule 40 PVC well with 5 or 10 feet of slotted screen will be placed inside the 6-inch surface casing to approximately 15 feet below the bottom of the casing at various depth intervals for each monitoring well. A 20/30 grade silica filter pack will be placed in the annular space around each well to approximately 2 feet above the top of the screen. A 1- to 2-foot fine sand (30/65) seal will be placed on top of the filter pack. The remaining annular space will be grouted to the surface with a neat cement. All monitoring wells on the east side of the NFF will be finished above grade with 3 feet of aboveground metal casing protective vault surrounding the 2-inch PVC well. Monitoring wells for the other NFFA sites will be completed flush mounted at land surface. Each monitoring well will be equipped with a locking well cap and a padlock.

Subsequent to installation, the shallow water-table wells will be developed using a centrifugal pump. The deep wells will be developed by air surging until the purged water is relatively sand free or as clear as the aquifer will allow in a reasonable amount of time.

All drilling fluids, sediment, and well development fluids from contaminated areas will be drummed, removed from the site, and properly disposed. The onsite Field Operations Leader (FOL) will determine proper disposal criteria.

Water Level Measurements. Groundwater levels will be measured using an electric water level indicator and an engineering tape accurate to 0.01 foot. The wells will be checked for the presence of free product by visual inspection of a groundwater sample taken from each well and the thickness of the free product will be measured by the use of an oil-water interface probe. Water level elevations will be calculated by subtracting the measured depth to groundwater from the surveyed elevation at the top of the well casing. This information will be plotted on a scaled water table contour map where flow lines (depicting groundwater flow direction) can be drawn perpendicular to the groundwater elevation contours. The groundwater hydraulic gradient will be calculated by subtracting the differences in groundwater elevation (in feet) between two wells or two points on the map and dividing the elevation difference by the distance between the two points to obtain a resulting hydraulic gradient in feet per foot.

Soil Sampling. Soil quality samples for organic vapor analyses will be placed in 16-ounce glass jars using a stainless-steel spoon and set in a 20 degree Celsius (°C) water bath for 5 minutes. Samples will be analyzed using an OVA with a flame ionization detector (FID) using the headspace technique described in Chapter 62-770, FAC.

Each soil sample for field GC analysis will be collected from the center portion of a split-spoon sample. Approximately 30 grams of soil from the split-spoon sample will be placed in a 40 milliliter glass vial. Organic-free water will be added to the soil sample until the vial is approximately 80 percent full. The vial will then be sealed with a Teflon™ septum and plastic cap, so as to preclude ambient air from entering the vial. Soil and water will be shaken vigorously to mix the two phases and assist in the release of contaminants, if present, from the mixture into the remaining airspace (headspace) of the vial. A gaseous sample will then be placed into a vial and extracted from the headspace by an air-tight syringe and injected into the GC for analysis. Samples will be analyzed using an HNU-GC, model 311 or equivalent.

Groundwater Sampling. The groundwater samples will be collected in accordance with the ABB-ES FDEP-approved CompQAP. The shallow water-table monitoring wells will be purged using low flow techniques. The shallow water-table wells will be purged using a peristaltic pump prior to groundwater sampling. Vertical extent deep wells will be purged using low flow techniques. The vertical extent deep wells will be purged using a Grundfos centrifugal pump prior to groundwater sampling. Low flow purging techniques will be used to minimize excessive turbidity, eliminate the need for filtration, and decrease volumes of contaminated purge water. Purging will continue until water quality field parameters (specific conductance, temperature, and pH) have stabilized. Groundwater samples will then be collected using an extruded Teflon™ bailer. Each sample will be placed into its appropriate container and preserved as specified by the required sample analysis and as outlined in the ABB-ES FDEP-approved CompQAP. All samples will be set in coolers and placed on ice. Samples will be shipped or delivered to Quanterra Laboratories, Inc., Tampa, Florida, within 24 hours after collection. All groundwater samples collected during the CA will be analyzed for the kerosene analytical group outlined in Chapter 62-770, FAC.

Slug Tests. Slug tests will be performed using a 1-inch outside diameter PVC pipe, 5 feet in length, filled with sand, and capped watertight at both ends. The water level changes in the monitoring wells will be recorded on an In-Situ,

Inc., Hermit 1000C data logger with a model PXD-260 pressure transducer or equivalent.

The pressure transducer will be suspended just above the bottom of the well and an initial water level will be recorded prior to beginning the test. The slug will then be lowered into the well until it is totally submerged beneath the water table. Water levels will then be observed until recovery to the original level. Following stabilization, the slug will quickly be removed with water level measurements recorded over time until the water level returns to the original level. A minimum of two rising head tests will be conducted for each well to obtain an average recovery response.

Aquifer characteristics will be calculated from slug test data using the computer program AQTESOLV™ (Geraghty & Miller, Inc., 1989) based on the analytical method presented by Bouwer and Rice (1976) for partially penetrating wells screened in an unconfined aquifer (an optional program may be used for wells screened in the Hawthorn Group). The program derives a hydraulic conductivity (K) value based on linear regression of the data gathered during the slug test. The slope of the resulting line represents the K value for each analytical run.

5.1 NORTH FUEL FARM AREA SITES. To further evaluate the extent of soil contamination in accordance with the FDEP comments to the NFFA sites CAR, several supplemental soil borings are proposed at the following sites: Truck Stand, JP-5 Spill, Alpha Dam, Gate 14 Dam, Possum Dam, and along the banks of Sal Taylor Creek. Soil borings will be advanced to the top of the water table using hand augers. Soil samples will be collected at 1 foot bls and every foot thereafter until the water table is reached. The soil samples will be analyzed in the field for petroleum hydrocarbons using an OVA in accordance with Chapter 62-770, FAC. In addition to the OVA analyses, soil samples will be screened using a field GC for BTEX constituents. OVA screening of soil samples from these borings will be used to assess the horizontal and vertical extent of soil contamination. If excessively contaminated soil is detected, sampling will continue as recommended in FDEP's "Guidelines For Assessment And Remediation Of Petroleum Contaminated Soil" (May 1994). Actual locations of the soil borings will be determined by the field team as more information is obtained about the soil contaminant plume.

Five supplemental water-table monitoring wells are proposed to further assess the horizontal extent of petroleum-contaminated groundwater. The supplemental monitoring wells are proposed for the following sites: two at the Truck Stand site, one at the Gate 10 Dam site, and two at the Alpha Dam site.

The proposed water-table monitoring wells will be installed to a total depth of approximately 15 feet bls and will be constructed of 2-inch inside diameter (ID), Schedule 40, flush-threaded PVC screen and casing. Screen length will be 10 feet with a slotted screen opening of 0.010 inch. At least 2 feet of screen will be placed above the water table to accommodate seasonal fluctuations of the water table. The screen will be surrounded with a quartz sand filter pack of 20/30 size (or an acceptable equivalent) to at least 1 foot above the top of the screen. A 1-foot fine sand (30/65) seal will be placed above the filter pack. The remaining annulus will be grouted to land surface with neat cement.

A locking, watertight cap will be installed on each well. The monitoring wells will be finished below grade in a subsurface traffic-bearing vault and protected with a metal cover. Upon completion, all newly installed monitoring wells will be developed by pumping until the purged water is clear and relatively free of sediment to assure a good hydraulic connection with the surrounding aquifer.

Typical water-table monitoring well construction details are illustrated in Figure 5-1. Detailed information concerning monitoring well construction, lithologic descriptions, split-spoon samples, and other pertinent data will be graphically displayed in boring logs in the CAR. Soil will be classified in accordance with the USCS.

A Florida-licensed professional surveyor will be contracted to conduct a ground survey of the horizontal and vertical coordinates for each of the monitoring wells. This information will be incorporated into either the U.S. Coastal and Geodetic Survey 1927 North American Datum (USCGS NAD'27) or base coordinate grid system as appropriate.

Groundwater samples will be collected after installation of the supplemental water-table monitoring wells. Groundwater samples will also be collected from the following monitoring wells at the Truck Stand, NFF, and JP-5 Spill sites: CEF-372-07, CEF-372-10D, CEF-372-16D, CEF-076-04, CEF-076-33D, CEF-JP5-11, CEF-JP5-12, CEF-JP5-14, and CEF-JP5-15. Groundwater samples will be collected and analyzed by USEPA Method 602 (VOAs including methyl tert-butyl ether [MTBE]), USEPA Method 610 (polynuclear aromatic hydrocarbons [PAHs]), USEPA Method 418.1 (TRPHs), and USEPA Method 239.2 (lead). In addition to the laboratory analyses, groundwater samples will be screened using a field GC for BTEX constituents. Quality assurance and quality control (QA/QC) samples will also be collected and analyzed as prescribed in ABB-ES' FDEP-approved CompQAP.

Groundwater samples will be collected from selected vertical extent monitoring wells installed on the east side of the NFF site to facilitate remedial design for the deep groundwater contamination. Remedial action groundwater samples will be analyzed for the following parameters: iron (USEPA Method 236.1), manganese (USEPA Method 243.1), alkalinity (USEPA Method 310.1), chloride as Cl (USEPA Method 325.1), sulfate as SO_4 (USEPA Method 375.4), total sulfide (USEPA Method 376.1), oil and grease (USEPA Method 413.1), total organic carbon (USEPA Method 415.1), total solids (USEPA Method 160.3), total suspended solids (USEPA Method 160.2), total dissolved solids (USEPA Method 160.2), hardness (USEPA Method 130.2), color (USEPA Method 110.2), dissolved oxygen (USEPA Method 360.1), total Kjeldahl nitrogen (USEPA Method 351.3), ammonia-nitrogen (USEPA Method 350.2), nitrate plus nitrite (USEPA Method 353.2), total phosphorus (USEPA Method 365.1), biological oxygen demand (USEPA Method 405.2), chemical oxygen demand (USEPA Method 410.4), total bacteria and specific petroleum degraders (USEPA Method 907B, Modified), and fingerprint (USEPA Method 8100). All samples will be shipped to Quanterra Laboratories, Inc., in Tampa, Florida, for analyses of kerosene analytical group compounds and the majority of remedial design parameters. Those remedial design parameters that cannot be analyzed by Quanterra Laboratories, Inc., will be analyzed by ABB-ES, Inc., Bioremediation Group in Wakefield, Massachusetts.

Confirmatory soil samples are proposed for each site along Sal Taylor Creek in areas that are excessively contaminated. These samples will be collected from the following sites: AVORD Dam, North Containment Pond, AVORD-Perimeter Road,

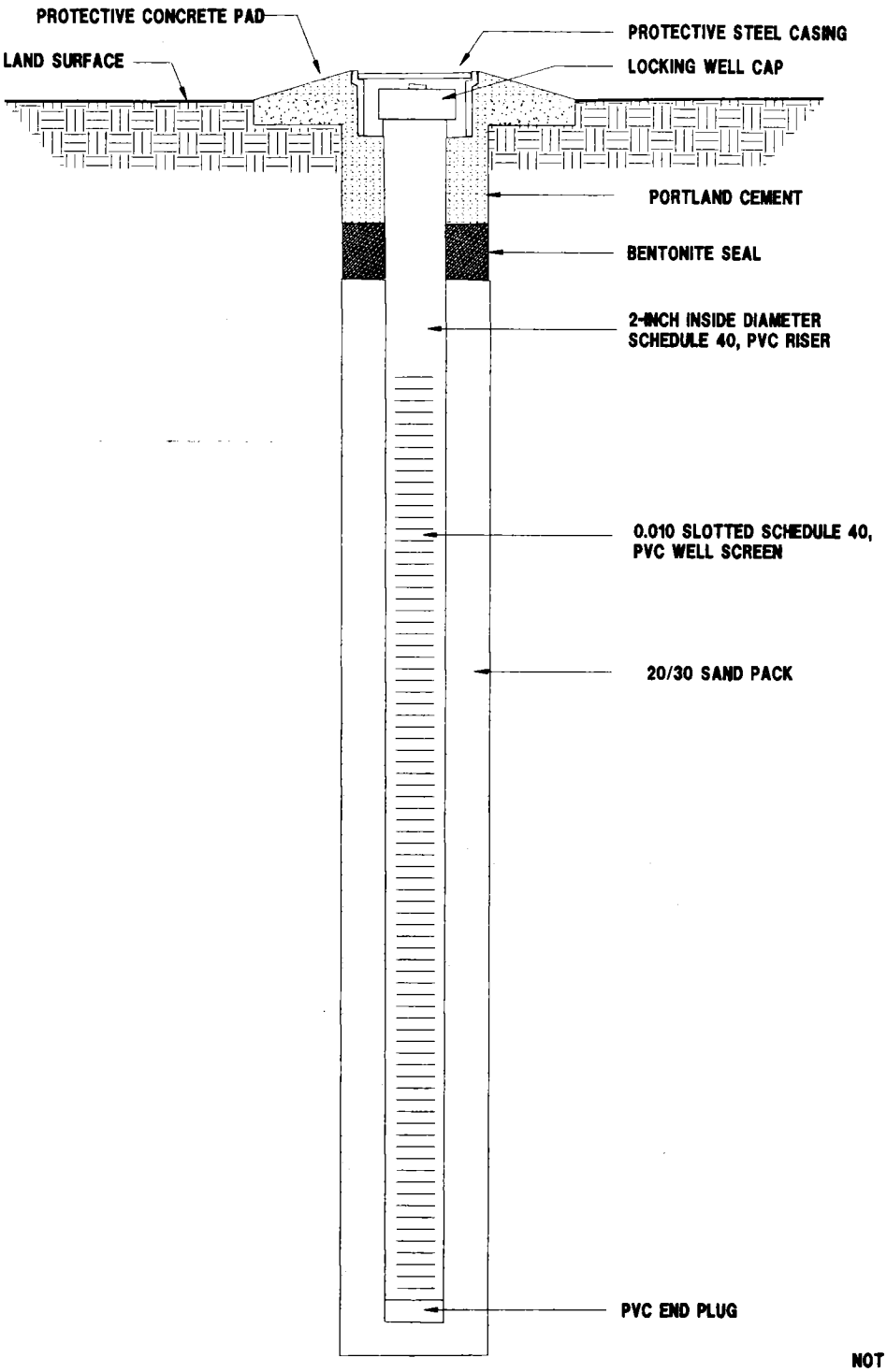

FIGURE 5-1
TYPICAL WATER-TABLE MONITORING WELL

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CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

Gate 10 Dam, Alpha Dam, Possum Dam, and Gate 14 Dam. A total of 13 soil samples will be collected and analyzed for USEPA Method 8020 (VOAs), USEPA Method 8100 (PAHs), USEPA Method 418.1 (TRPHs), and USEPA Method 239.2 (lead).

Surface water sediment sampling is proposed at each of the Sal Taylor Creek dam sites where excessively contaminated sediment was detected in the stream during the 1993 CA. Toxicity testing of the sediment will be necessary to assess the effects of the JP-5 release on fauna and flora at the sites.

After installation of the supplemental monitoring wells and concurrent with the groundwater sampling event, water level measurements will be obtained from all existing site monitoring wells. Water level measurements will be used to establish the direction of groundwater flow and provide data on fluctuations in the water table. The field investigations for the Truck Stand, JP-5 Spill, AVORD Dam, North Containment Pond, AVORD and Perimeter Road Junction, Gate 10 Dam, Alpha Dam, Possum Dam, Gate 14 Dam, and Sal Taylor Creek are discussed in detail below.

5.1.1 **Truck Stand** To address FDEP's comments to the July 1994 Truck Stand site CARA concerning the extent of soil contamination, soil borings will be advanced northeast and east of soil boring SB-15. The proposed soil boring locations are shown on Figure 5-2. Additional soil borings will be sampled, if appropriate, by field team personnel in accordance with FDEP's "Guidelines For The Assessment And Remediation of Petroleum Contaminated Soil" (May 1994).

Two water-table monitoring wells were recommended by FDEP to further assess the horizontal and vertical extent of petroleum-related groundwater contamination. These wells will be installed in the following locations: (1) in the general vicinity of SB-38 and (2) in the general vicinity of SB-45. The proposed water-table monitoring wells will be installed to a total depth of approximately 15 feet bls using hollow stem augers. The proposed monitoring well locations are shown on Figure 5-3.

Groundwater samples will be collected from each well after installation of the supplemental monitoring wells. Groundwater samples, including QA/QC samples, will also be collected from wells CEF-372-07, CEF-372-10D, and CEF-372-16D and analyzed for kerosene analytical group parameters. In addition, four shallow piezometers will be installed in the vicinity of monitoring well CEF-372-02 to further estimate the horizontal extent of free product. The proposed piezometer locations are shown on Figure 5-3.

5.1.2 **JP-5 SPILL AREA**. To address FDEP's December 1994 comments concerning the extent of soil contamination, approximately 56 soil borings are proposed in the following locations: (1) west, south, and southeast of XB-64; (2) east of XB-60; (3) west and southwest of B-6; (4) west of XB-74; (5) east of XB-78; (6) north of XB-79; and (7) north of XB-81. The proposed soil boring locations are shown on Figure 5-4. Additional soil boring locations will be determined in the field in accordance with FDEP guidelines.

Groundwater samples including QA/QC samples will be collected from monitoring wells CEF-076-04, CEF-JP5-11, CEF-JP5-12, CEF-JP5-14, CEF-JP5-15, and CEF-076-33D and analyzed for kerosene analytical group parameters.

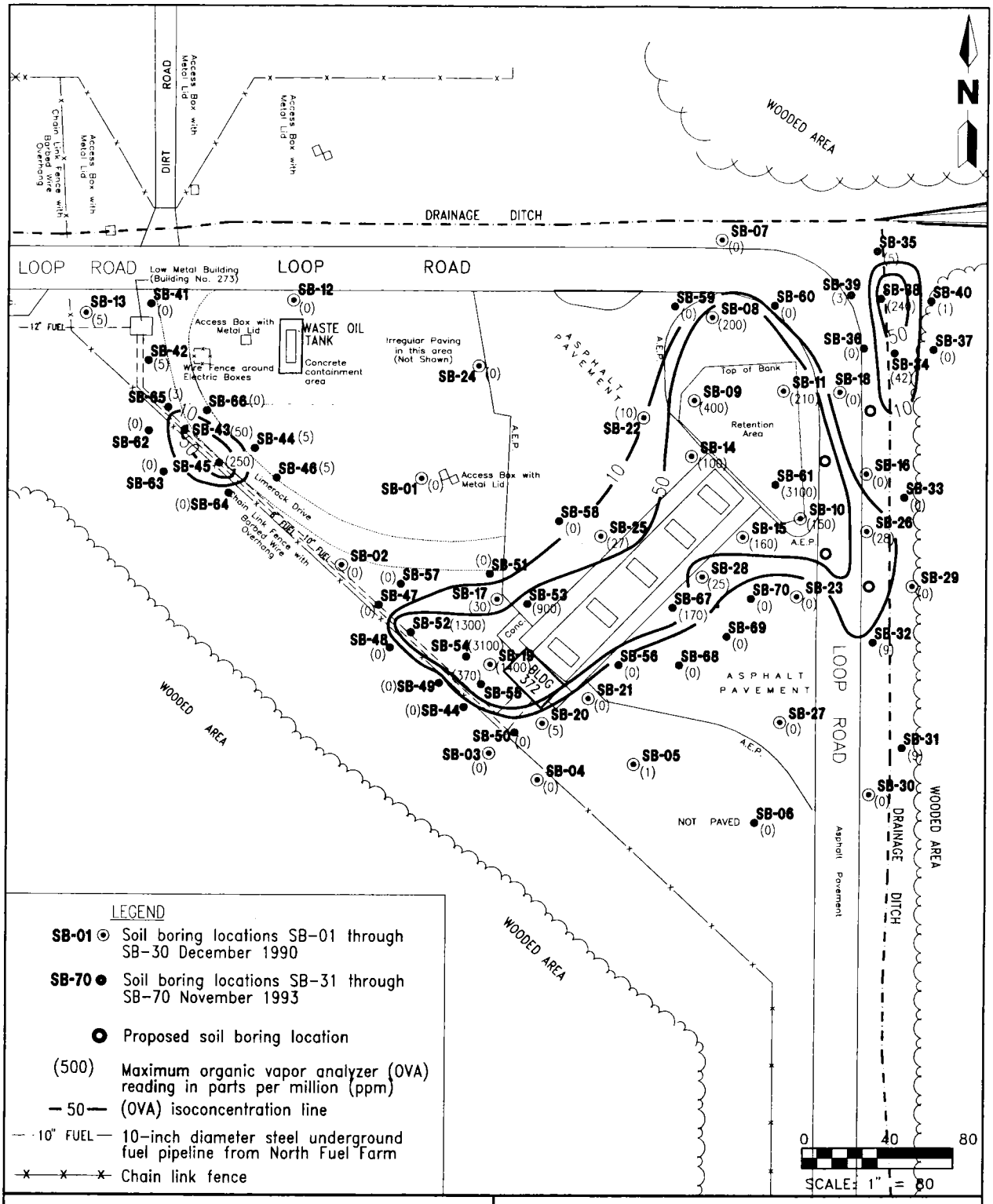

FIGURE 5-2
PROPOSED SOIL BORING LOCATION MAP, TRUCK STAND SITE

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

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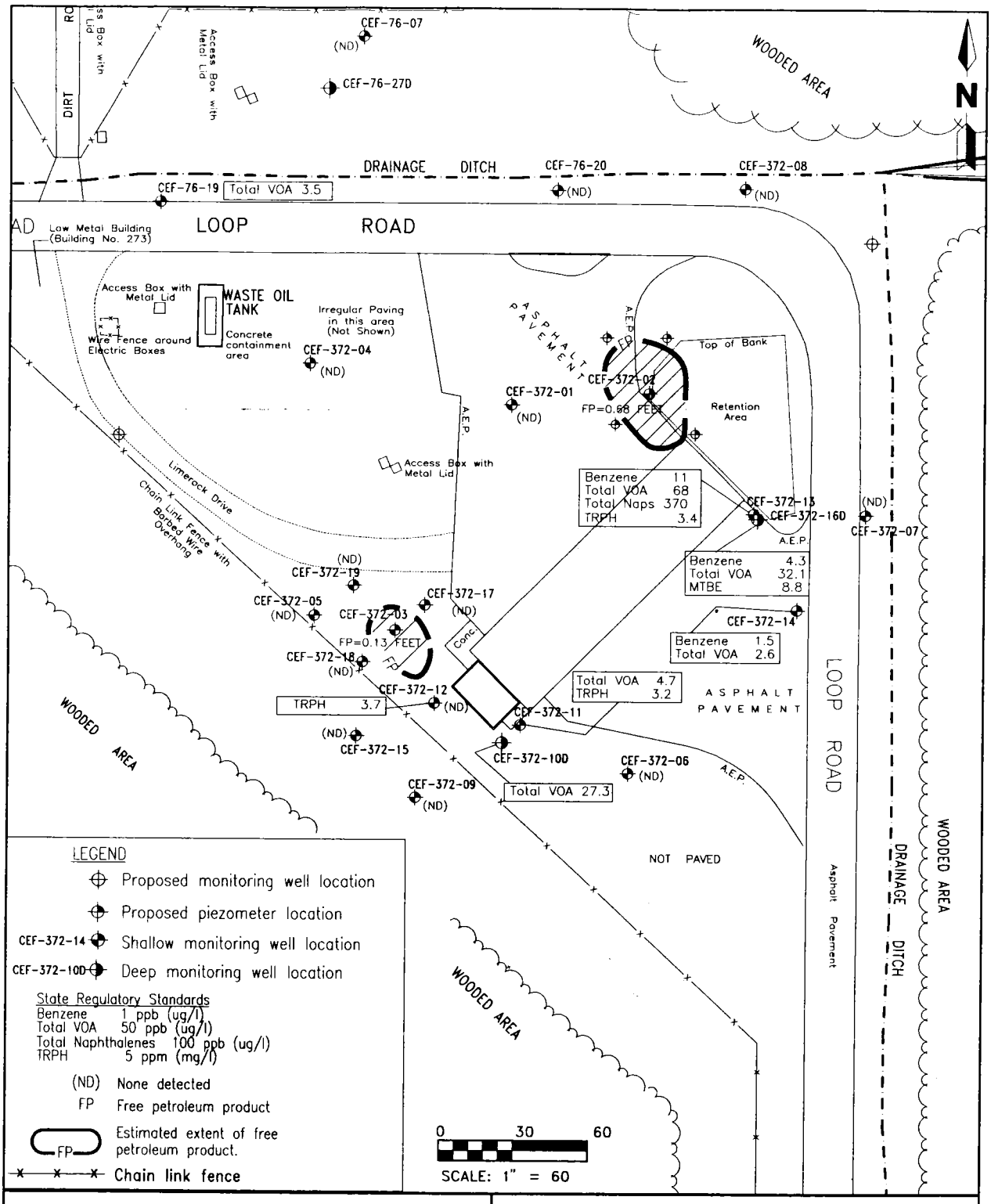

FIGURE 5-3
PROPOSED MONITORING WELL AND PIEZOMETER LOCATION MAP, TRUCK STAND SITE

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CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

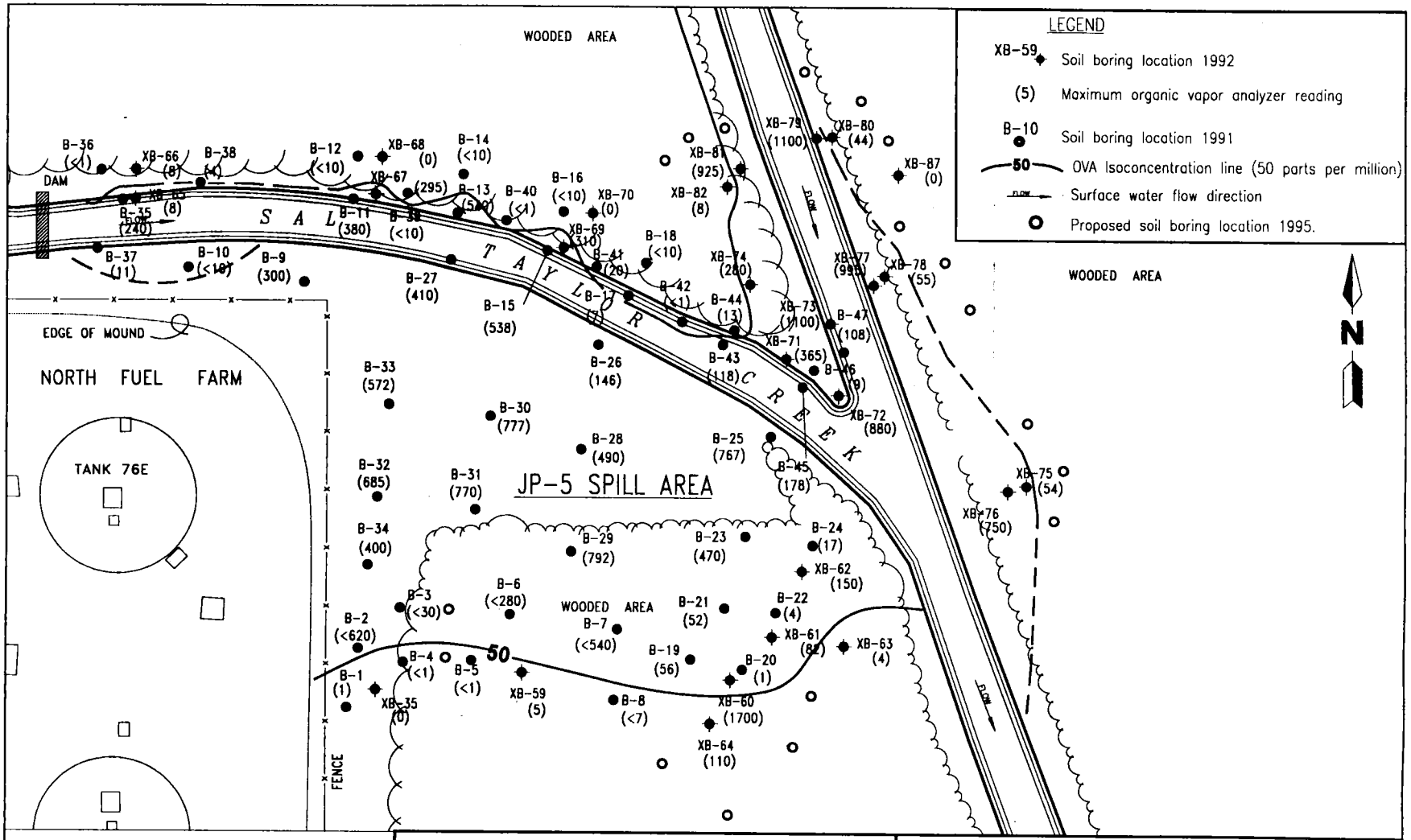

FIGURE 5-4

PROPOSED SOIL BORING LOCATION MAP, JP-5 SPILL SITE

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

5.2 SAL TAYLOR CREEK SITES.

5.2.1 Aviation Ordnance Dam (AVORD) Site One soil sample will be collected and analyzed for kerosene analytical group compounds to confirm results of OVA readings obtained during the initial CA near soil boring location 93B-12. The location of the confirmatory soil sample is shown on Figure 5-5.

Due to excessively contaminated surface water sediment at the AVORD Dam site, toxicity testing of the sediment will be performed to assess the effects on fauna and flora. The scope of services for toxicity testing will be submitted separately at a later date and is subject to FDEP approval.

5.2.2 North Containment Pond Site Two soil samples will be collected to confirm results of OVA readings obtained during the initial CA near soil boring locations 93C-11 and 93C-30. Soil samples will be analyzed for kerosene analytical group compounds. Confirmatory soil sample locations are shown on Figure 5-6.

Due to excessively contaminated surface water sediment at the North Containment Pond site, toxicity testing of the sediment will be performed to assess the effects on fauna and flora. The scope of services for toxicity testing will be determined at a later date and is subject to FDEP approval.

5.2.3 AVORD-Perimeter Road Site One soil sample will be collected to confirm results of OVA headspace readings obtained during the initial CA near soil boring location 93D-10. The soil sample will be analyzed for kerosene analytical group compounds. The confirmatory soil sample location is shown on Figure 5-7.

Due to excessively contaminated surface water sediment at the AVORD-Perimeter Road site, toxicity testing of the sediment will be performed to assess the effects on fauna and flora. The scope of services for toxicity testing will be determined at a later date and is subject to FDEP approval.

5.2.4 Gate 10 Dam Site Three soil samples will be collected to confirm results of OVA headspace readings obtained during the initial CA near soil boring locations 93E-31, 93E-34, and 93E-55. The soil samples will be analyzed for kerosene analytical group compounds. Confirmatory soil sample locations are shown on Figure 5-8.

One shallow monitoring well will be installed at or near soil boring location 93E-20. The location of the proposed monitoring well is shown on Figure 5-9. Following installation of the monitoring well, a groundwater sample will be collected and analyzed for kerosene analytical group compounds.

Due to excessively contaminated surface water sediment at the Gate 10 Dam site, toxicity testing of the sediment will be performed to assess the effects on fauna and flora. The scope of services for toxicity testing will be determined at a later date and is subject to FDEP approval.

5.2.5 ALPHA Dam Site To address FDEP's comments to the July 1994 Alpha Dam site CAR concerning the extent of soil contamination, soil borings will be advanced at the following locations: (1) south of soil boring 93F-60, (2) south of soil boring 93F-52, and (3) southwest of soil boring 93F-51. The proposed

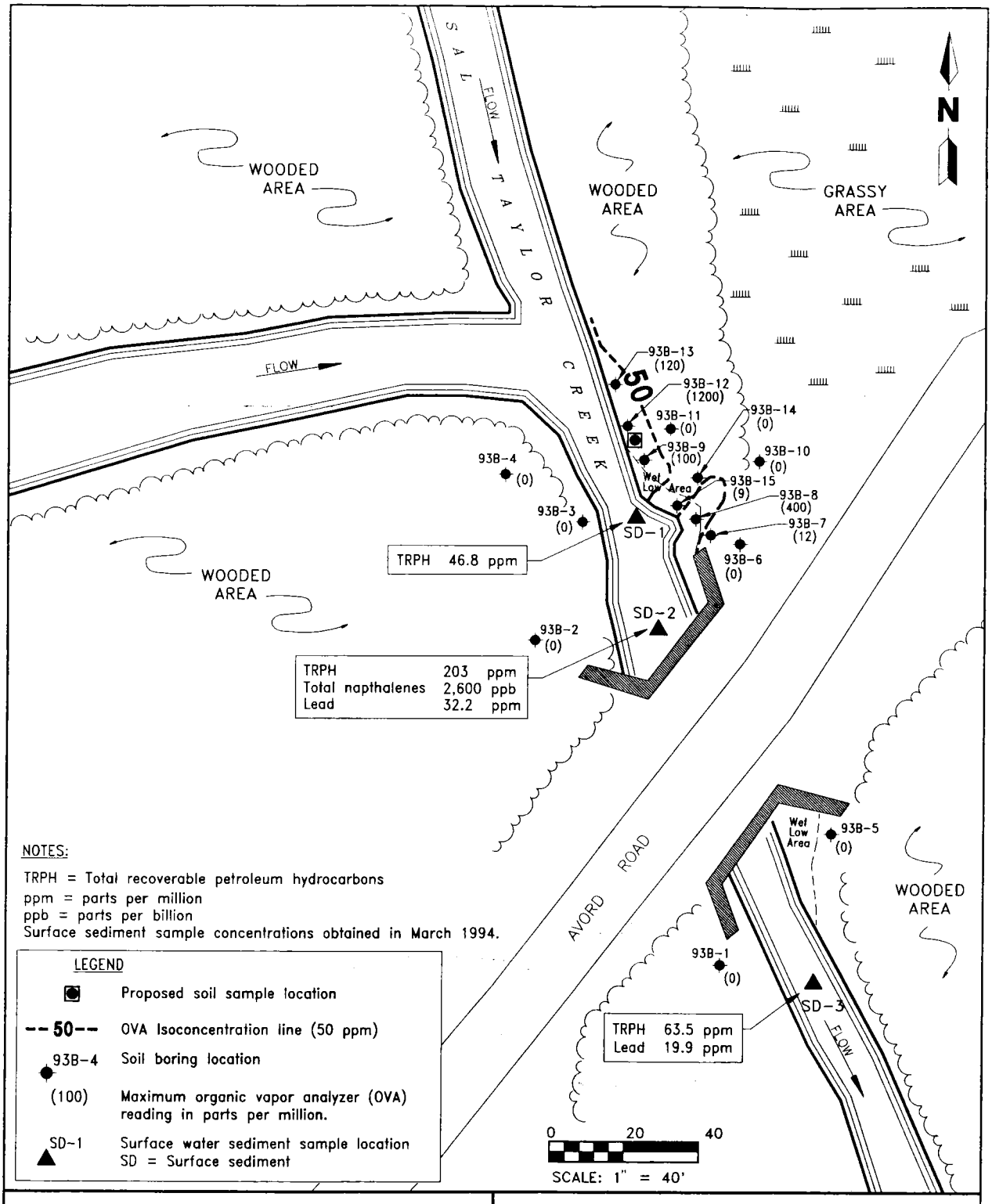

FIGURE 5-5
PROPOSED SOIL SAMPLE LOCATION MAP, AVORD DAM SITE

CECIL\AVORD\KP\NP\02-1-95

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

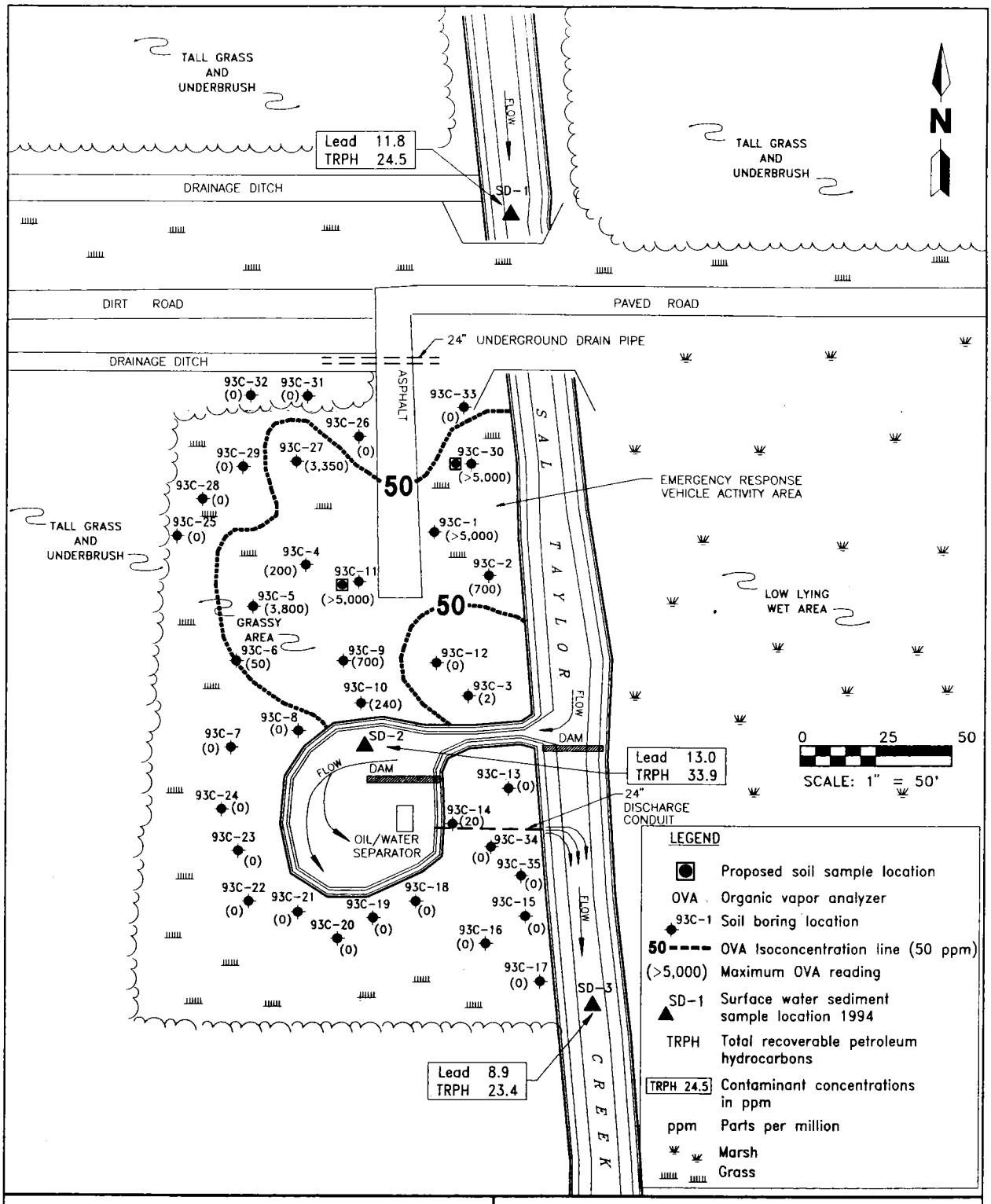

FIGURE 5-6
PROPOSED SOIL SAMPLE LOCATION MAP, NORTH CONTAINMENT POND SITE

CECIL\AVORD\KP\NP\02-1-95

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

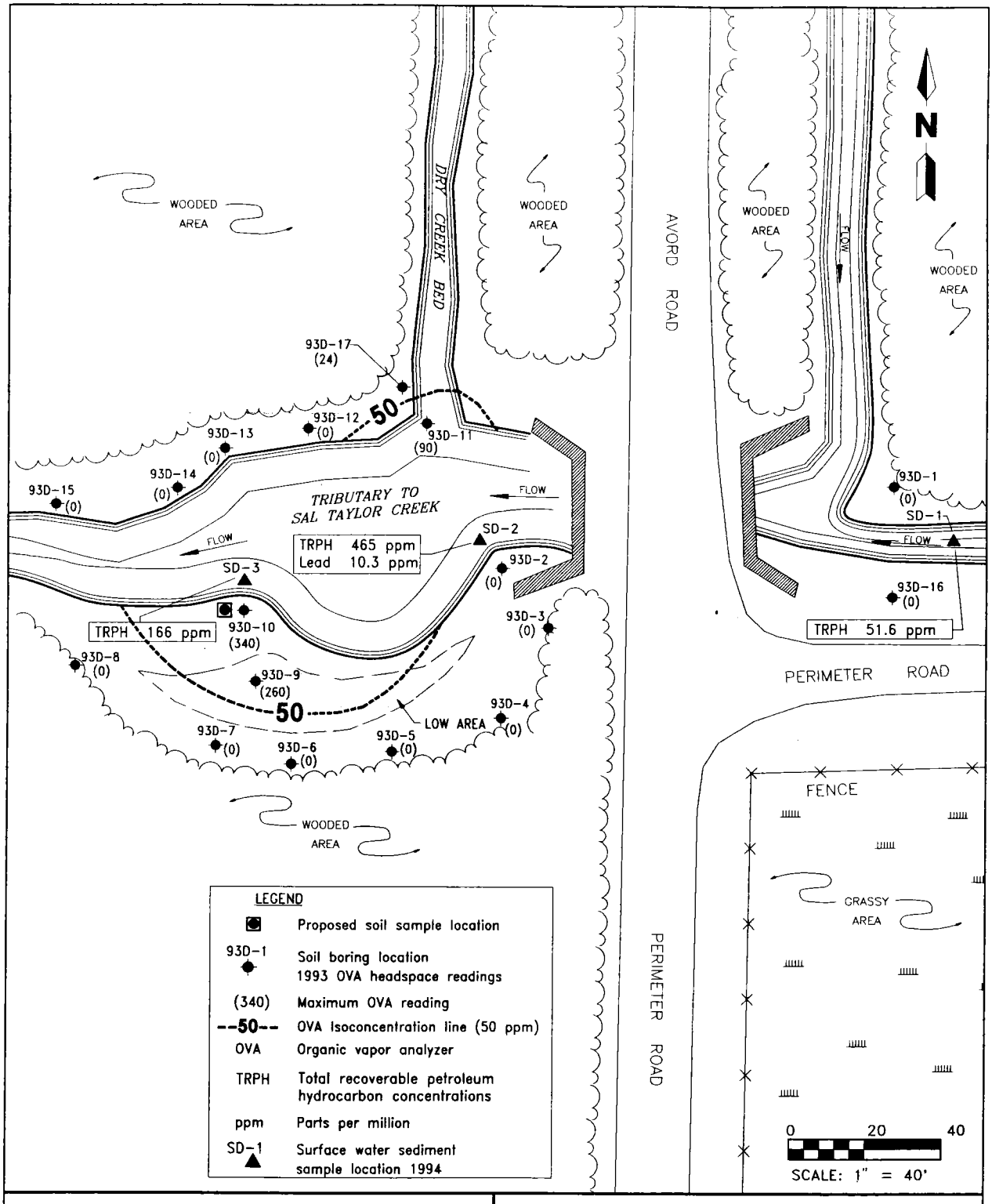

FIGURE 5-7
PROPOSED SOIL SAMPLE LOCATION MAP, AVORD-PERIMETER ROAD SITE

CECIL\AVORD\KP\NP\02-1-95

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

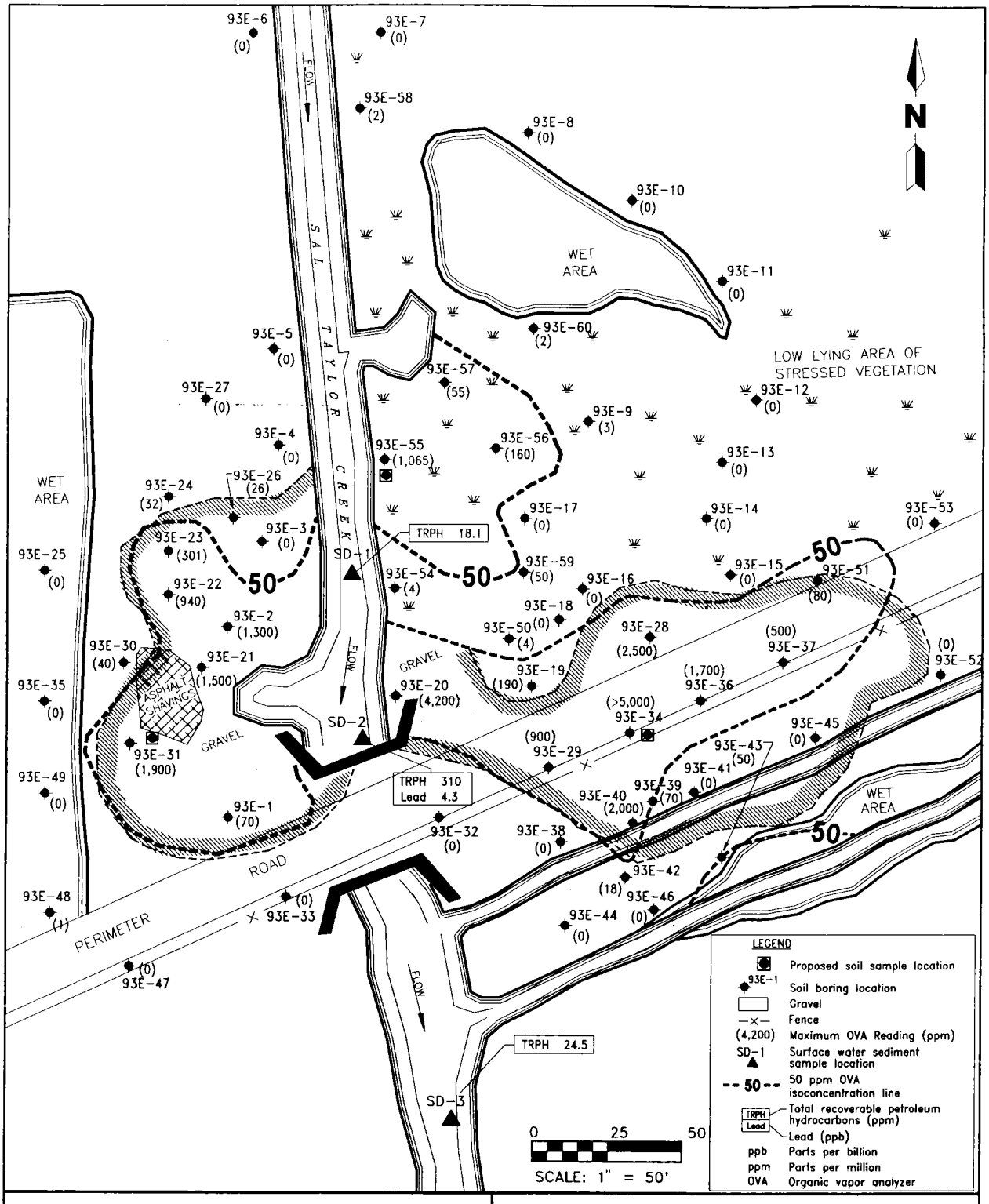

FIGURE 5-8
PROPOSED SOIL BORING AND SOIL SAMPLE LOCATION MAP, GATE 10 DAM SITE

CECIL/AVORD/02-1-95

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

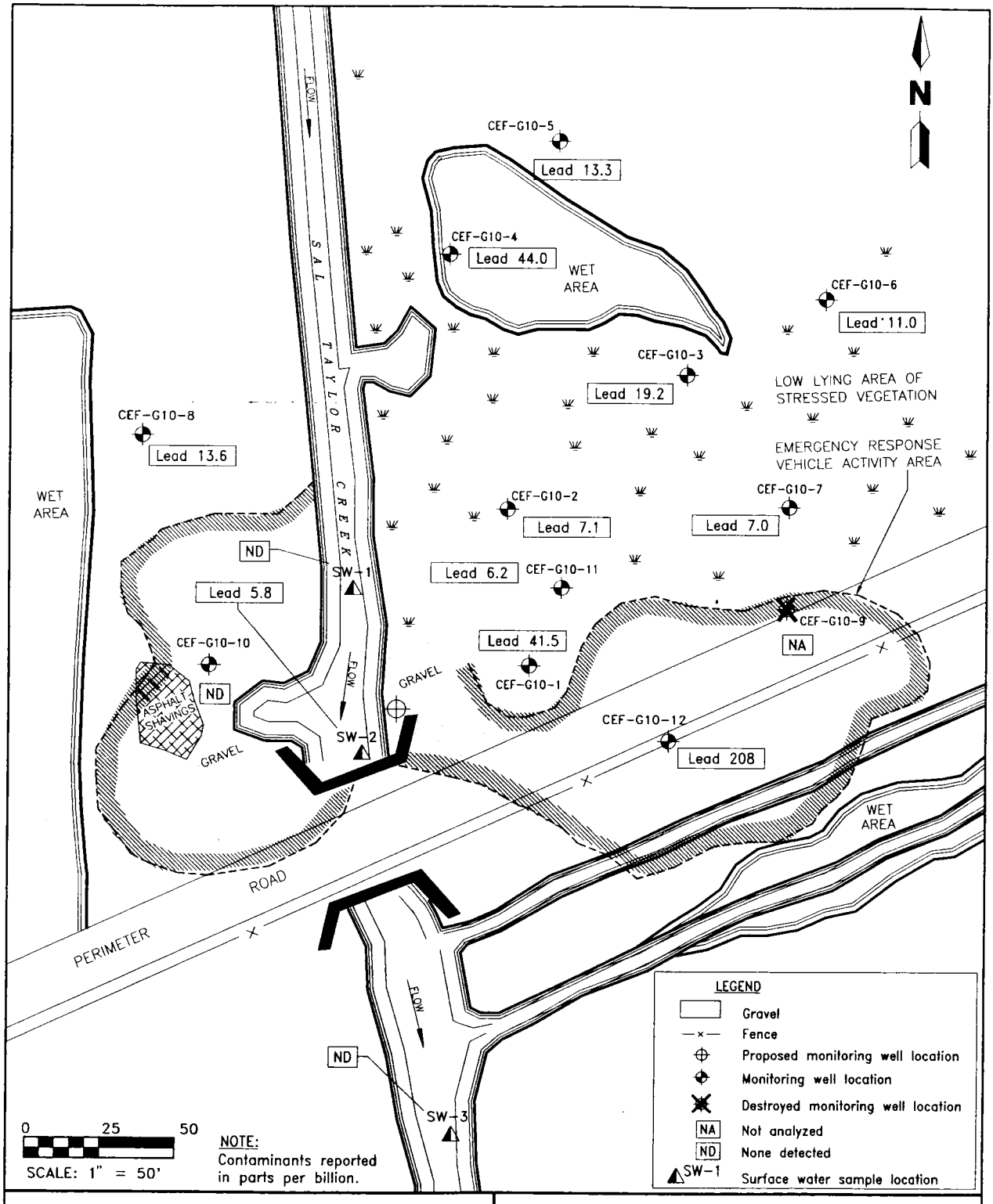

FIGURE 5-9
PROPOSED MONITORING WELL LOCATION MAP, GATE 10 DAM SITE

CECIL/AVORD/02-1-95

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

soil boring locations are shown on Figure 5-10. Additional soil borings will be sampled, if appropriate, by field team personnel in accordance with FDEP's "Guidelines for the Assessment and Remediation of Petroleum Contaminated Soil" (May 1994).

Three soil samples will be collected and analyzed for kerosene analytical group compounds to confirm results of OVA headspace readings obtained during the initial CA near soil boring locations 93F-33, 93F-39, and 93F-50. Confirmatory soil sample locations are shown on Figure 5-10.

Two shallow water-table monitoring wells are proposed near soil borings 93F-50 and 93F-39. The locations of the proposed monitoring wells are shown on Figure 5-11. Following installation of the supplemental monitoring wells, two groundwater samples will be collected from each well and analyzed for kerosene analytical group compounds.

Due to excessively contaminated surface water sediment at the Alpha Dam site, toxicity testing of the sediment will be performed to assess the effects on fauna and flora. The scope of service for toxicity testing will be submitted separately at a later date and is subject to FDEP approval.

5.2.6 **POSSUM DAM SITE**. To address FDEP's comments to the July 1994 Possum Dam site CAR concerning the extent of soil contamination, soil borings will be advanced at the following locations: (1) northeast of soil boring 93G-18, (2) south-southeast of soil boring 93G-15, and (3) northwest of soil boring 93G-11. The proposed soil boring locations are shown on Figure 5-12. Additional soil borings will be sampled, if appropriate, by field team personnel in accordance with FDEP's "Guidelines for the Assessment and Remediation of Petroleum Contaminated Soil" (May 1994).

Two soil samples will be collected to confirm results of OVA headspace readings obtained during the initial CA near soil boring locations 93G-10 and 93G-15. Soil samples will be analyzed for kerosene analytical group compounds. Confirmatory soil sample locations are shown on Figure 5-12.

Due to excessively contaminated surface water sediment at the Possum Dam site, toxicity testing of the sediment will be performed to assess the effects on fauna and flora. The scope of services for toxicity testing will be submitted separately at a later date and is subject to FDEP approval.

5.2.7 **GATE 14 DAM**. To address FDEP's comments to the July 1994 Gate 14 Dam site CAR concerning the extent of soil contamination, soil borings will be advanced at the following locations: (1) southwest of soil boring 93H-4, (2) north of soil boring 93G-3, and (3) north and northeast of soil boring 93G-10. The proposed soil boring locations are shown on Figure 5-13.

Additional soil borings will be sampled, if appropriate, by field team personnel in accordance with FDEP's "Guidelines for the Assessment and Remediation of Petroleum Contaminated Soil" (May 1994).

One soil sample will be collected and analyzed for kerosene analytical group compounds to confirm results of OVA headspace readings obtained during the initial CA near soil boring 93H-10. The confirmatory soil sample location is shown on Figure 5-13.

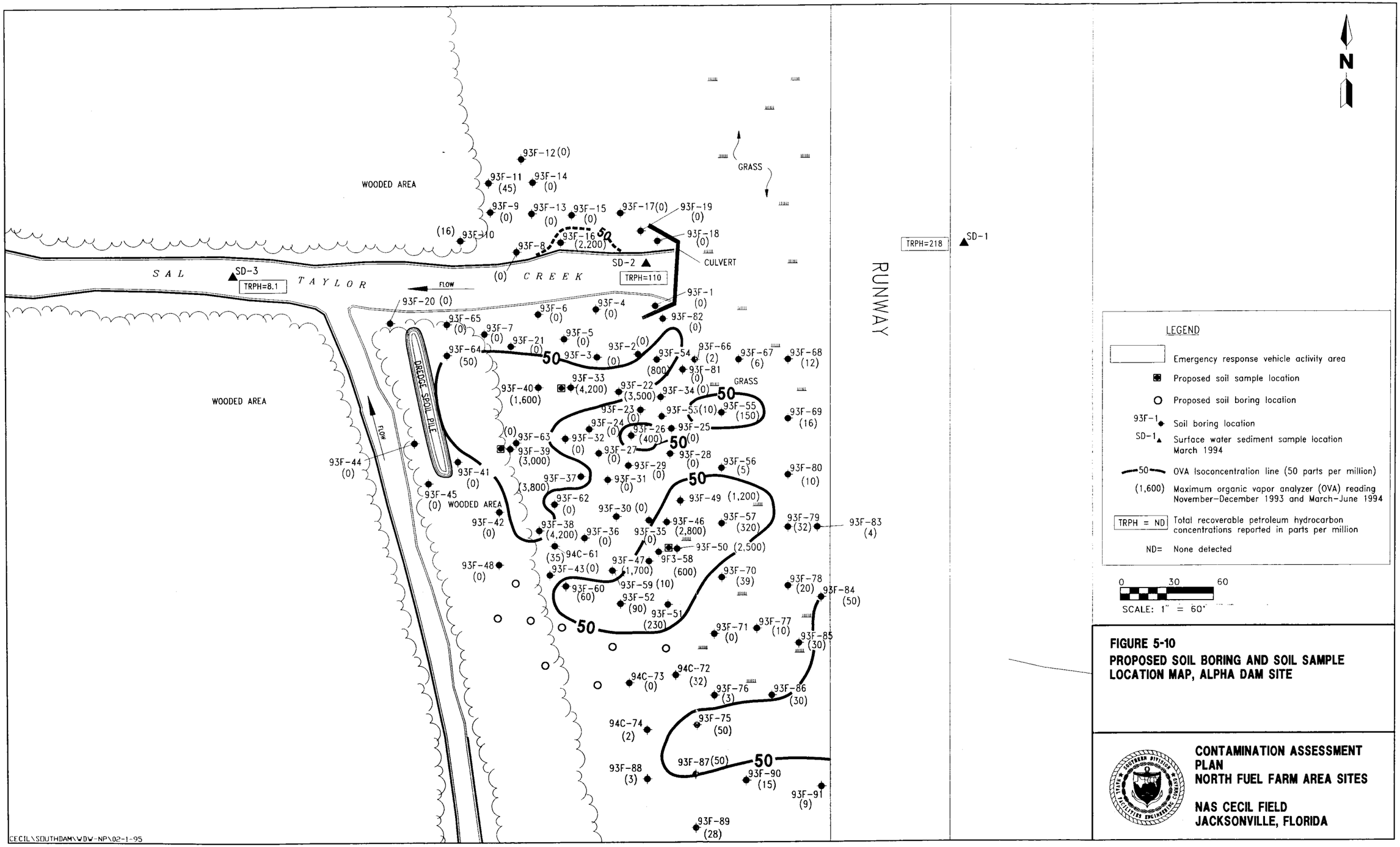

FIGURE 5-10
PROPOSED SOIL BORING AND SOIL SAMPLE LOCATION MAP, ALPHA DAM SITE

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

CECIL\SOUTHDAM\WDW-NP\02-1-95

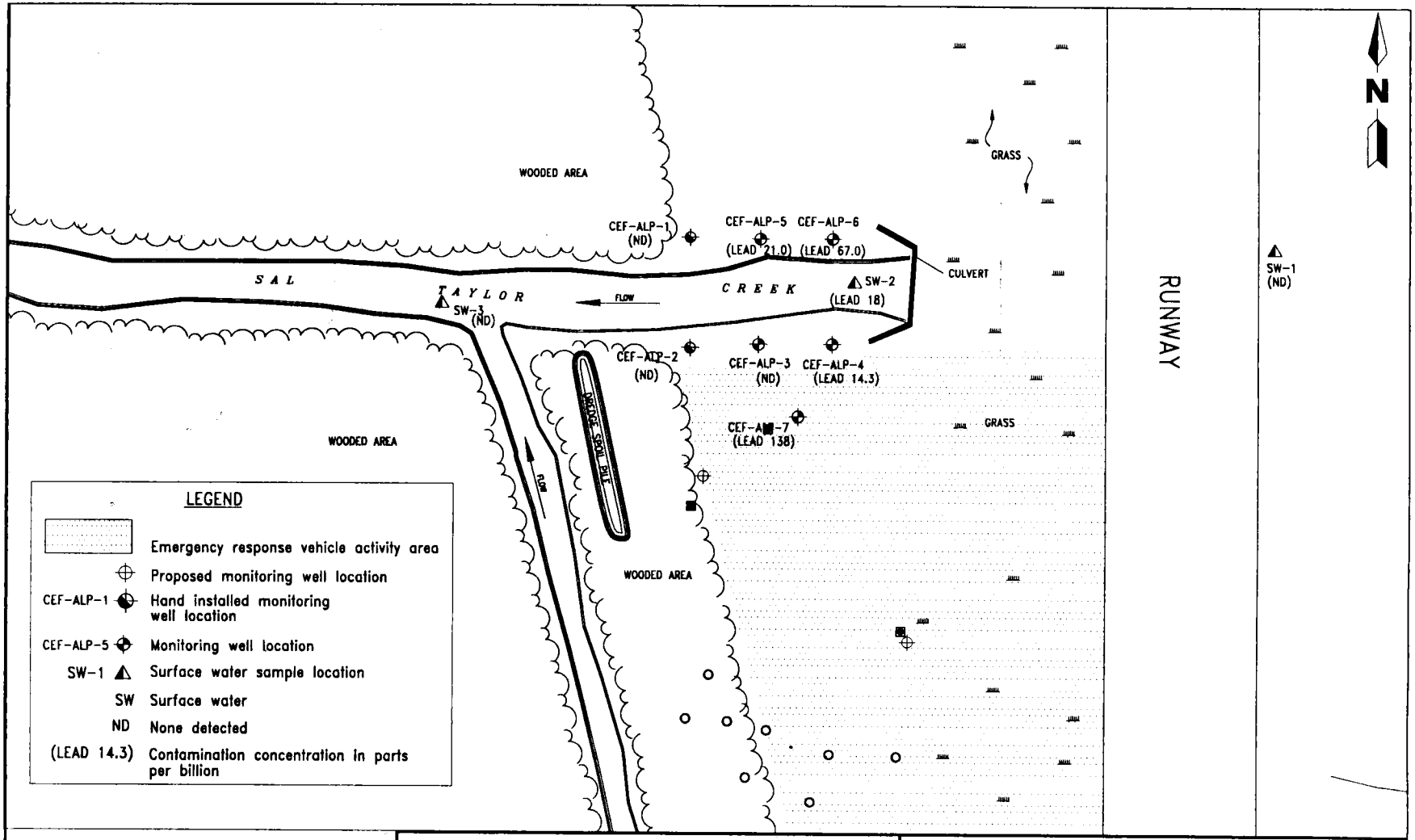

FIGURE 5-11
PROPOSED MONITORING WELL LOCATION MAP, ALPHA DAM SITE

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

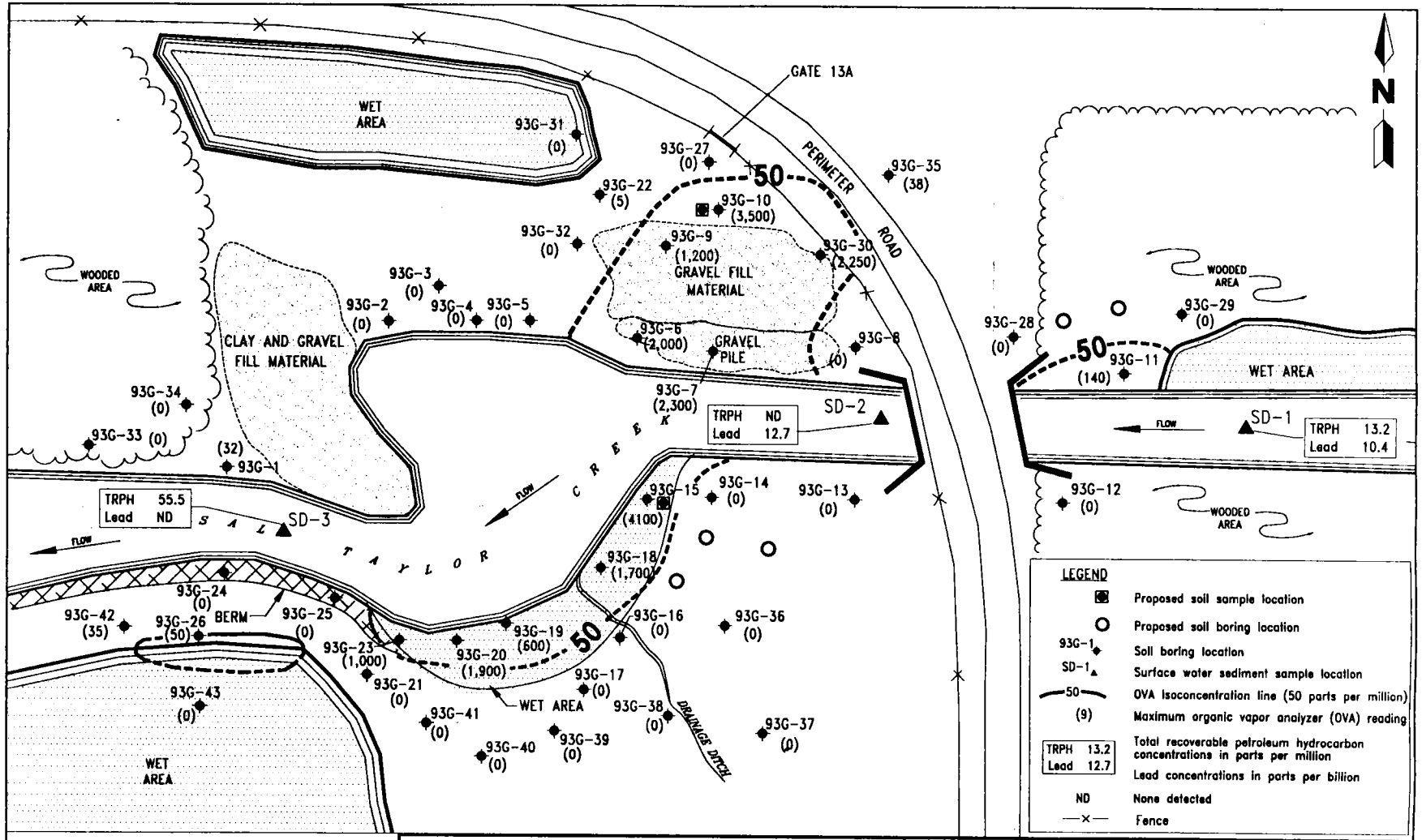

FIGURE 5-12
PROPOSED SOIL BORING AND SOIL SAMPLE LOCATION MAP, POSSUM DAM SITE

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

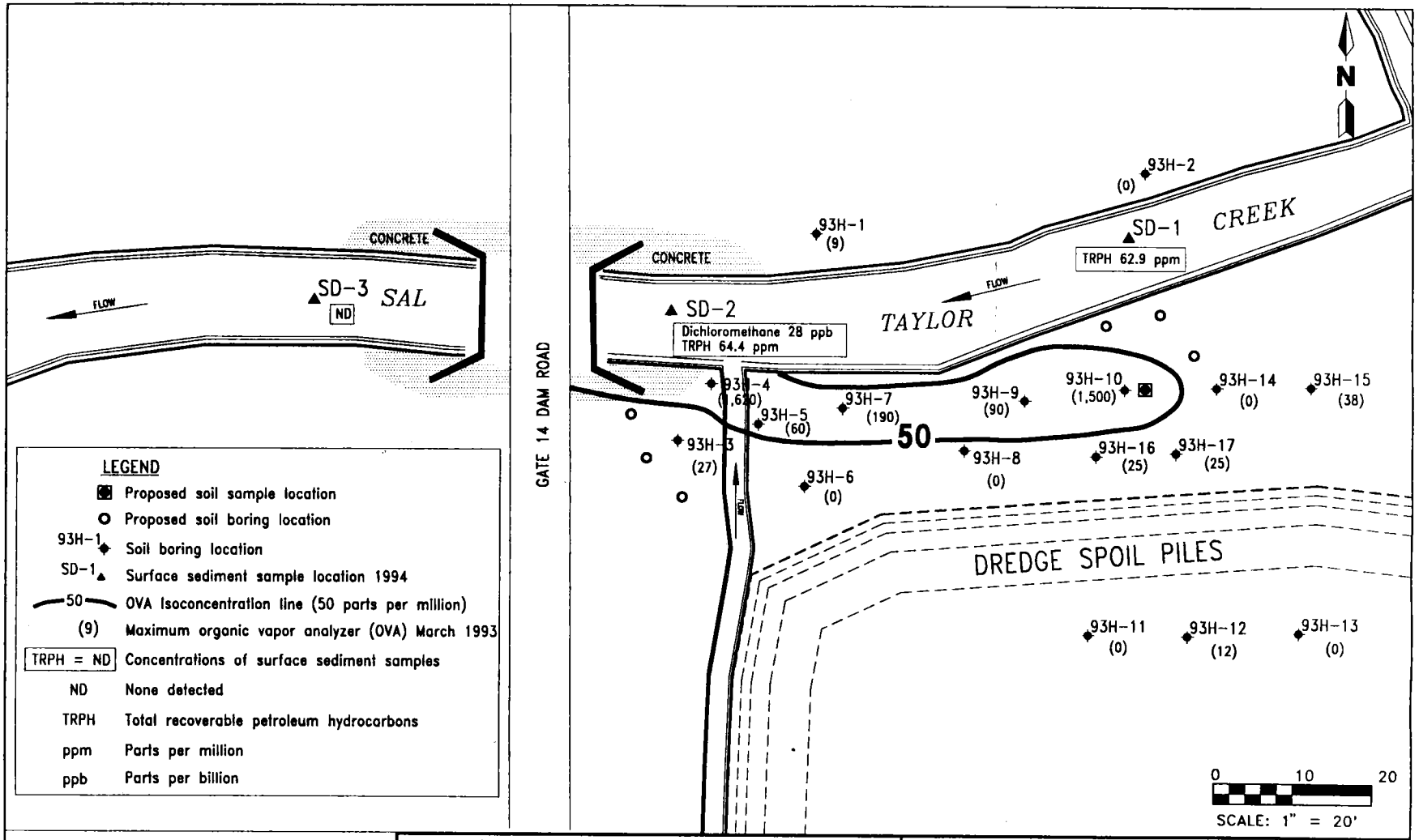

FIGURE 5-13
PROPOSED SOIL BORING AND SOIL SAMPLE LOCATION MAP, GATE 14 DAM SITE

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

CECIL\SOUTHDAM\WDW-NP\02-1-95

Due to excessively contaminated surface water sediment at the Gate-14 Dam site, toxicity testing of the sediment will be performed to assess the effects on fauna and flora. The scope of services for toxicity testing will be submitted separately at a later date and is subject to FDEP approval.

5.2.8 Sal Taylor Creekbank Site To address FDEP's comments to the July 1994 Sal Taylor Creek CAR concerning the extent of soil contamination, soil borings will be advanced at the following locations: (1) west, south, and east of soil boring 93I-6; (2) north, east, and south of soil boring 93I-10; (3) north, east, and south of soil boring 93I-45; (4) north, west, and south of soil boring 93I-18; (5) west, north, and east of soil boring 93I-50; (6) north, west, and south of soil boring 93I-51; (7) north, east, south, and west of soil boring 93I-20; (8) west, south, and east of soil boring 93I-53; (9) west, south, and east of soil boring 93I-36; and (10) west, north, and east of soil boring 93I-37. The proposed soil boring locations are shown on Figure 5-14. Additional soil borings will be sampled, if appropriate, by field team personnel in accordance with FDEP's "Guidelines for the Assessment and Remediation of Petroleum Contaminated Soil" (May 1994).

5.3 NORTH FUEL FARM.

5.3.1 Field Investigation To assess the horizontal and vertical extent of groundwater contamination, 38 two-stage vertical extent (intermediate and deep) monitoring wells and one shallow water-table monitoring well will be installed. Groundwater samples obtained during the preliminary field investigation with a Hydropunch™ sampler will be analyzed and the results used to optimize monitoring well locations and screen interval depths. The proposed monitoring well locations and screen interval locations are shown on Figure 5-15.

Vertical extent monitoring wells will be installed by advancing a 10-inch borehole to depths ranging from 30 feet to 110 feet bls. Soil samples will be collected at depth intervals of 5 feet using SPTs with steel split-spoon samplers. Six-inch, Schedule 40 PVC surface casing will be set into the borehole at various depths ranging from 20 feet to 95 feet bls. The annular space surrounding the surface casing will be filled with a neat cement grout to land surface. A 5⅞-inch borehole will be advanced inside the surface casing to a depth approximately 15 feet below the bottom of the surface casing. A 2-inch ID monitoring well will be set inside the 6-inch PVC surface casing. The well will be constructed of 2-inch, Schedule 40 PVC riser with 5 feet of 2-inch, Schedule 40 PVC screen at the bottom. The screen will have 0.010-inch slot size openings. The annular space around the well screen will be filter packed with 20/30 or equivalent size sand to a depth of approximately 2 feet above the top of the screen. Two feet of fine sand (30/65 grade) will be placed immediately above the filter pack. The remainder of the annular space will be filled with a neat cement grout to land surface. The shallow monitoring well will be installed using hollow-stem augers as described in Section 5.1.

A locking, watertight cap will be installed on each well. All monitoring wells will be finished above grade with 3 feet of aboveground metal casing protective vault surrounding the 2-inch PVC well. Subsequent to installation, all newly installed monitoring wells will be developed by pumping until the purged water is clear and relatively free of sediment to assure a good hydraulic connection with the surrounding aquifer.

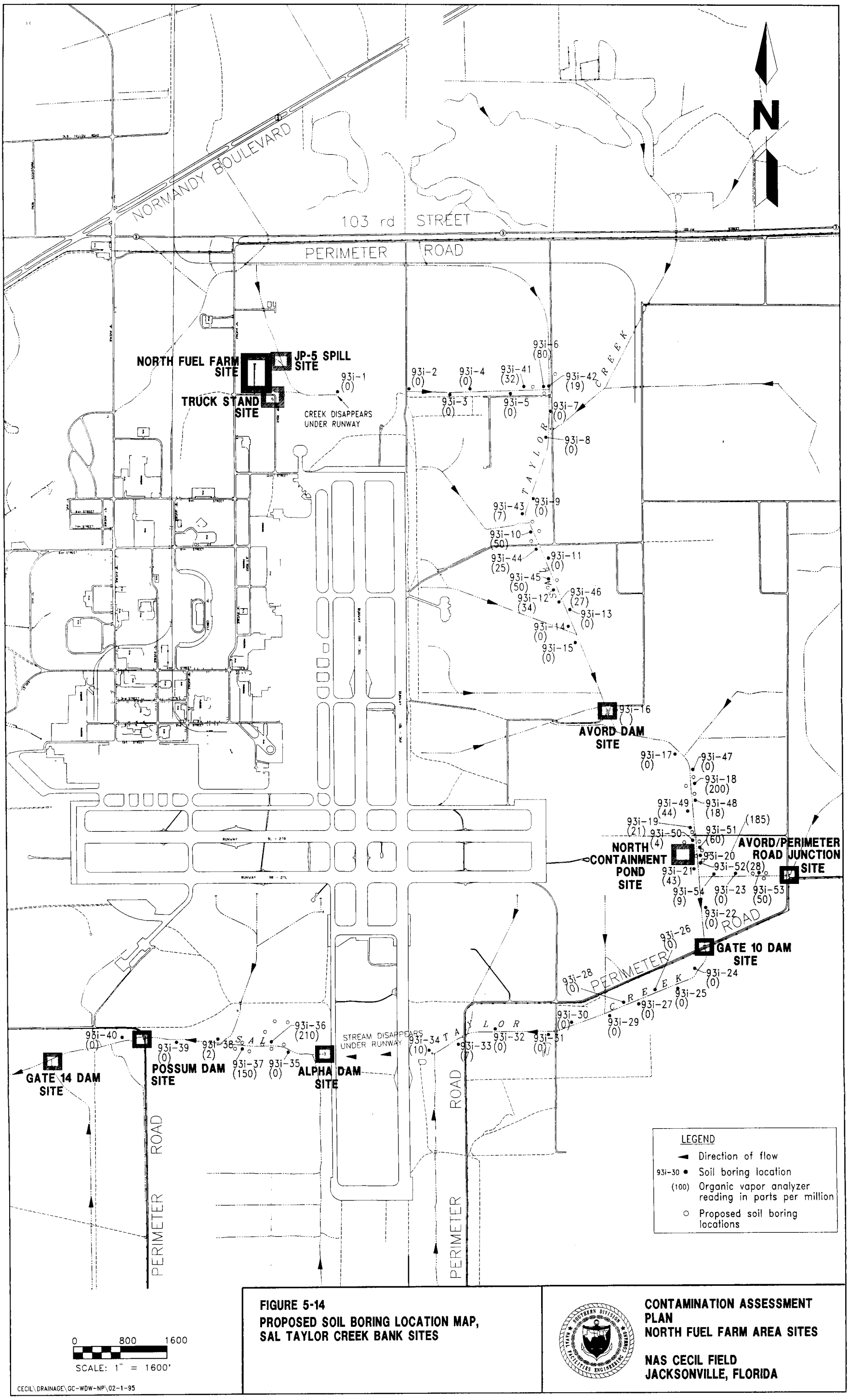

FIGURE 5-14
PROPOSED SOIL BORING LOCATION MAP, SAL TAYLOR CREEK BANK SITES

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

Installation details for two-stage vertical extent monitoring wells are presented on Figure 5-16. Detailed information of monitoring well construction, lithologic descriptions, and other pertinent data will be graphically displayed in boring logs in the CARA. Soil will be classified in accordance with the USCS.

5.3.2 **Sample Collection and Analysis** Following installation of the supplemental monitoring wells, groundwater samples will be collected from all wells at the NFF. Groundwater samples will be analyzed for the Chapter 62-770, FAC, kerosene analytical group compounds in accordance with USEPA Method 601 (volatile organic halocarbons including ethylene dibromide [EDB]), USEPA Method 602 (VOAs), USEPA Method 625 (PAHs), USEPA Method 418.1 (TRPHs), and USEPA Method 239.2 (lead). Approximately 81 groundwater samples will be collected from all existing monitoring wells (45 vertical extent monitoring wells and 36 water-table monitoring wells). In addition, QA/QC samples will be collected and analyzed as prescribed in ABB-ES' FDEP approved CompQAP and approximately six groundwater samples will be collected from monitoring wells screened at different intervals to facilitate the remedial design. Groundwater sampling parameters for RAP analyses are described in Section 5.1. Groundwater and soil samples will be analyzed in the field, during well installation and sampling, for petroleum-related hydrocarbon constituents using an HNU-311 portable GC or equivalent for BTEX constituents. A summary of groundwater analytical results from Hydropunch™ samples obtained during the PCA in October and November 1994 are shown in Table 5-1.

A Florida-licensed professional surveyor will be contracted to conduct a ground survey of the horizontal and vertical coordinates of each of the monitoring wells. This information will be incorporated into either the United States Coastal and Geodetic Survey 1927 North American Datum (USCGS NAD'27) or base coordinate grid system as appropriate.

After installation of the supplemental monitoring wells and concurrent with the groundwater sampling event, water levels will be measured in all existing site monitoring wells. Water level measurements will be used to establish the groundwater flow direction in the upper and lower water-bearing zones of the surficial aquifer and to provide data on water table fluctuations.

5.3.3 **Aquifer Slug Tests** Aquifer tests will be performed at the site to provide additional groundwater flow data for the surficial aquifer. After the permanent monitoring wells have been constructed and sampled, *in situ* hydraulic conductivity tests (slug tests) will be conducted in 12 of the monitoring wells constructed in the surficial aquifer to estimate the horizontal hydraulic conductivity of the aquifer media. Slug tests will be performed using the SOPs approved by the ABB-ES Board of Technical Directors. The actual wells that will be used for slug tests will be determined in the field. Slug test graphical data and aquifer parameter calculations will be presented in the CARA.

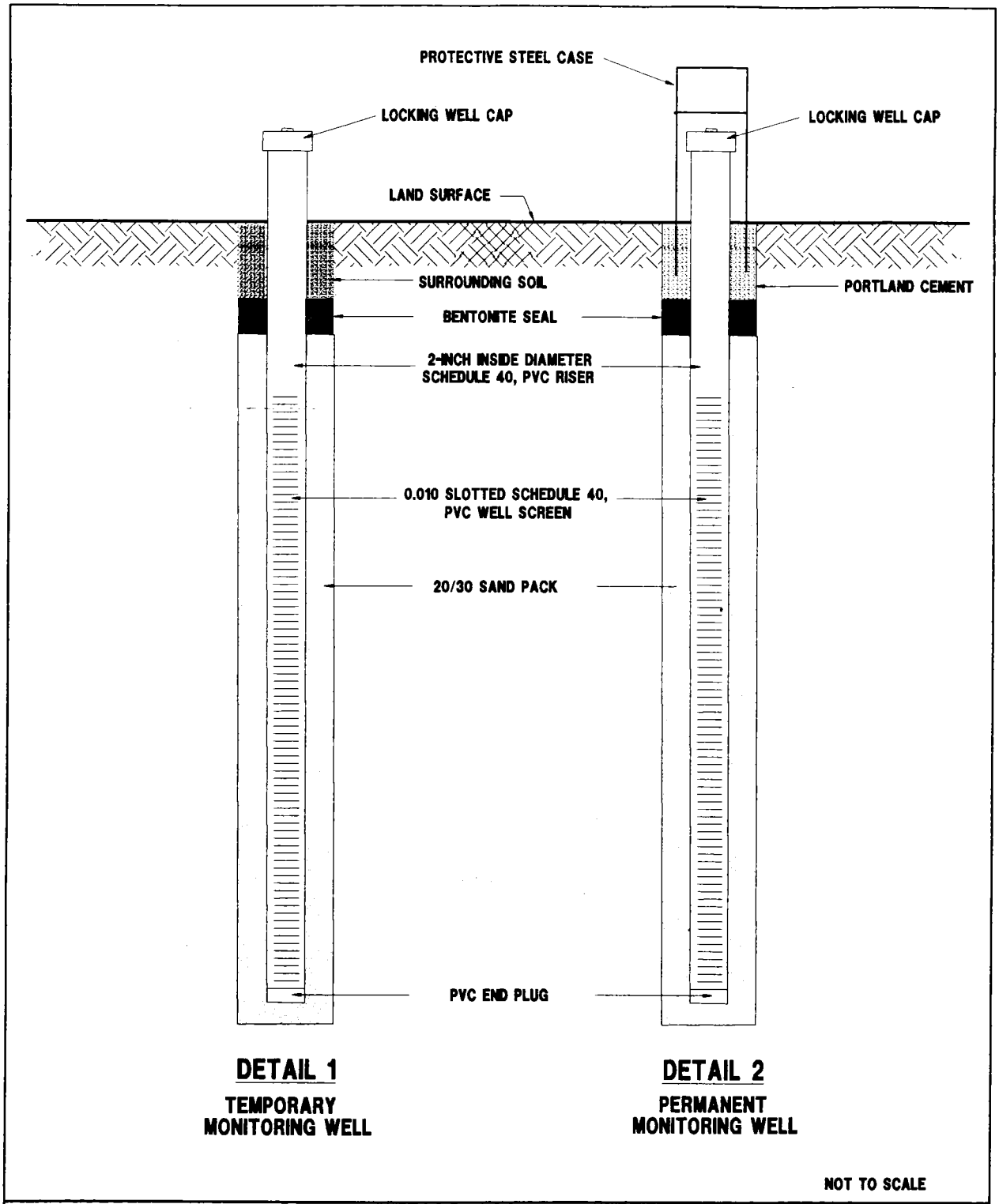

FIGURE 5-16
TYPICAL TWO-STAGE VERTICAL-EXTENT GROUNDWATER MONITORING WELL

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CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

Table 5-1
Summary of Hydropunch™ Groundwater Analytical Results, October and November 1994

Contamination Assessment Plan
North Fuel Farm Area Sites
NAS Cecil Field, Jacksonville, Florida

Hydropunch™ Boring Location and Sampling Depth (feet)	Contaminant					
	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	Detection Limit
HP-1, 20	NA	NA	NA	NA	NA	NA
HP-1, 47	1,400	ND	200	830	2,430	20
HP-1, 60	2,200	ND	ND	140	2,340	100
HP-1, 80	72	ND	3.8	46	121.8	2.0
HP-1, 100	6.8	ND	ND	5.7	12.5	1.0
HP-2, 20	ND	ND	ND	ND	ND	1.0
HP-2, 40	ND	ND	ND	ND	ND	1.0
HP-2, 60	110	ND	1	ND	111	1.0
HP-2, 80	25	ND	ND	ND	25	1.0
HP-2, 100	4.6	ND	ND	ND	4.6	1.0
HP-3, 23.5	ND	ND	ND	ND	ND	1.0
HP-3, 40	NA	NA	NA	NA	NA	NA
HP-3, 63.5	11	ND	ND	230	241	5.0
HP-3, 84.5	3.0	ND	ND	7.5	10.5	2.0
HP-3, 99.5	ND	ND	ND	ND	ND	1.0
HP-4, 20	ND	6.9	3.1	17	27	1.0
HP-4, 40	ND	1.4	ND	3.6	5	1.0

See notes at end of table.

Table 5-1 (Continued)
Summary of Hydropunch™ Groundwater Analytical Results, October and November 1994

Contamination Assessment Plan
North Fuel Farm Area Sites
NAS Cecil Field, Jacksonville, Florida

Hydropunch™ Boring Location and Sampling Depth (feet)	Contaminant					
	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	Detection Limit
HP-4, 60	ND	16	7.6	41	64.6	1.0
HP-4, 80	ND	ND	2.0	7.7	9.7	1.0
HP-4, 100	ND	2.0	ND	3.7	5.7	1.0
HP-5, 20	ND	ND	ND	ND	ND	1.0
HP-5, 40	ND	ND	ND	ND	ND	1.0
HP-5, 60	28	ND	93	740	861	10
HP-5, 80	ND	ND	1.2	10	11.2	1.0
HP-5, 100	24	ND	ND	1.1	25.1	1.0
HP-6, 20	ND	ND	ND	ND	ND	1.0
HP-6, 40	ND	ND	ND	ND	ND	1.0
HP-6, 60	ND	ND	ND	ND	ND	1.0
HP-6, 80	ND	ND	ND	ND	ND	1.0
HP-6, 100	1.9	ND	ND	8.1	10	1.0
HP-9, 20	ND	ND	ND	ND	ND	1.0
HP-9, 40	ND	ND	ND	ND	ND	1.0
HP-9, 60	ND	ND	ND	ND	ND	1.0
HP-9, 80	1700	ND	44	330	2,074	20

See notes at end of table.

Table 5-1 (Continued)
Summary of Hydropunch™ Groundwater Analytical Results, October and November 1994

Contamination Assessment Plan
North Fuel Farm Area Sites
NAS Cecil Field, Jacksonville, Florida

Hydropunch™ Boring Location and Sampling Depth (feet)	Contaminant					
	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	Detection Limit
HP-9, 100	ND	ND	ND	ND	ND	1.0
HP-14, 20	ND	ND	ND	ND	ND	1.0
HP-14, 40	ND	ND	ND	ND	ND	1.0
HP-14, 59	ND	ND	ND	ND	ND	1.0
HP-14, 80	ND	ND	ND	ND	ND	1.0
HP-14, 99	ND	ND	ND	ND	ND	1.0
HP-15, 20	ND	ND	ND	ND	ND	1.0
HP-15, 40	ND	ND	ND	ND	ND	1.0
HP-15, 60	ND	ND	ND	ND	ND	1.0
HP-15, 80	ND	ND	ND	ND	ND	1.0
HP-15, 100	20	ND	1.1	8.0	29.1	1.0

Notes: Concentrations in micrograms per liter ($\mu g/\ell$).
NA = sample not analyzed in laboratory.
ND = none detected.

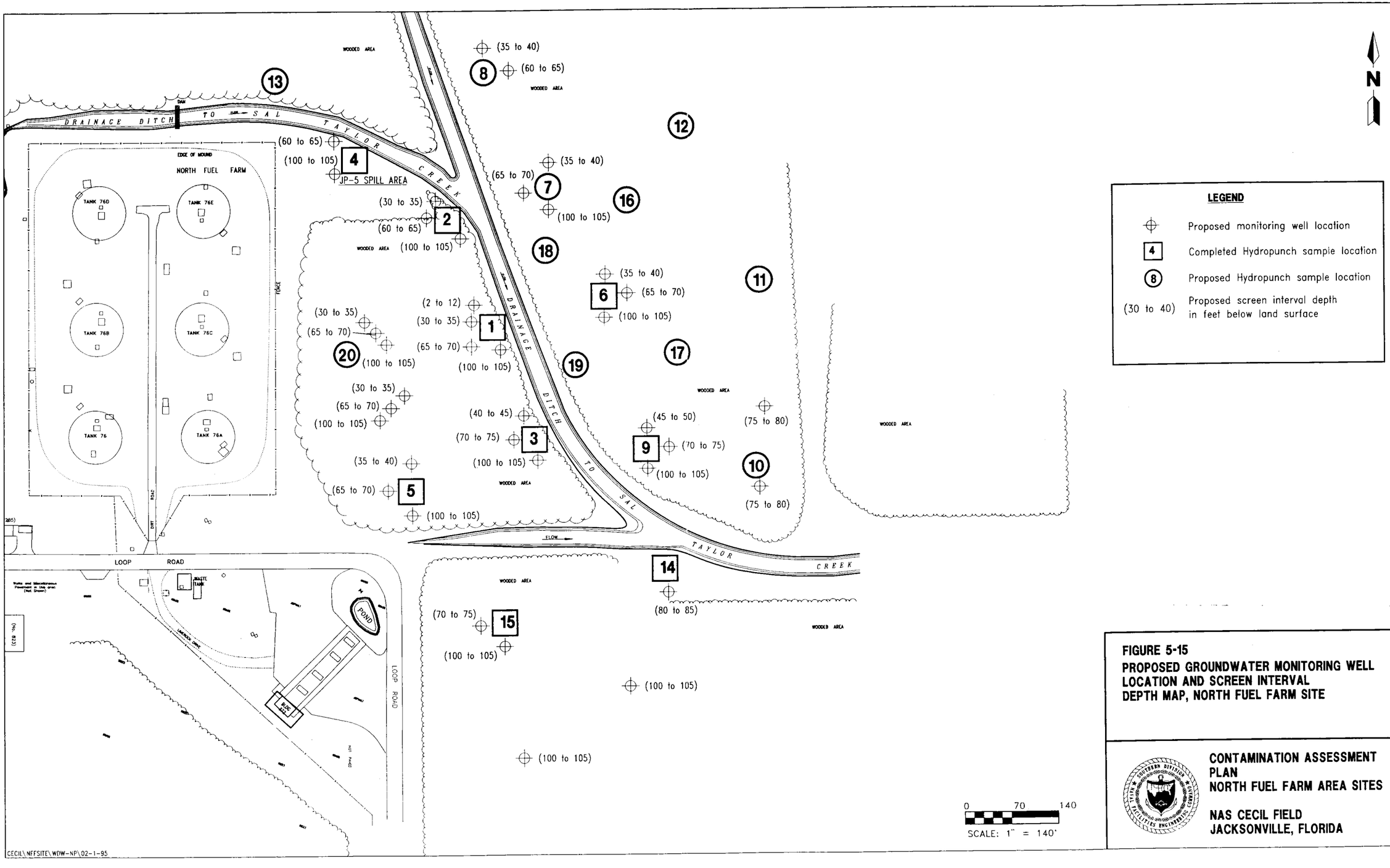

FIGURE 5-15
PROPOSED GROUNDWATER MONITORING WELL LOCATION AND SCREEN INTERVAL DEPTH MAP, NORTH FUEL FARM SITE

CONTAMINATION ASSESSMENT PLAN
NORTH FUEL FARM AREA SITES

NAS CECIL FIELD
JACKSONVILLE, FLORIDA

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APPENDIX A

Florida Department of Environmental Protection Correspondence

Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

September 17, 1992

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Carl Loop
Code 18237
Department of the Navy
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Post Office Box 10068
Charleston, South Carolina 26411-0068

Dear Mr. Loop:

Department personnel have completed the technical review of the Final Draft Contamination Assessment Report for the North Fuel Farm Facility 76, NAS Cecil Field. I have enclosed a memorandum addressed to me from Mr. Mark Canfield. It documents our comments on the referenced report.

If I can be of any further assistance with this matter, please contact me at 904/488-0190.

Sincerely,

Craig F. Fenny For

Eric S. Nuzie
Federal Facilities Coordinator

ESN/bb

Enclosure

cc: Mark Canfield
Brian Cheary
Lynn Griffin
John Mitchell
Jerry Young
Allison Drew
John Dingwall
Basit Ghori

For Routing To Other Than The Addressee
To: Location:
To: Location:
To: Location:
From: Date:

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

TO: Eric S. Nuzie, Federal Facilities Coordinator
Bureau of Waste Cleanup

THROUGH: Dr. James J. Crane, Environmental Administrator
Technical Review Section
Bureau of Waste Cleanup JJC

Tim J. Bahr, Technical Review Section
Bureau of Waste Cleanup TB

FROM: Mark A. Canfield, Technical Review Section
Bureau of Waste Cleanup MAC

DATE: September 8, 1992

SUBJECT: Final Draft, CAR dated June 1992
North Fuel Farm Facility 76
Cecil Field, Naval Air Station

In my phone conversation, August 28, 1992, with Mr. Carl Loop of the Navy's Southern Division we discussed the North Fuel Farm (Facility 76) and the 900,000 gallon JP-5 Fuel Spill at this location. In our discussion we agreed that the comments generated by the FDER after reviewing the CAR listed above would be incorporated into the Contamination Assessment Report (CAR) for the 900,000 gallon site. In the future documentation for these sites will be combined and the sites approached as one.

After reviewing the above listed document I find that in order to meet the requirements of Chapter 17-770, Florida Administrative Code (F.A.C.), the following comments need to be addressed:

1. Additional detail is needed on Figure 2-3 indicating the location of the nearby stream in relation to the North Fuel Farm and also the area covered by the 900,000 JP-5 fuel spill.

2. Free product recovery should be implemented in accordance with Rule 17-770.300(1), F.A.C., if measurable amounts are detected at any monitoring well. Additionally, an update of the recovery efforts conducted, particularly on free product thicknesses measured and volumes recovered to date, should be provided.

review can be completed and a Remedial Action Plan (RAP) prepared based on current data and water quality condi tions subsequent to soil remediation. Note, additional monitoring wells should be installed if significant contaminant concentrations are detected at perimeter monitoring wells of any affected stratum or at the vertical extent well.

7. The complete round of sampling and analyses, requested above, should also include selecting two representative monitoring wells containing free product and sampling the groundwater below the free product for EPA Methods 602 (including MTBE) and 610.

8. Following installation of the supplemental monitoring wells, and concurrent with the sampling event, a complete set of water level measurements must be obtained to verify the direction of groundwater flow and to estimate fluctuations in the water table. These data must be provided in tabular form (including top of casing elevations, depths to water, and corresponding water level elevations) and in graphic form showing their interpretation of the groundwater flow direction.

9. Please have the results of the supplemental assessment provided to me within sixty (60) days of receipt of this request. If additional time is needed, a time extension request should be submitted, in accordance with Rule 17-770.800(6), F.A.C. If Navy personnel should have any questions concerning this review, please have them contact you or me at (904) 488-0190.

10. Please note, all supplemental contamination assessment related documents should be signed and sealed by a registered professional in accordance with Rule 17-770.500, F.A.C. The certification should be made by a registered professional who is able to demonstrate competence in the subject area(s) addressed within the sealed document.

Rcvd 12/14/94

001 -8516

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
2155 EAGLE DR., P.O. BOX 190010
NORTH CHARLESTON, S.C. 29419-9010

PLEASE ADDRESS REPLY TO THE COMMANDING OFFICER, NOT TO THE SIGNER OF THIS LETTER. REFER TO:

5090
Code 1842
12 Dec 1994

ABB Environmental Services, Inc.
Attn: Mr. John Kaiser
2590 Executive Center Circle, East
Tallahassee, FL 32301

Subj: COMMENTS ON THE CONTAMINATION ASSESSMENT REPORT (CAR) FOR THE NORTH FUEL FARM AREA, NAS CECIL FIELD, JACKSONVILLE, FLORIDA

Dear John:

The following comments are forwarded to you for your response. If there are any questions please contact me at (803) 743-0896.

Sincerely,

Bryan Kizer, EIT
Remedial Project Manager
Petroleum Branch

Encl:
Comment on the Contamination Assessment Report

FLORIDA

Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

December 1, 1994

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Commanding Officer
Mr. Bryan Kizer, Code 1842
SOUTHNAVFACENGCOM
Post Office Box 190010
North Charleston, SC 29419-0068

RE: Contamination Assessment Report, dated July 1994
North Fuel Farm Area Sites, Naval Air Station Cecil Field
Florida

Dear Mr. Kizer:

I have reviewed the Contamination Assessment Report (CAR) dated July 1994 (received July 29, 1994), submitted for the above-referenced facility. In order to meet the requirements of Chapter 62-770, Florida Administrative Code (F.A.C) the following comments need to be addressed:

1. There is a need to amend several pages within this submittal. Changes should be made to the following pages and submitted as errata sheets:

   a. Page 1-1, 2nd paragraph, change February 1994 to February 1991.

   b. Page 1-1, 2nd paragraph, the estimated volume of JP-5 spilled in 1991 was 912,736 gallons. Change all references of approximately 900,000 gallons to approximately 913,000 gallons.

   c. Page 2-1, 1st paragraph, this paragraph should reference the 22,772 gallon spill on August 3, 1987 that initiated the first CAR submitted for the North Fuel Farm (ABB-ES, 1992).

   d. Page 2-1, 1st paragraph, is the impressed-current type corrosion protection operational? It has been indicated to me that it is not functioning.

e. Page 2-1, 1st paragraph, how is the volume of each tank measured?

f. Page 2-1, 1st paragraph, one of the six tanks (76E) is believed to be no longer in service, this should be mentioned.

g. Page 2-1, 1st paragraph, what was the date of the last internal visual inspection?

h. Page 2-3, 1st paragraph, see comment 1a.

i. Page 2-7, Figure 2-3, is the creek labeled as Sal Taylor Creek really Sal Taylor Creek or just a tributary?

j. Page 3-1, ABB-ES has conducted extensive field investigations under the CERCLA program and developed stratigraphic nomenclature for the surficial aquifer and upper Hawthorn Formation (i.e. UZS, LZS, UZH). This nomenclature should be adapted and referenced in this CAR.

k. Page 9-1, two previous CARs submitted by ABB-ES: North Fuel Farm, Facility 76, dated June 1992; and Truck Stand, Facility 372, dated May 1992 should be referenced.

CAR ADDENDUM TRUCK STAND SITE

2. Page I-1-1, 3rd paragraph, ABB-ES has defined the base of the surficial aquifer as the top of the dolomite encountered throughout the installation (see RI/FS for Operable Unit 1; any descriptions of Sites 3, 5, 16, or 17; and the Draft RI/FS Workplan for Operable Units 3, 4, 5, and 6), and not the stiff clay encountered at 78 feet below land surface.

3. Page I-2-2, Figure 2-1 and Pages I-2-3 through I-2-7, Table 2-1, the OVA readings depicted on Figure 2-1 for SB-15 (0 ppm), SB-39 (3 ppm), and SB-44 (5 ppm) do not correlate with Table 2-1. The values noted for these same soil borings on Table 2-1 are: SB-15 (160 ppm); SB-39 (34 ppm); and SB-44 (0 ppm).

4. Figure 2-1 should be recontoured to include the above stated values. This would increase the aerial extent of

excessively contaminated soil east of SB-15 and the extent of contaminated soil west of SB-39.

5. Page I-2-9, 2nd paragraph, the rationale for the installation of monitoring wells CEF-372-17 through CEF-372-19 should be explained. If these were installed to delineate the horizontal extent of free product, why were no wells installed around CEF-372-2?

6. Page I-2-9, 2nd paragraph, change CEF-06-19 to CEF-076-19.

7. Page I-2-9, 2nd paragraph, the location of monitoring wells CEF-076-07 and CEF-076-27D should be included on a figure showing all monitoring well locations.

8. Page I-2-15, Table 2-2, the regulatory standard for Class G-II groundwater for lead is 15 ppb. The standards referenced are promulgated under Chapter 62-750, F.A.C. and not Chapter 62-770, F.A.C.

9. A supplemental soil assessment in accordance with Rule 62-770.200(2), F.A.C., and the Department's May 1994 "Guidelines for Assessment and Remediation of Petroleum Contaminated Soil" should be performed northeast and east of SB-15 to determine the horizontal and vertical extent of soil contamination in the unsaturated zone. The OVA values should be summarized in a table, and the approximate extent of soil contamination should be represented in graphic form.

10. Two additional, permanent water-table monitoring wells should be installed as follows to define the horizontal and vertical extent of the groundwater contamination:

    a. One water-table well in the general vicinity of SB-38; and

    b. One water-table well in the general vicinity of SB-245.

11. Following installation the supplemental monitoring wells and CEF-372-07, CEF-372-10D, and CEF-372-16D, should be sampled and analyzed for EPA Methods 602, 610, 418.1, and 239.2.

12. The extent of free product in the vicinity of monitoring well CEF-372-02 should be determined. The use of shallow

piezometers is an acceptable means to accomplish this objective.

The results of the supplemental assessment should be submitted for review within the time frame established by the Navy's 1994 Petroleum Site Management Plan.

JP-5 SPILL

13. In a meeting on November 9, 1994 between FDEP, the NAVY, SOUTHDIVNAVFACENGCOM, and ABB-ES it was decided that the majority of the excessively contaminated soil in the "kill-zone" would be excavated as part of the remediation for the North Fuel Farm. It is apparent that if this remedial alternative is indeed implemented, seven monitoring wells (CEF-076-4, CEF-076-33D, CEF-JP5-11, CEF-JP5-12, CEF-JP5-14, CEF-J5-15), will be destroyed. Prior to the implementation of this remedial alternative, these wells should be resampled and analyzed by EPA Methods 602, 610, 418.1, and 239.2.

14. Based on Figures 2-1 and 2-2 the amount of excessively contaminated soil at the site has not been fully delineated. Therefore, a supplemental assessment in accordance with Rule 62-770.200(2), F.A.C., and the Department's May 1994 "Guidelines for Assessment and Remediation of Petroleum Contaminated Soil" should be performed to determine the horizontal extent of soil contamination in the unsaturated zone more precisely. Borings should be perfromed west, south, and southeast of XB-64; east of XB-60; west and southwest of B-6; west of XB-74; east of XB-78; north of XB-79; and north of XB-81.

    At each location, samples for OVA screening should be collected one foot below land surface and every foot thereafter until the water table is reached. If excessively contaminated soil is detected at the requested locations, sampling should continue outward on a twenty-five foot spacing until the extent of soil contamination is determined. The OVA values should be summarized in a table, and the approximate extent of soil contamination should be represented in graphic form based exclusively on results from samples collected from the unsaturated zone. Please note, performing the supplemental soil assessment in conjunction with the proposed soil excavation is acceptable.

"SAL TAYLOR CREEK" SPILL AREA

15. The scale of Figure 2-4 (1"=2000') does not show enough detail to adequately represent the area. Supplemental maps of a larger scale should be included to present greater detail to the areas where OVA readings where collected.

16. Based on Figures 2-4 the amount of excessively contaminated soil at the site has not been fully delineated. Therefore, a supplemental assessment in accordance with Rule 62-770.200(2), F.A.C., and the Department's May 1994 "Guidelines for Assessment and Remediation of Petroleum Contaminated Soil" should be performed to determine the horizontal extent of soil contamination in the unsaturated zone more precisely. Borings should be performed west, south, and east of 93i-6; north, east, and south of 93i-10; north, east,and south of 93i-45; north, west, and south of 93i-18; west, north, and east of 93i-50; north, west, and south of 93i-51; north, east, south, and west of 93i-20; west, south, and east of 93i-53; west, south, and east of 93i-36; and west, north, and east of 93i-37.

    At each location, samples for OVA screening should be collected one foot below land surface and every foot thereafter until the water table is reached. If excessively contaminated soil is detected at the requested locations, sampling should continue outward on a twenty-five foot spacing until the extent of soil contamination is determined. The OVA values should be summarized in a table, and the approximate extent of soil contamination should be represented in graphic form based exclusively on results from samples collected from the unsaturated zone.

AVORD DAM SITE

17. No Further Action has been proposed for this site even though there has been excessively contaminated soil delineated at the site. Contaminated sediment (naphthalene, TRPH, and lead) has also been found at the site. Therefore, as was discussed in our meeting on October 7, 1994, some additional assessment on the toxicity of these sediments on aquatic organisms will be necessary to document that there is no current effects on fauna and flora.

18. In addition, a confirmatory soil sample at the location of 93B-12 is being requested, in that excessively contaminated soils have been delineated and apparently no groundwater

contamination exists. This sample should be analyzed by EPA Methods 8020, 8100, 418.1, and 239.2.

NORTH CONTAINMENT POND

19. No Further Action has been proposed at this site even though excessively contaminated soils have been delineated. The proposed no remediation of soils because of adverse impacts on wetlands is questionable. Soil remediation at this site may be possible and should be evaluated.

20. As was discussed in our meeting on October 7, 1994, some additional assessment on the toxicity of these sediments on aquatic organisms will be necessary to document that there is no current effects on fauna and flora.

21. Confirmatory soil samples at the location of 93C-11 and 93C-30 is being requested, in that excessively contaminated soils have been delineated and apparently no groundwater contamination exists. These samples should be analyzed by EPA Methods 8020, 8100, 418.1, and 239.2.

AVORD PERIMETER ROAD

22. No Further Action has been proposed for this site even though there has been excessively contaminated soil delineated at the site. Contaminated sediment (TRPH) has also been found at the site. Therefore, as was discussed in our meeting on October 7, 1994, some additional assessment on the toxicity of these sediments on aquatic organisms will be necessary to document that there is no current effects on fauna and flora.

23. In addition, a confirmatory soil sample at the location of 93D-10 is being requested, in that excessively contaminated soils have been delineated and apparently no groundwater contamination exists. This sample should be analyzed by EPA Methods 8020, 8100, 418.1, and 239.2.

GATE 10 DAM

24. Limited excavation of contaminated soils has been proposed at this site. I concur with this recommendation.

25. As was discussed in our meeting on October 7, 1994, some additional assessment on the toxicity of these sediments on

aquatic organisms will be necessary to document that there is no current effects on fauna and flora.

26. Confirmatory soil samples at the location of 93E-55, 93E-31, and 93E-34 is being requested, in that excessively contaminated soils have been delineated and apparently no groundwater contamination exists. These samples should be analyzed by EPA Methods 8020, 8100, 418.1, and 239.2.

27. One additional, permanent water-table monitoring well should be installed at the approximate location of 93E-20. This well should be sampled and analyzed by EPA Methods 602, 610, 418.1, and 239.2.

ALPHA DAM

28. No Further Action has been proposed for this site even though there has been excessively contaminated soil delineated at the site. Contaminated sediment (TRPH) has also been found at the site.

29. As was discussed in our meeting on October 7, 1994, some additional assessment on the toxicity of these sediments on aquatic organisms will be necessary to document that there is no current effects on fauna and flora.

30. Confirmatory soil samples at the location of 93F-33, 93F-39, and 93F-50 is being requested, in that excessively contaminated soils have been delineated and apparently no groundwater contamination exists. These samples should be analyzed by EPA Methods 8020, 8100, 418.1, and 239.2.

31. Based on Figures 2-2 the amount of excessively contaminated soil at the site has not been fully delineated. Therefore, a supplemental assessment in accordance with Rule 62-770.200(2), F.A.C., and the Department's May 1994 "Guidelines for Assessment and Remediation of Petroleum Contaminated Soil" should be performed as follows to determine the horizontal extent of soil contamination in the unsaturated zone more precisely. Borings should be performed south of 93F-60; south of 93F-52 and southwest of 93F-51.

    At each location, samples for OVA screening should be collected one foot below land surface and every foot thereafter until the water table is reached. If excessively contaminated soil is detected at the requested locations,

sampling should continue outward on a twenty-five foot spacing until the extent of soil contamination is determined. The OVA values should be summarized in a table, and the approximate extent of soil contamination should be represented in graphic form based exclusively on results from samples collected from the unsaturated zone.

32. Two additional, permanent water-table monitoring wells should be installed at the approximate location of 93F-39 and the approximate location of 93F-50. These wells should be sampled and analyzed by EPA Methods 602, 610, 418.1, and 239.2.

POSSUM DAM

33. No Further Action along with limited soil excavation have been proposed for this site. The appropriateness of the proposed limited soil excavation will be evaluated after the requested supplemental assessment is performed.

34. As was discussed in our meeting on October 7, 1994, some additional assessment on the toxicity of these sediments on aquatic organisms will be necessary to document that there is no current effects on fauna and flora.

35. Confirmatory soil samples at the location of 93G-10, and 93G-15 is being requested, in that excessively contaminated soils have been delineated and apparently no groundwater contamination exists. These samples should be analyzed by EPA Methods 8020, 8100, 418.1, and 239.2.

36. Based on Figure 2-2 the amount of excessively contaminated soil at the site has not been fully delineated. Therefore, a supplemental assessment in accordance with Rule 62-770.200(2), F.A.C., and the Department's May 1994 "Guidelines for Assessment and Remediation of Petroleum Contaminated Soil" should be performed to determine the horizontal extent of soil contamination in the unsaturated zone more precisely. Borings should be performed northeast of 93G-18 and south-southeast of 93G-15; and northwest of 93G-11..

    At each location, samples for OVA screening should be collected one foot below land surface and every foot thereafter until the water table is reached. If excessively contaminated soil is detected at the requested locations, sampling should continue outward on a twenty-five foot spacing until the extent of soil contamination is determined. The OVA

values should be summarized in a table, and the approximate extent of soil contamination should be represented in graphic form based exclusively on results from samples collected from the unsaturated zone.

GATE 14 DAM SITE

37. No Further Action has been proposed for this site even though there has been excessively contaminated soil delineated at the site. Contaminated sediment (TRPH) has also been found at the site.

38. As was discussed in our meeting on October 7, 1994, some additional assessment on the toxicity of these sediments on aquatic organisms will be necessary to document that there is no current effects on fauna and flora.

39. A confirmatory soil sample at the location of 93H-10 is being requested, in that excessively contaminated soils have been delineated and apparently no groundwater contamination exists. This sample should be analyzed by EPA Methods 8020, 8100, 418.1, and 239.2.

40. Based on Figure 2-2 the amount of excessively contaminated soil at the site have not been fully delineated. Therefore, a supplemental assessment in accordance with Rule 62-770.200(2), F.A.C., and the Department's May 1994 "Guidelines for Assessment and Remediation of Petroleum Contaminated Soil" should be performed to determine the horizontal extent of soil contamination in the unsaturated zone more precisely. Borings should be performed southwest of 93H-4 and north of 93H-3; northeast of 93H-10; and north 93H-10.

    At each location, samples for OVA screening should be collected one foot below land surface and every foot thereafter until the water table is reached. If excessively contaminated soil is detected at the requested locations, sampling should continue outward on a twenty-five foot spacing until the extent of soil contamination is determined. The OVA values should be summarized in a table, and the approximate extent of soil contamination should be represented in graphic form based exclusively on results from samples collected from the unsaturated zone.

If you have any concerns regarding this letter, please contact me at (904) 921-9991.

Sincerely,

Michael J. Deliz

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

cc: John Mitchell, FDEP Natural Resource Trustee
Brian Cheary, FDEP Northeast District
Bart Reedy, USEPA - Atlanta
Jerry Young, City of Jacksonville
Steve Wilson, SOUTHDIV

TJB JJC ESN ESN

APPENDIX B

Site Background Information and Documentation

5090
18IR
10 Apr 91

See Distribution List

Gentlemen:

On February 10, 1991, a little over 900,000 gallons of JP-5 were discharged to drainage ditches on Cecil Field. It is the opinion of the On-Scene Coordinator, Mr. John Dingwall, that environmental damage was limited to Navy property limits. Comments by EPA, Florida Department of Environmental Regulation and City of Jacksonville Bio-Environmental Services Division indicated they deem environmental damage was limited to Cecil Field.

Within the damaged areas, recovery (with regard to benthic, macroinvertebrate and higher organism repopulation) is expected to continue without external input or operation, i.e., by natural biodegradation and recruitment. Expected clean-up and remediation costs are estimated at between $1.4 million and $2.2 million.

Enclosed is a copy of my OSC report for this fuel spill. Any questions may be referred to Mr. John Dingwall at (904) 778-6495.

John D. Dingwall
JOHN D. DINGWALL
On-Scene Coordinator/
Navy On-Scene Commander

Distribution:
US Coast Guard, NRT
EPA, DC, NRT
Dept. of Transportation, NRT
Dept. of Defense, NRT
Dept. of Agriculture, NRT
Dept. of Commerce, NRT
Dept. of Energy, NRT
Dept. of Health and Human Services, NRT
Federal Emergency Management Agency, NRT
Dept. of Interior, NRT
Dept. of Justice, NRT
Dept. of Labor, NRT
Dept. of State, NRT
EPA, Region IV, Atlanta, RRT
FDER, Northeast District, RRT
FDER, Tallahassee, RRT
BESD, RRT
Florida Marine Patrol, RRT
COMHELSWINGSLANT, RRT

5090
18IR

On-Scene Coordinator/Navy On-Scene Commander (OSC/NOSCDR)
Report on the

SPILL RESPONSE TO 900,000-GALLON JP-5 SPILL OF
09 - 10 FEBRUARY 1991

1. Chronological Summary of Events:

a. The Naval Investigative Service (NIS) Resident Agency at NAS Cecil Field has not yet completed its formal investigation into the cause of the fuel spill. However, they believe that the overfilling of Tank 6 (Tank 76E) at the NAS Cecil Field Bulk Facility (NAS Cecil Field Main Fuel Farm), Florida Department of Environmental Regulation (FDER) Facility ID Number 168507293, was a deliberate act and was not accidental. The transfer valves for Tank 4 and Tank 5 were opened, the receipt valve for Tank 6 was opened, and pumping was started sometime between 6:30 p.m. and 8:41 p.m., Saturday, February 9, 1991.

b. The JP-5 spill was discovered by Fuel Farm personnel and reported to the Fire Department at 7:06 a.m., Sunday, February 10, 1991. The Fire Department equipment arrived at the Main Fuel Farm about 7:10 a.m. Fuel Farm personnel shut off electrical switches located on top of the fuel farm which secured the discharge of oil. At 7:17 a.m., Fuel Farm and Fire Department personnel made an assessment of the size of the fuel spill. As soon as they discovered it was a very large spill, Fire Department personnel notified the Officer of the Day and advised him to notify the Commanding Officer, Captain (CAPT) R. W. Nordman, and the Public Works Department, including the Seabees.

c. At 8:00 a.m.,Fuel Farm Personnel had estimated the spill to be about 900,000 gallons. On Monday, February 11, they calculated a more accurate estimate from the following records:

Fuel Farm Records as of 7:00 a.m., Friday, February 8, 1991:

Tank 76	(1) 12' 2 3/4"	559,907 gallons	
Tank 76A	(2) 7' 7 1/4"	350,144 gallons	Pumped to Day Tk
Tank 76B	(3) 9' 1 1/4"	418,235 gallons	Pumped to Day Tk
Tank 76C	(4) 12' 1"	552,858 gallons	
Tank 76D	(5) 12' 2 1/2"	559,039 gallons	
Tank 76E	(6) 11' 6 3/8"	528,096 gallons	

No oil was received before the next readings on Monday, February 11, 1991:

Tank 76	(1)	12' 2 1/2"	558,964 gallons
Tank 76A	(2)	6' 2 5/8"	287,109 gallons
Tank 76B	(3)	6'10 3/4"	317,843 gallons
Tank 76C	(4)	1' 3 1/8"	64,874 gallons Pump lost suction
Tank 76D	(5)	2' 1"	99,050 gallons
Tank 76E	(6)	12' 3 3/4"	563,333 gallons

Estimated Fuel Lost = (Tank 76C Friday - Tank 76C Monday) + (Tank 76D Friday - Tank 76D Monday) - (Tank 76E Monday - Tank 76E Friday) = (552,858 - 64,874) + (559,039 - 99,050) - (563,333 - 528,096) = 487,984 + 459,989 - 35,237 = 912,736 gallons. Each tank reading is accurate to within about 950 gallons. Therefore, the estimated amount spilled was 912,736 +/- 5700 gallons.

FUEL RECOVERED

DATE	CUMULATIVE GALLONS RECOVERED
2/11/91	220,000
2/12/91	342,359
2/13/91	588,241
2/14/91	600,448
2/15/91	690,294
2/16-21/91	706,868
2/21-3/13/91	708,737

d. At 7:20 a.m., Fire Department personnel started tracking the fuel flow East into the Aviation Ordnance (AVORD) area (See attached map of spill route and dams). At 7:30 a.m. a crash fire truck was dispatched to the North Containment Pond. Upon arrival, the Fire Department found fuel had already passed this location. At 7:35 a.m., Fire Chief Phillips was notified of the fuel spill and tried unsuccessfully to contact Mr. John Dingwall, Environmental Engineering Division Director, Public Works Department, and On-Scene Coordinator/Navy On-Scene Commander (OSC/NOSCDR). (I, Mr. Dingwall, was on a vacation weekend at Daytona Beach). At 7:38 a.m., the Fire Department personnel arrived at Perimeter Road Gate 10 and the fuel had not yet reached this portion of the drainage system. Therefore, they deployed three sets of absorbent booms at this location and, at 7:55 a.m., notified the Weapons Department to exercise caution in the AVORD area due to the presence of large quantities of fuel there.

e. About 8:00 a.m., Fuel Farm personnel started initial recovery using station defuelers at the North Containment Pond. At the same time, Ensign (ENS) Alberghini of the Public Works Department was notified by the Command Duty Officer that an undetermined amount of fuel had been spilled -- estimated between 2,000 - 90,000 gallons in quantity. He notified Mr. Ben House, a

Public Works Environmental Engineering Division employee, at 8:10 a.m., notified the Public Works Officer, Commander (CDR) Deane E. Leidholt, and departed his residence to go to the spill site.

f. At 8:10 a.m., the Fire Department requested culverts, a front end loader and a bulldozer at the Gate 10 area to build a dam across the drainage ditch. At 8:55 a.m., they placed the culverts into the water at the dam site. At 9:05 a.m., the first Public Works Seabee arrived on the scene and the Officer of the Day gave permission to proceed and construction of the Gate 10 Dam began.

g. At 9:10 a.m., Fire Department personnel began assessing other downstream locations for suitable dam sites. Starting 9:15 am., Mr. Ben House and ENS Alberghini made a quick inspection tour of streams and containment ponds. There were about 15 - 20 inches of fuel in North Containment Pond and, at 9:30 a.m., the Gate 10 Dam was completed and working properly. This stopped the flow of any more fuel past Gate 10 -- only a small amount had passed before completion of the dam. At 9:40 a.m., Fire Department personnel requested delivery of limerock to the Gate 10 Dam area to build a hardened area for truck defueling operations.

h. Mr. House and ENS Alberghini continued their tour and found that fuel had not reached the Possum Dam Area where Fire Department personnel were standing by. At 10:20 a.m., Fire Department personnel delivered culverts to the Possum Dam site at Gate 13A. Fire Department personnel hand placed two culverts and a by-pass at Possum Dam; Public Works Seabee's built a dam to close the Possum Dam by-pass.

i. About 9:30 a.m., CDR Leidholt arrived at Cecil Field to assess the situation. He proceeded to the Fuel Farm where he met CAPT Nordman who had been on-scene since about 9:30 a.m. They proceeded to tour the drainage ditch, containment areas and streams to determine current status of the spill. While they were in the field, the Fire Department reported to the Command Center about noon informing them in detail about the size and flow route of the fuel spill, fuel collection points and dam sites. At 12:30 p.m., the Fire Department deployed portable fire extinguishers to the fuel collection points. About 1:30 p.m., CAPT Nordman and CDR Leidholt returned to the Command Center.

j. Upon his return, CDR Leidholt immediately issued a contract directing Marine Industrial Services (MIS), a fuels handling contractor, to aid in the organized recovery operations. Contracts direction for containment and recovery assistance was also issued to the base maintenance contractor, Fluor Daniel Services, Inc. (FDS), and the base transportation contractor, D & D, Inc. At 1:00 p.m., ENS Alberghini called Mr. David Pipkin to respond to the

spill who arrived on the scene about 2:00 p.m. At 1:10 p.m., the Ensign called Mr. Frank Sigona to come in and assist in responding to the fuel spill. Before Mr. Sigona left, he asked his wife to check out the phone number for my hotel in Daytona Beach and advise me of the fuel spill. At the same time, MIS was on their way to Cecil Field. Mrs. Sigona contacted me in Daytona Beach about 1:30 p.m. advising me of the 900,000-gallon oil spill. Therefore, I checked out of the hotel and departed for NAS Cecil Field.

k. At 2:00 p.m., Mr. Pipkin arrived at Cecil Field and performed a survey of the work in progress. The Command Center requested that Mr. Pipkin report field observations and reporting requirements. He started developing spill report data for release to the 24-hour Emergency Response numbers.

l. Between 2:00 - 2:30 p.m., Mr. Sigona noted there was about 20 inches of fuel over the dam at the North Containment Pond. He instructed personnel to build a large pond upstream of Possum Dam.

m. When MIS arrived they placed their three vacuum trucks at the Gate 10 Dam site and immediately began pumping oil from the over one foot layer that was on the water trapped behind Gate 10 Dam. Also, the permanent 5-foot and 4-foot road bridge culverts were completely sealed to preclude escape of any fuel.

n. The Seabees constructed Dam Alpha by the runways using two 18-inch culverts. A minimal amount of fuel had made it as far as Dam Alpha. Dam Alpha became the collection point for any fuel breaching the Gate 10 Dam defenses keeping it from progressing any further downstream. No trace of fuel was evident at the Possum Dam site. About 4:00 p.m., a helicopter from NAS Jacksonville arrived and CDR Leidholt flew over the spill site to assess the situation as well as to look for additional effective dam sites. No fuel was seen west (downstream) of Dam Alpha and an additional dam site was identified downstream of Possum Dam at Gate 14.

o. I arrived at 4:30 p.m., obtained a rundown of the situation from CDR Leidholt and began making the legally mandated notifications. I called the National Response Center at 5:06 p.m., Report #58862; called the EPA, Mr. Steve Sprahls, at 5:20 p.m.; and called FDER, Mr. Bobby Brents, at 5:25 p.m. Mr. David Pipkin provided his copy of FDER reporting Requirements to CDR Leidholt at the Command Center at 6:00 p.m.

p. Because of the large amount of trapped fuel, CDR Leidholt issued contract's direction for two additional vacuum trucks and two tankers to be brought in by MIS to assist in the recovery operations. To assist with government recovery operations at the North Containment Pond area, CDR Leidholt also issued contract's direction for Jacksonville Pollution Control (JPC) to assist in

containment and cleanup. The Seabees placed two 18-inch culverts at Possum Dam and built a temporary dam east of Possum Dam so that a containment pond could be dug out. Through the support of CBU-410 and RNMCB-14 (both units from NAS Jacksonville), two bulldozers, two front-end loaders, four dump trucks and two backhoes were mobilized to the Possum Dam area. In addition, a drag line was used to increase the size of the pond behind Possum Dam. JPC came on board with three vacuum trucks and were staged at the North Containment Pond along with the Navy Fuel Farm defuelers.

r. Mr. Frank Sigona and I toured the drainage ditches to further assess the situation. Although, there was significant quantities of fuel at the North Containment Pond and Gate 10 Dam, there was not even a sheen at Possum Dam. To enable around-the-clock recovery operations, light plants were established at North Containment Pond and Gate 10 Dam areas and staffed with contractor personnel.

s. Ms. Pam Fellabaum, FDER, arrived at about 11:00 p.m. and Mr. Sigona and I showed her the spill area and the spill route all the way tothe Possum Dam area arriving back in the office at about 12:30 a.m., Monday, February 11, 1991. Ms. Christine Ulmer, EPA, Atlanta, arrived at about 1:00 a.m. on Monday, February 11, and Mr. Sigona, Ms. Fellabaum and I showed her the spill area and the spill route all the way to the Possum Dam area arriving back in the office at about 3:00 a.m. At this same time, at the direction of CAPT Nordman, CDR Leidholt, ENS Alberghini, and Mr. Paul Hale had the road bridge culverts at the AVORD area blocked off with plywood, trapping surface fuel but allowing some flow to continue under the plywood. I provided copies of the NAS Cecil Field certified, non-implemented Spill Prevention Control and Countermeasure Plan to the EPA and FDER representatives. The EPA's consulting personnel arrived at about 3:30 a.m., at which time containment operations were stopped since all the oil was contained on station and no further action could be continued due to inadequate lighting. However, skimming operations continued through the night.

t. Representatives from EPA (Ms. Ulmer) and FDER (Mr. Michael Reutter) returned at 7:30 a.m., Monday, February 11, 1991, to reassess the situation of the spill area. Contract's direction was given to Envirotech Corporation (EC) to provide additional vacuum trucks to the Dam Alpha area. Notification of the spill was provided to Bio-Environmental Services Division (BESD) of the City of Jacksonville, the Florida Marine Patrol and the Department of Fish and Wildlife. A representative from BESD, Mr. Terry Carr, arrived later in the morning; he also toured the spill area and downstream dam sites. Several pumps were ordered to aid in decreasing the water level behind both Gate 10 Dam and Possum Dam. The second dam at Gate 10 was erected just south of

the existing dam. Only one 18-inch culvert was set in the new dam (later, two more 18-inch culverts were added). The second dam was constructed because the original dam was slowly blowing out at its base thus increasing the threat of losing the contained fuel. Once the second dam at Gate 10 was in place, the first dam was partially removed to allow the newly installed culvert to function properly. About 12:00 p.m., the temporary dam at Possum Dam was partially removed in order to release some of the water from behind the dam. The water quickly encompassed the entire dam and washed out Possum Dam within minutes. The Gate 14 Dam was washed out by the incoming water and emergency containment efforts resumed. A slight sheen that had been covering less than 5% of the pond behind Possum Dam was lost -- the maximum fuel that might have been lost was 6 - 10 gallons of JP-5. When Possum Dam was lost, EPA, the State and BESD chased whatever spill might have left the station, but to no avail. Mr. Sigona and I remained at NAS Cecil Field to assure no additional fuel would be lost. The BESD took water samples downstream in Sal Taylor Creek and Yellow Water Creek -- analytical results later showed no trace of JP-5 in Yellow Water Creek and about 0.2 ppm in Sal Taylor Creek. Within 15 minutes, EO1 Hall rebuilt the temporary dam by Possum Dam and additional booms were placed downstream of Possum Dam. At this point, several 18-inch and 24-inch culverts were ordered through FDS.

u. Monday, February 11, afternoon, the Seabees reconstructed the Gate 14 Dam with two 18-inch plastic culverts. Four-inch and six-inch pumps were placed at both Gate 10 Dam and Possum Dam. The drag line continued to enlarge the Possum Dam pond. By 2:00 p.m., the galvanized culverts were delivered and two of the 24-inch culverts were used to build Dam John 100 yards downstream of the Gate 14 Dam. Dam John was the first dam constructed with a limerock and earth mixture to enhance strength and endurance. Possum Dam was then rebuilt using galvanized culverts. With the temporary dam in place, the pond at Possum Dam was pumped dry and construction was resumed. About 3:00 p.m., Mr. David Pipkin was briefed by CDR Leidholt on the spill cleanup in progress and was requested to accompany the base Public Affairs Officer (PAO) when he briefed the press. He accompanied the press on a bus tour to the Fuel Farm and Gate 10 Dam. By 6:00 p.m., Possum Dam was complete with two galvanized culverts in limerock.

v. Monday, February 11, evening, pumps were used around the clock to fill in the pond at Possum Dam so that the temporary dam could be broken allowing the drainage ditch to flow freely through the Possum Dam angled culverts. Since the water level at the Gate 10 Dam was getting very high, the first and immediate order of business was to decrease the water level behind Gate 10 Dam. Pumping for recovery of JP-5 continued 24-hours a day by all three contractors.

w. Tuesday, February 12, 1991, the Florida Marine Patrol provided a helicopter to take EPA and FDER personnel downstream to try to locate any sign of the minor fuel loss -- all to no avail. Following this helicopter ride, CDR Leidholt and I took a helicopter ride starting at the fuel farm and following the drainage ditch and stream all the way downstream to where Yellow Water Creek enters a wide marshy area by the high-voltage line crossing. Heavy contamination was noted upstream of Gate 10 Dam. Moderate to light contamination was noted between Gate 10 Dam and Possum Dam. Very light contamination was noted between Possum Dam and Gate 14 Dam. No contamination was found downstream of Gate 14 Dam. Large quantities of limerock were obtained and used for the hardening of dams.

x. Wednesday, February 13, 1991, strengthening and hardening of dams with 800 additional tons of limerock continued. Mr. Frank Sigona and I, along with regulatory agency personnel, continued to monitor progress of oil spill and cleanup efforts. Recovery of JP-5 was begun in the AVORD area. The fuel farm was obtaining too much water with the recovered fuel so it was decided to decant the water from the storage tanks and treat it in the reserve portion of the Sewage Treatment Plant. Mr. Steve Wilson from Southern Division, Naval Facilities Engineering Command, (SOUTHDIV) arrived to offer assistance -- I requested they initiate Contamination Assessment procedures. I took photos of the spill situation. Minor rainfall during the evening washed out more of the oil from upstream positions to collection points and apparently washed out a very small amount of oil probably adsorbed on sediment that was washed downstream. From about 7:00 p.m. - 10:00 p.m., extensive sandbagging was performed at Possum Dam, Gate 14 Dam and Dam John. The sandbags were placed around the culvert outfalls to keep the dams from washing out.

y. The morning of Thursday, February 14, 1991, the EPA representative considered that the Navy OSC, was properly handling the spill so EPA would not have to take over as OSC and returned to Atlanta after leaving phone numbers where she could be reached, including her beeper number. FDER and BESD continued to monitor the Navy's cleanup. BESD took four additional samples of water from Sal Taylor and Rowell Creeks. According to BESD, these samples showed JP-5 contamination greater than 2.4 ppm, but within water quality standards. I took additional photos of the spill situation. The BESD's Mr. Gerrald Young provided additional assistance.

z. On Friday, February 15, 1991, fuel cleanup continued with skimming of the surface layer of oil. An OSHA inspector, Mr. Anthony Wilkes, was given a tour of the spill site. He suggested that additional training would be required for FDS personnel in order for them to continue cleanup efforts. I, with

the assistance of Mr. Frank Sigona arranged to give required training to FDS personnel the following day. That evening, cleanup operations were curtailed for the weekend pending results of inspections by Mr. Sigona and me on Saturday, Sunday and Monday.

aa. Saturday, February 16, 1991, I made a tour of the spill route noting no need to call contractors in for cleanup effort on the weekend. Mr. Sigona and I, in cooperation with the FDS Safety Officer, Mr. Gary Sutton, provided two hours training to each of two shifts of FDS personnel to the satisfaction of the OSHA representative.

ab. Sunday, February 17, 1991, I made a tour of the spill route noting no need to call contractors in for cleanup effort on the weekend.

ac. Monday, February 18, 1991, I made a tour of the spill route noting no need to call contractors in for cleanup effort on the weekend.

ad. Tuesday, February 19, 1991, cleanup effort resumed, but no regulatory agency personnel were on site.

ae. Wednesday, February 20, 1991, AIRLANT and SOUTHDIV visit to evaluate cleanup effort and begin providing Contamination Assessment/Remedial Action Plan assistance. To provide an overview of the spill situation, the Navy chartered a commercial helicopter. The FDER's Mr. Michael Reutter and I took a helicopter ride with video and still photographers. We travelled the entire spill route, noting the contamination on station and lack of contamination off station. Mr. Sigona and SOUTHDIV'S Mr. Steve Wilson and Mr. Herb Frasier then took a helicopter ride following the same route as the first ride so they could also better assess the situation.

af. Thursday, February 21, 1991, Mr. Marvin Barnes, AIRLANT, toured the spill route -- AIRLANT and SOUTHDIV gave their opinions as to ways to prevent future oil escapes. SOUTHDIV representatives left and suggested SOUTHDIV Design Engineers be contacted for a dam design. I contacted SOUTHDIV Design Engineers, who were to do some initial research and calculations before coming out for a site visit on Monday, February 25, 1991.

ag. Friday, February 22, 1991, Mr. Sigona and I tried to find eight feet of oil indicated by a monitoring well. Upon baling out the monitoring well, one inch of oil remained. Skimming of oil was discontinued for the weekend.

ah. Saturday, February 23, 1991, Mr. Sigona and I still found only one inch of oil in the monitoring well and baled it out until just a sheen remained.

ai. Sunday, February 24, 1991, I checked Possum Dam and Gate 14 Dam.

aj. Monday, February 25, 1991, skimming of oil resumed at Possum Dam -- Possum Dam cleaned completely. SOUTHDIV's Mr. Jeff Guss, Mr. Ron Blackmore and Mr. David Franklin arrived to tour dam sites. Two feet of oil found in monitoring well at Fuel Farm.

ak. Tuesday, February 26, 1991, Dam Alpha and North Containment Pond cleaned completely. SOUTHDIV design engineers prepare dam designs. We dug a six-foot deep trench along the rear of the Fuel Farm to try to intercept the two-foot layer of oil, but only a sheen of oil was found.

al. Wednesday, February 27, 1991, the Dam 10 area skimming was finished and the area was cleaned completely. So skimming was resumed at South Containment Pond. SOUTHDIV design engineers finished designs and returned to SOUTHDIV.

am. Thursday, February 28, 1991, we skimmed the standby aeration tank at the STP. I received the proof sheet and video from the latest helicopter ride. Public Works and Fuel Farm/Supply personnel met to discuss appropriate action to coordinate environmental concerns with future plans for fuels operations.

an. On Friday, March 1, 1991, CDR Leidholt, Lieutenant (LT) Scanlan, ENS Alberghini, Mr. Paul Hale, Mr. Richard Donaghue, Mr. John Nadal and I met to discuss action to take with respect to upcoming rain forecast -- showers today and 1 1/2" early tomorrow morning. We decided to break through side of Gate 10 Dam to lower the water level behind the dam and to open up one of the 24" culverts at Possum Dam to lower water level behind the dam. Plywood was placed across the road bridge culverts just above water level in the area above the North Containment Pond to allow flow while containing surges in flow from rainfall. The water level at the North Containment Pond was 5" above the dike at 11:00 a.m. and 4" below the top of the dike at 4:30 p.m. The level in Possum Dam dropped about 4" in the same timeframe. MIS skimmed oil from the drainage ditch at the Main Fuel Farm. MIS skimmed oil from the South Containment Pond. We placed oil absorbant pads behind the oil absorbant boom just downstream of Possum Dam -- these pads picked up some oil. We placed pads behind Gate 14 Dam -- these pads did not have sufficient oil to pick up anything.

ao. On Saturday, March 2, 1991, Mr. Sigona and I toured the spill area after 0.6" rain fell in 3 hours and 1" rain had fallen

recovered within the first week. It has been estimated that at least 150,000 gallons evaporated and some still remains in the soil along the initial portion of the spill route.

3. Problems Encountered. There were three major problems encountered. The first major problem was water level rising behind containment dams. This problem was resolved partially by placing culverts in the dam at an angle to retain the oil and allow passage of water and by opening culverts that would draw from well below the oil/water interface. Also, pumps were used to try to alleviate this problem. The second problem was running out of room to store the recovered oil/water mixture. This problem was resolved by removing water from the bottom of the storage tanks and treating it in an unused portion of the wastewater treatment plant and by bringing in portable oil/water separators. The third problem was the dams being washed out by the approximately 3.58" of rainfall the weekend of March 2, 1991. We then used plywood to block off top portions of culverts upstream of the North Containment Pond to act as a flow equalizer. This flow equalization combined with a containment boom deployed to direct oil into the containment pond when the water level gets over the concrete diversion dam level and deploying absorbent booms downstream have been sufficient to maintain the oil on station. These temporary measures will be modified once the new dam, designed to hold back the flow of up to a 4" storm, is complete. The OSHA violations by contractors were noted by Mr. Anthony Wilkes of the local OSHA office located in Jacksonville, Florida (OSHA violations will be addressed in the OSHA report when it is published).

4. Recommendations.

a. Means to Prevent Recurrence.

(1) NAS Cecil Field should activate the high level alarm system except during alarm system maintenance periods. They should backup the alarm system with a method that informs security personnel when the high level alarm system is shut down. Also, they should provide high level alarms to the three tanks at the South Fuel Farm area which presently lack them.

(2) NAS Cecil Field should write and implement a procedure that states the frequency of security patrols and includes a checklist of items to inspect during these patrols. Also, they should implement increased security measures to include at the least central controls of pumps in manned building, locking mechanisms to secure main transfer valves (until/unless better security measures are devised and implemented), and access control to Fuel Farm space and keys.

(3) NAS Cecil Field needs to provide additional site specific spill response training to all personnel who may be involved in a spill including, but not limited to Fire Department, Security Department, Fuels Department and Public Works personnel.

Training should include a mock fuel spill response exercise at least annually.

(4) NAS Cecil Field fuel transfer operations should be operated on the "buddy" system (two personnel jointly overseeing operation), manpower allowing, in the event of multiple simultaneous transfer operations.

b. Improvements to Response Actions. Response actions by NAS Cecil Field were timely and effective in maintaining the spill on station. There are basically two improvements I would recommend for future responses. First, I would try to regulate the flow of water above the North Containment Pond in order to allow the pond to continue operating properly. Secondly, I would set up procedures to notify the regulatory agencies a little sooner in the event of a spill of this magnitude.

c. Changes in Plans. I have no changes to recommend to the National Contingency Plan or Federal Regional Plan. I recommend that the NAS Cecil Field Spill Control and Countermeasure Plan be revised to address a spill of this maghitude at the Main Fuel Farm and to address large magnitude spills that could be anticipated at the South Fuel Farm and the other Day Tank area. This revised plan should be submitted to EPA in mid-May, 1991.

5. Comment. I believe the NAS Cecil Field Commanding Officer, Captain R. W. Nordman, is to be commended for his support of the cleanup efforts. I personally saw him in the field surveying the situation daily, including Saturday and Sunday, for the first two weeks of the cleanup. The first day of the spill, he was in a continuous response mode -- both in the field and in the Command Center.

John D. Dingwall

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Navy On-Scene Commander