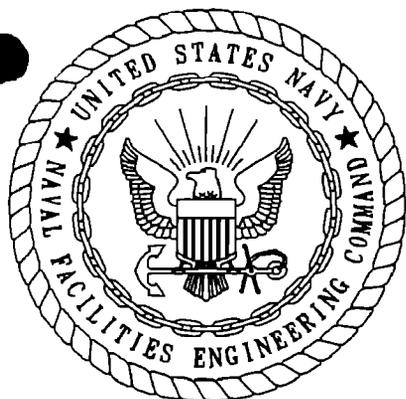


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CONTAMINATION ASSESSMENT REPORT ADDENDUM FOR NORTH FUEL FARM AREA
JP-5 SPILL SITE AND SAL TAYLOR CREEK BANK SITES NAS CECIL FIELD FL
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ABB ENVIRONMENTAL SERVICES INC

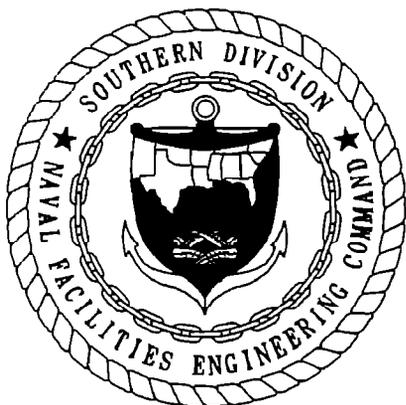


**CONTAMINATION ASSESSMENT REPORT ADDENDUM
NORTH FUEL FARM AREA JP-5 SPILL SITE AND
SAL TAYLOR CREEK BANK SITES**

**NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

**UNIT IDENTIFICATION CODE: N60200
CONTRACT NO.: N62467-89-D-0317/105**

MARCH 1996



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29419-9010**

**CONTAMINATION ASSESSMENT REPORT ADDENDUM
NORTH FUEL FARM AREA JP-5 SPILL SITE AND
SAL TAYLOR CREEK BANK SITES**

**NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

Unit Identification Code: N60200

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Prepared by:

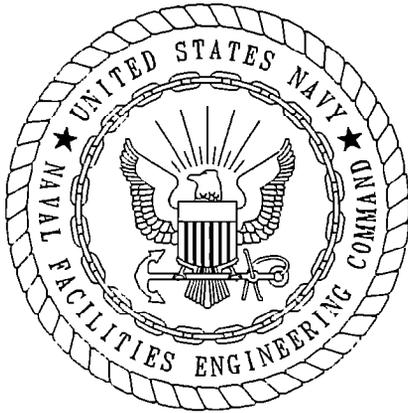
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Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
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Bryan Kizer, Code 1842, Engineer-in-Charge

March 1996



CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

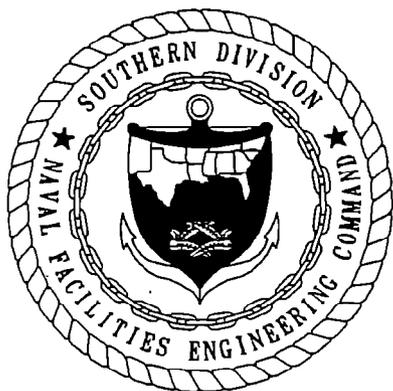
The Contractor, ABB Environmental Services, Inc., hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/105 are complete and accurate and comply with all requirements of this contract.

DATE: March 14, 1996

NAME AND TITLE OF CERTIFYING OFFICIAL: Rao Angara
Task Order Manager

NAME AND TITLE OF CERTIFYING OFFICIAL: Eric Blomberg, P.G.
Project Technical Lead

(DFAR 252.227-7036)



FOREWORD

Subtitle I of the hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, primarily petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (Title 40 CFR 280), *Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*, and Title 40 CFR 281, *Approval of State Underground Storage Tank Programs*. Title 40 CFR 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of Chapter 62-770, Florida Administrative Code, *State Underground Petroleum Environmental Response*, regulations pertaining to petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Commanding Officer, Naval Air Station (NAS) Cecil Field, Jacksonville, Florida, or to Southern Division, Naval Facilities Engineering Command, Code 1842 at AUTOVON 563-0528 or (803) 820-5896.

EXECUTIVE SUMMARY

At the request of the Navy, a supplemental assessment was performed from March to September 1995 at the JP-5 spill site and nine Sal Taylor Creek Bank Sites, NAS Cecil Field, Jacksonville, Florida. The purpose of the assessment was to address comments from the Florida Department of Environmental Protection on the JP-5 Spill Site Contamination Assessment Report submitted in July 1994. The supplemental assessment consisted of the installation of one double-cased, deep monitoring well, advancement of soil borings, and collection of soil samples, and collection of groundwater samples from selected monitoring wells.

Supplemental Assessment Findings

- Depth to water in the surficial aquifer at the JP-5 spill site ranges from 0.5 foot to 4.0 feet bls, and the general groundwater flow direction is to the south-southeast.
- Excessively contaminated soil was not detected at the JP-5 spill site during the supplemental assessment. However, water-saturated soil samples 95A-47, 95A-48, 95A-50, 95A-53, 95A-55, 95A-56, 95A-57, and 95A-58, collected on the east side of the drainage ditch that flows into Sal Taylor Creek, had organic vapor analyzer (OVA) readings greater than 50 parts per million (ppm). These samples could not be classified as excessively contaminated soil due to the saturated conditions.
- Five confirmatory soil samples were collected to verify if soil contamination, detected using an OVA, was present near the drainage ditch that flows from the access road to Sal Taylor Creek. TRPH and lead were the only kerosene analytical group parameters detected in the confirmatory soil samples collected at the JP-5 spill site. TRPH values ranged from below method detection limits (sample CEF-JP5-SD2) to 130 ppm (sample CEF-JP5-SD1). Lead concentrations ranged from 1.1 ppm (sample CEF-JP5-SD5) to 6.6 ppm (samples CEF-JP5-SD2 and CEF-JP5-SD3).
- Free product was observed in monitoring well CEF-JP5-11 during this supplemental field investigation. Free product thickness in monitoring well CEF-JP5-11 was 0.02 foot. Free product was not detected in monitoring well CEF-076-04. Free product, if present in monitoring wells CEF-JP5-11 and CEF-076-04, continues to be recovered on a weekly basis.
- Benzene concentrations ranged from below method detection limits in monitoring well CEF-076-04 to 160 ppb in monitoring well CEF-JP5-14. The FDEP target level of 1 ppb for benzene was exceeded in monitoring well CEF-JP5-12 and CEF-JP5-14.

- Total VOA concentrations ranged from 22.2 ppb in monitoring well CEF-076-04 to 368 ppb in monitoring well CEF-JP5-14. The FDEP target level of 50 ppb for VOAs was exceeded in monitoring wells CEF-JP5-12, CEF-JP5-14, and CEF-JP5-15.
- Total naphthalenes ranged from below method detection limits in monitoring well CEF-JP5-14 to 121 ppb in monitoring well CEF-JP5-15. The FDEP target level of 100 ppb for total naphthalenes was exceeded in monitoring well CEF-JP5-15.
- The vertical extent of petroleum contamination does not exceed 65 feet bls, which is the top of the screen interval of well CEF-076-45I.

Conclusions

The information obtained during the initial CA in 1991 through 1994 and the 1995 supplemental field investigations at the JP-5 spill site appears to be sufficient to assess the horizontal and vertical extent of excessively contaminated soil and groundwater contamination. The contaminant distribution indicates that the majority of the area affected by the petroleum release is in the spill area, which extends from North Fuel Farm Tank 76E to the drainage ditch that discharges into Sal Taylor Creek. Soil north and east of the drainage ditch had OVA concentrations greater than 50 ppm, but could not be classified as excessively contaminated soil due to the saturated conditions.

The areal extent of excessively contaminated soil detected at nine sites (93I-6, 93I-10, 93I-18, 93I-20, 93I-36, 93I-37, 93I-45, 93I-51, and 93I-53) along the banks of Sal Taylor Creek appears to be delineated in accordance with FDEP guidelines (FDEP, 1994). The extent of excessively contaminated soil at these sites is limited to one or two soil borings which are spaced at a distance of approximately 20 feet.

Recommendations

Due to the presence of free product, excessively contaminated soil, and contaminated groundwater that exceeds Chapter 62-770, FAC, regulatory criteria, the Navy recommends that a remedial action plan be prepared for the JP-5 spill site. The area north and east of the drainage ditch would not be included as part of the RAP because this area is in a wetland, the soil does not meet FDEP criteria for excessively contaminated soil, and TRPH concentrations in soil slightly exceeded State regulatory standards in only two soil samples. In addition, free product recovery should continue on a regular basis, and maintenance of all fuel tanks should be conducted on a routine schedule.

Excessively contaminated soil detected along the creek bank of Sal Taylor Creek is of limited areal extent and is located in a wetland. Therefore, the Navy recommends allowing natural biodegradation to proceed as a remedial action.

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GLOSSARY

ABB-ES ABB Environmental Services, Inc.
AVORD aviation ordnance

bls below land surface

CAR contamination assessment report
CARA contamination assessment report addendum

EDB ethylene dibromide

FAC Florida Administrative Code
FDEP Florida Department of Environmental Protection
ft/ft feet per foot

MTBE methyl tert-butyl ether

NAS Naval Air Station
NFF North Fuel Farm

OVA organic vapor analyzer

PAH polynuclear aromatic hydrocarbons
Pb lead
ppb parts per billion
ppm parts per million
PVC polyvinyl chloride

SOUTHNAV-
FACENCOM Southern Division, Naval Facilities Engineering Command

TRPH total recoverable petroleum hydrocarbons

USEPA U.S. Environmental Protection Agency

VOA volatile organic aromatic
VOH volatile organic hydrocarbon

1.0 INTRODUCTION

This Contamination Assessment Report Addendum (CARA) was prepared for the JP-5 spill site and nine sites along the banks of Sal Taylor Creek.

The JP-5 spill site is located adjacent to Tank 76-E at the northeast corner of the North Fuel Farm (NFF) at Naval Air Station (NAS) Cecil Field in Jacksonville, Florida (Figure 1-1). The site is bounded to the north and east by a drainage ditch that flows into Sal Taylor Creek, to the south by a dense wooded area, and to the west by NFF Tank 76E (Figure 1-2). The nine sites along the banks of Sal Taylor Creek are located between the seven spill containment sites (Aviation Ordnance [AVORD] Dam, North Containment Pond, AVORD-Perimeter Road, Gate-10 Dam, Alpha Dam, Possum Dam, and Gate-14 Dam) and are designated 93I-6, 93I-10, 93I-45, 93I-18, 93I-20, 93I-51, 93I-53, 93I-36, and 93I-37 (Figure 1-1). Details of the seven spill containment sites contamination assessments are presented in separate contamination assessment reports (CARs).

On February 10, 1991, approximately 913,000 gallons of JP-5 jet fuel overflowed from Tank 76-E. The fuel flowed down the slope on the east side of the earth-mounded tank into a small drainage ditch that discharges into Sal Taylor Creek.

At the request of Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), ABB Environmental Services, Inc. (ABB-ES) completed a soil boring program from July 18 to August 27, 1991, to provide a preliminary assessment of the extent of soil and groundwater contamination at the JP-5 spill area along the banks of Sal Taylor Creek and at the seven dam and/or containment sites along Sal Taylor Creek. ABB-ES advanced a total of 411 soil borings at and between the seven containment sites and analyzed soil samples from each boring using the organic vapor analyzer (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. Results of the preliminary assessment indicated the presence of excessively contaminated soil and groundwater at the JP-5 spill area and at each of the seven containment sites.

From May 27 to June 5, 1992, ABB-ES conducted a soil boring and shallow monitoring well installation and sampling program to obtain additional data for determining the extent of soil and groundwater contamination at the JP-5 spill site and the sites along Sal Taylor Creek. ABB-ES sampled a total of 87 soil borings at the sites and analyzed the soil samples from each boring using OVA headspace techniques. Eleven shallow monitoring wells (CEF-JP5-01 through CEF-JP5-11) were installed at the JP-5 spill site. Results of the 1992 assessment were presented in the initial contamination assessment (CA) (ABB-ES, 1994).

The 1991 and 1992 soil OVA data indicated that the majority of excessively contaminated soil was concentrated primarily in a triangular-shaped area where the spill had occurred. Excessively contaminated soil was also detected along the north and east banks of the drainage ditch that flows into Sal Taylor Creek and in the wooded area adjacent to the spill area.

To verify the 1991 and 1992 soil OVA data and assess the extent of subsurface soil contamination, 37 additional soil borings (93A-1 through 93A-37) were sampled at the JP-5 spill site in 1993.

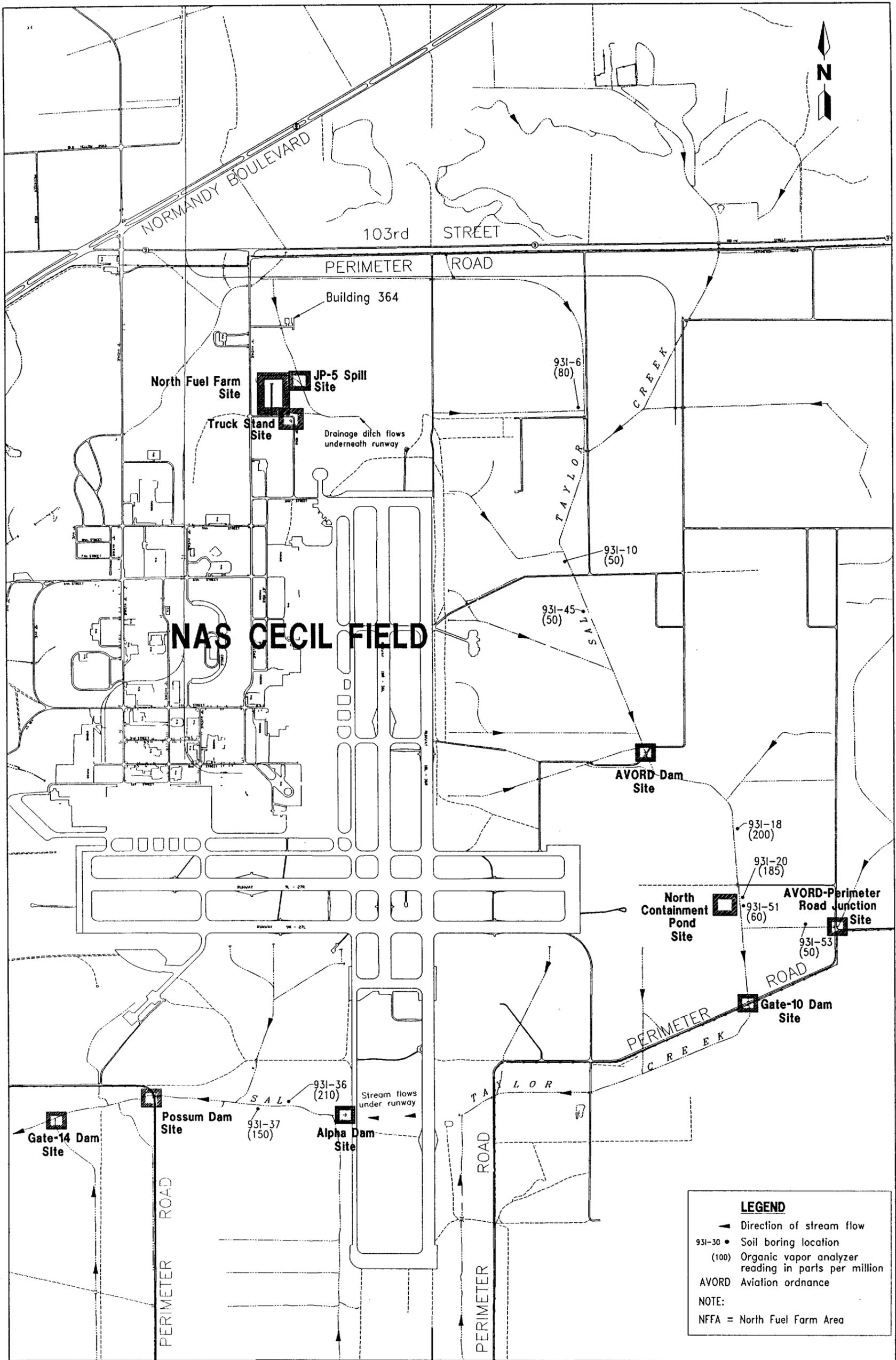
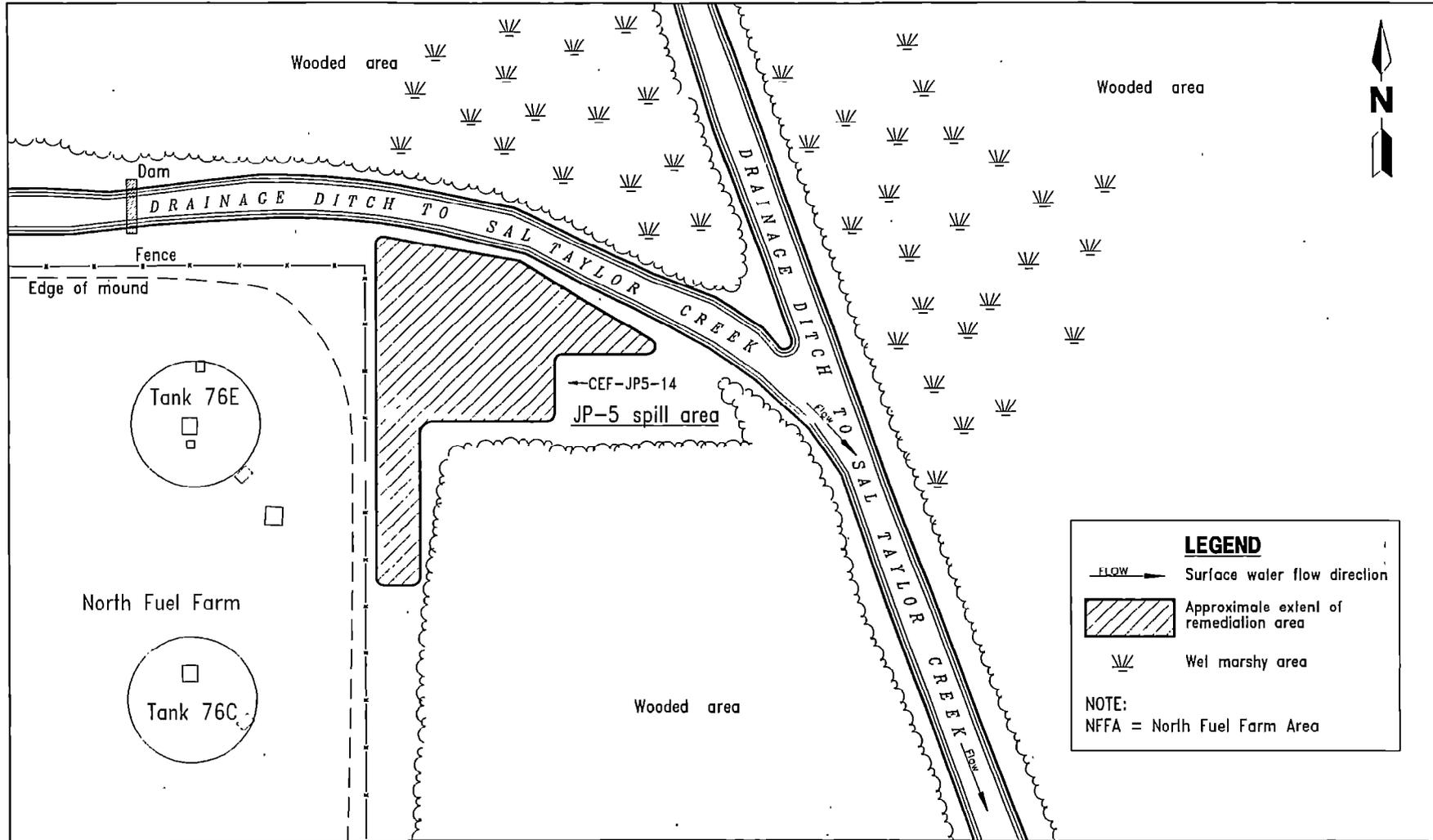


FIGURE 1-1
LOCATION MAP OF JP-5 SPILL SITE,
AND SAL TAYLOR CREEK SITES

0 800 1600
 SCALE: 1 INCH = 1600 FEET



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LEGEND

— FLOW — Surface water flow direction

Approximate extent of remediation area

Wet marshy area

NOTE:
NFFA = North Fuel Farm Area

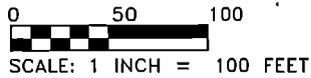


FIGURE 1-2
JP-5 SPILL AREA
SITE MAP



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Results of the 1993 soil OVA data indicate excessively contaminated soil was primarily concentrated in the spill area; however, the concentrations were generally less than those detected during the 1991 investigation.

In October and November 1993, soil samples were collected from 54 borings spaced at 500-foot intervals along the bank of Sal Taylor Creek to assess the extent of excessively contaminated soil. Excessively contaminated soil was detected in 9 borings along the Sal Taylor Creek bank.

To further assess the extent of groundwater contamination, ABB-ES field personnel returned to the JP-5 fuel spill area in February 1994, and installed five additional shallow monitoring wells and one double-cased deep monitoring well.

In July 1994, a CAR presenting the results, conclusions, and recommendations of the 1991 through 1994 field investigation for the JP-5 fuel spill area was submitted to the Florida Department of Environmental Protection (FDEP) for review. After reviewing the CAR, FDEP requested additional soil borings be advanced around the perimeter of the NFF spill area and groundwater samples be collected from selected monitoring wells to further delineate the extent of soil and groundwater contamination at the JP-5 spill area. In addition, the FDEP requested that the sites along the banks of Sal Taylor Creek, which had OVA readings equal to or greater than 50 parts per million (ppm) on an OVA, be properly delineated in accordance with Chapter 62-770, Florida Administrative Code [FAC], guidelines.

In accordance with Chapter 62-770, FAC, free product recovery was initiated in April 1994 by NAS Cecil Field personnel. Free product is currently being recovered using a Teflon^R bailer on a weekly basis. Free product was detected in monitoring wells CEF-076-04 and CEF-JP5-11 on March 7, 1994, with thicknesses of 1.36 feet and 0.03 foot, respectively, and 0.07 foot and 0.03 foot, respectively, on March 15 and 16, 1994. Monitoring well CEF-JP5-11 contained 0.02 foot of free product on August 14, 1995. However, no free product was detected in monitoring well CEF-076-04. No free product has been detected in any of the other site monitoring wells.

From September 1995 through January 1996, an initial remedial action was conducted by Bechtel Environmental, Inc., to remove excessively contaminated soil from the JP-5 spill site. Approximately 2,750 cubic yards of petroleum-contaminated soil were removed from the site and taken to a thermal desorption unit near Site 3 at Cecil Field for treatment. Clean fill sand was used as backfill to bring the excavation to grade.

ABB-ES was authorized by SOUTHNAVFACENCOM to conduct a supplemental assessment and develop an addendum to the July 1994 CAR for the JP-5 spill site and the nine sites along the banks of Sal Taylor Creek. The supplemental assessment at the JP-5 spill site and the nine sites along the banks of Sal Taylor Creek were conducted between March and September 1995. Results and conclusions based on the supplemental assessment and recommendations for the JP-5 spill site and the nine Sal Taylor Creek bank sites are presented in this CARA.

1.1 PURPOSE. The purpose of this CARA is to present the results, conclusions, and recommendations of the supplemental assessment conducted in 1995 for the JP-5 spill site and nine Sal Taylor Creek bank sites. FDEP comments concerning the

JP-5 spill site CAR and the Sal Taylor Creek bank sites were addressed during this supplemental assessment and are discussed in this report.

1.2 SCOPE AND RATIONALE. The scope and rationale of the supplemental assessment conducted at the JP-5 spill site and Sal Taylor Creek bank sites included:

- installation of one double-cased deep monitoring well at the JP-5 spill site to further assess the vertical extent of groundwater contamination;
- advancement of soil borings and collection of soil samples for OVA headspace analysis to assess the extent of soil contamination;
- collection of groundwater samples from selected monitoring wells at the JP-5 spill site for laboratory analysis using U.S. Environmental Protection Agency (USEPA) Methods 602, 610, 418.1, and 239.2; and
- collection of five soil samples for laboratory analysis at the JP-5 spill site using USEPA Methods 8010A/8020, 8310, 418.1, 8010, and 7421 to verify if excessive soil contamination previously detected using an OVA at the JP-5 spill site exceeded Chapter 62-775, FAC target levels for clean soil.

2.0 FIELD METHODOLOGY

All field methodologies used during the supplemental assessment were in conformance with the ABB-ES, FDEP-approved, June 1994 Comprehensive Quality Assurance Plan. Appendix C in the North Fuel Farm Area CAR (ABB-ES, 1994) describes all investigative methodologies and procedures that were employed during the supplemental assessment.

2.1 SOIL BORING AND ORGANIC VAPOR ANALYZER SCREENING.

2.1.1 JP-5 Spill Site To further assess the extent of soil contamination at the JP-5 spill site, 21 soil borings (95A-38 through 95A-58) were advanced to the top of the water table (approximately 0.5 to 1.5 feet below land surface [bls]) on March 23, 24, and 27, 1995 using a hand auger. Soil samples from soil borings 95A-47 through 95A-58 were collected from land surface to 0.5 foot bls. Soil samples from soil borings 95A-38 through 95A-46 were collected at 1 foot bls and at 1.5 feet bls where the water table was encountered. Soil samples from each boring were screened for organic vapors using an OVA in accordance with Chapter 62-770.200(2), FAC, guidelines. The OVA data from these borings and previous OVA data obtained during the initial CA were used to assess the horizontal and vertical extent of soil contamination. The locations of soil borings advanced in 1993, 1994, and during the 1995 supplemental investigation are shown on Figure 2-1. Soil sample OVA headspace results are discussed in Subsection 3.1.1.

2.1.2 Sal Taylor Creek Bank Sites. To further assess the extent of soil contamination at the nine Sal Taylor Creek Bank Sites, 52 soil borings were advanced to the water table using a hand auger. Soil samples were collected from each boring at 0 to 1 foot bls and every other foot thereafter to the top of the water table (approximately 2 to 5 feet bls). Soil samples were screened in the field for organic vapors using an OVA in accordance with Chapter 62-770.200(2), FAC, guidelines. No soil borings were advanced to delineate the extent of excessively contaminated soil at soil boring location 93i-50 because it had an OVA value of 4 ppm, well below the 50 ppm excessively contaminated soil standard.

2.2 SOIL SAMPLING. Surface soil samples were collected at the JP-5 spill site north and east of the drainage ditch that flows into Sal Taylor Creek. Each soil sample was analyzed for kerosene analytical group constituents as described in Chapter 62-770, FAC.

2.2.1 JP-5 Spill Site Five surface soil samples (CEF-JP5-SD1 through CEF-JP5-SD5) were collected on September 5, 1995, at or near the drainage ditch that discharges into Sal Taylor Creek (Figure 2-1). Soil samples were collected to verify if contaminated soil was present where excessively contaminated soil was previously detected using an OVA. All surface soil samples were shipped to Quanterra Laboratories in Tampa, Florida, for analysis. Surface soil samples were analyzed for Chapter 62-770, FAC, kerosene analytical group, which includes USEPA Methods 8010A/8020 (volatile organic aromatics [VOA]), USEPA Method 8310 (polynuclear aromatic hydrocarbons [PAHs]), USEPA Method 418.1 (total recoverable petroleum hydrocarbons [TRPHs]), USEPA Method 8010 (volatile organic halocarbons [VOHs]), and USEPA Method 7421 (lead [Pb]).

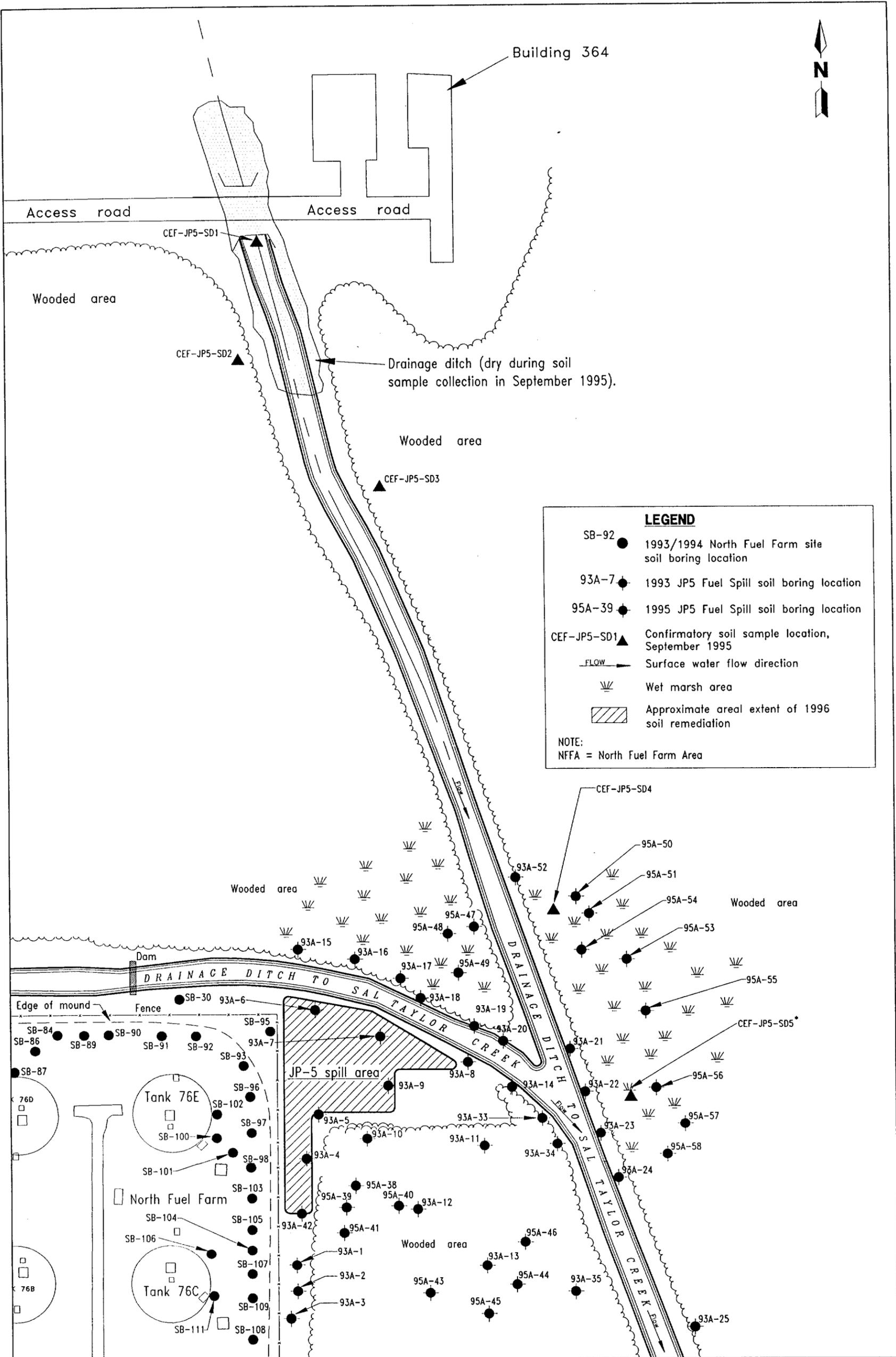


FIGURE 2-1
SOIL BORING AND SOIL SAMPLE
LOCATION MAP, 1993, 1994, AND 1995

0 50 100
SCALE: 1 INCH = 100 FEET



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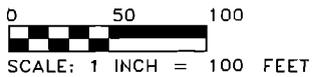
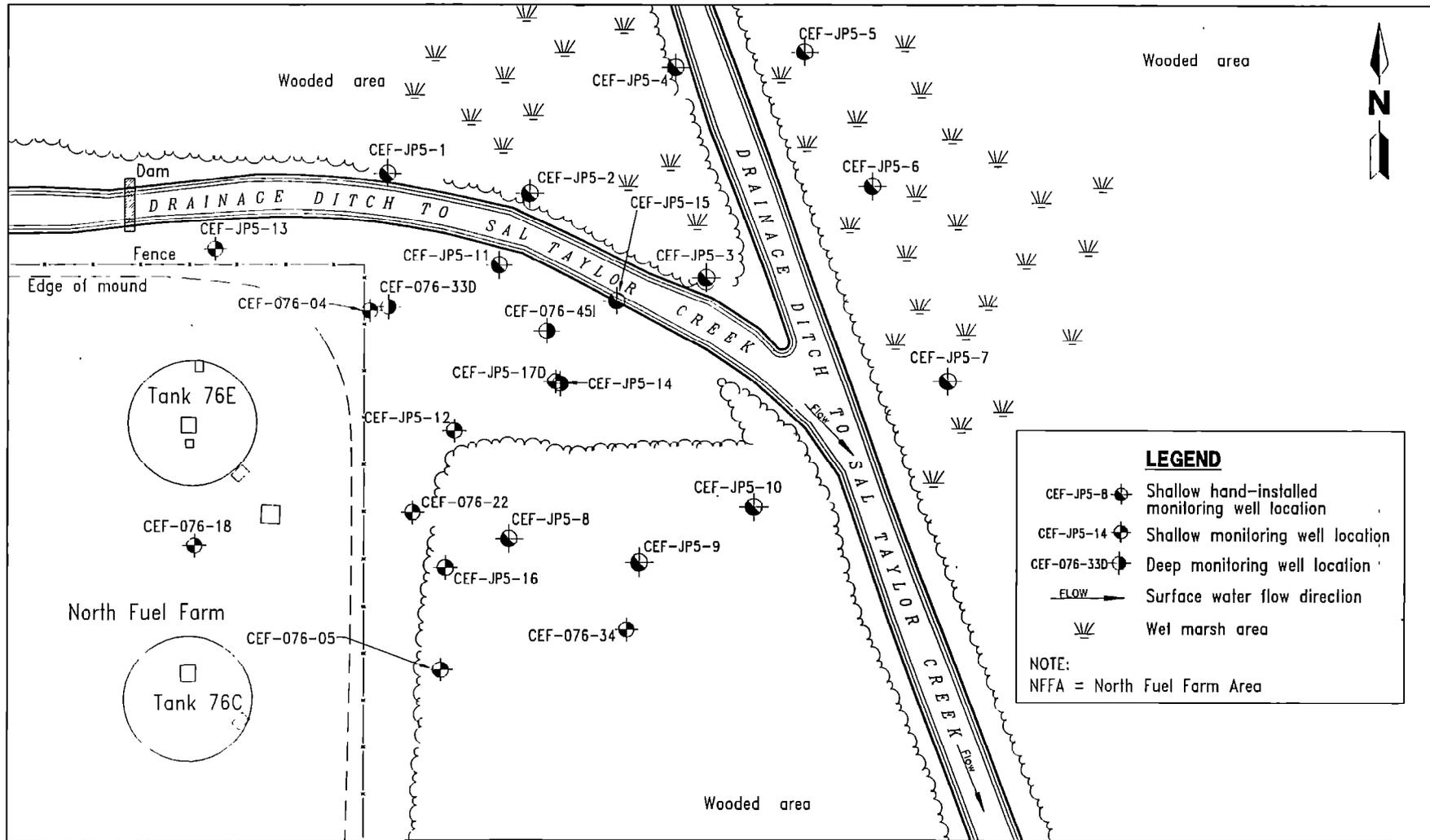
2.3 MONITORING WELL INSTALLATION PROGRAM. ABB-ES field personnel supervised the drilling and installation of one double-cased groundwater monitoring well (CEF-076-45I) at the JP-5 spill site. The monitoring well was installed to assess the vertical extent of petroleum contamination in the groundwater at the NFF and, the JP-5 spill site. CEF-076-45I was installed in the spill area in the northeast corner of the North Fuel Farm (Figure 2-2).

Deep monitoring well CEF-076-45I was installed by using mud rotary drilling techniques to advance a 12-inch borehole to a depth of 60 feet bls and setting 6-inch polyvinyl chloride (PVC) surface casing into the borehole. The annular space surrounding the surface casing was filled with a cement grout to land surface. A 5 7/8-inch mud rotary borehole was advanced inside the surface casing to a depth of 10 feet below the bottom of the surface casing, and the monitoring well was set inside the 6-inch surface casing to a total depth of 70 feet bls.

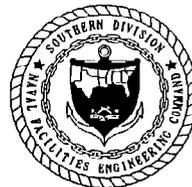
The deep monitoring well is constructed of 2-inch, Schedule 40, PVC riser with 5 feet of 2-inch, Schedule 40, PVC screen set between 65 and 70 feet bls. The screen has 0.010-inch slot openings. The annular space around the well screen consists of a filter pack of 20/30 grade sand that extends from the base of the well screen to approximately 2 feet above the top of the screen. The seal consists of 2 feet of fine sand (30/65 grade) placed directly on top of the filter pack. The remainder of the annular space was filled with a neat cement grout to land surface. The location of all the JP-5 spill site monitoring wells including well CEF-076-45I are shown on Figure 2-2. The lithologic log for monitoring well CEF-076-45I is presented in Appendix A, Monitoring Well Lithologic Log.

2.4 GROUNDWATER SAMPLING PROGRAM. Groundwater samples were collected from 4 monitoring wells (CEF-076-04, CEF-JP5-12, CEF-JP5-14, and CEF-JP5-15). Two monitoring wells, CEF-076-33D and CEF-JP5-11, were requested by the FDEP for sampling, but could not be sampled because monitoring well CEF-076-33D was damaged and monitoring well CEF-JP5-11 contained free product. All four groundwater samples were collected on August 8 and 9, 1995, and analyzed for Chapter 62-770, FAC, kerosene analytical group constituents, which include USEPA Methods 602 (VOA including methyl tert-butyl ether [MTBE], 601 (chlorinated hydrocarbons), 610 (PAH), 418.1 (TRPH), and dissolved lead (Pb). Ethylene dibromide (EDB), which is part of the kerosene analytical group, was not requested by FDEP for laboratory analysis. A groundwater sample was also collected from monitoring well CEF-076-45I on July 11, 1995, and analyzed for all kerosene analytical group constituents except lead.

2.5 MONITORING WELL ELEVATION SURVEY. A monitoring well elevation survey was conducted at the JP-5 spill site by a Florida-registered land surveyor. The horizontal and vertical survey control was referenced into a benchmark located on a concrete wall in the northeast corner of the intersection of "A" Avenue and Loop Road. The horizontal datum is referenced to the North American Datum 1983-90 Florida State Plan Coordinate System Zone East, and the vertical datum is based on the National Geodetic Vertical Datum of 1929. Elevation and water level data for all monitoring wells were measured on the north side of the well casing.



**FIGURE 2-2
MONITORING WELL
LOCATION MAP**



**CONTAMINATION ASSESSMENT
REPORT ADDENDUM,
NFFA, JP-5 SPILL SITE, AND
SAL TAYLOR CREEK BANK SITES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

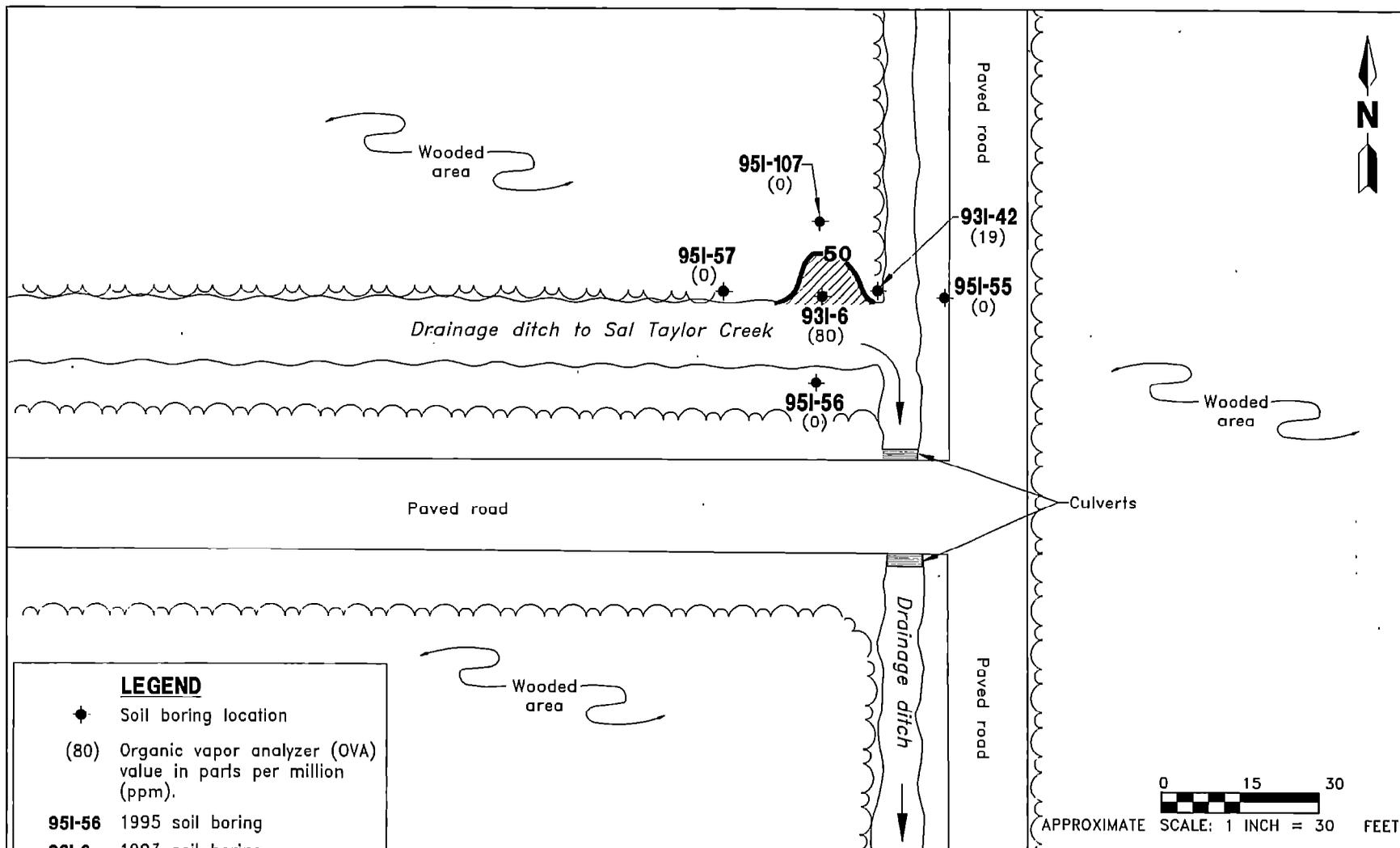
3.0 SUPPLEMENTAL ASSESSMENT RESULTS

3.1 SOIL ASSESSMENT RESULTS.

3.1.1 JP-5 Spill Site Excessively contaminated soil (greater than 50 ppm on an OVA) was not detected at the JP-5 spill site during the supplemental assessment. However, water-saturated soil samples 95A-47, 95A-48, 95A-50, 95A-53, 95A-55, 95A-56, 95A-57, and 95A-58 collected on the east side of the drainage ditch that flows into Sal Taylor Creek had OVA concentrations greater than 50 ppm, but could not be classified as excessively contaminated soil (per FDEP guidelines) due to the saturated conditions. Saturated conditions further east of these sample locations precluded the collection of unsaturated soil samples for delineating the extent of excessively contaminated soil. In an effort to quantify soil contamination in the saturated area, five confirmatory soil samples were collected, two east of the drainage ditch and three north of the JP-5 spill site where the fuel released February 10, 1991, backed up in the drainage ditch to the access road, near Building 364 (Figure 3-1). Results of the surface soil samples are discussed in Subsection 3.2.1. Petroleum-contaminated soil, which is defined by the FDEP as greater than 10 ppm on an OVA (FDEP, 1994), was detected in soil boring 95A-39. Soil boring 95A-39 had an OVA concentration of 44 ppm from 0 to 1 foot bls. To delineate the extent of soil contamination around soil boring 95A-39, soil borings 95A-40, 95A-41, and 95A-42 were advanced east, south, and west of soil boring 95A-39. No soil contamination was detected in any of the three soil borings except soil boring 95A-41. Soil boring 95A-41 had an OVA reading of 1 ppm from 0 to 1 foot bls. Supplemental soil borings 95A-38 through 95A-58 advanced during this phase of the CA are shown in Figure 3-1. Soil . this sample OVA results are presented in Table 3-1.

3.1.2 Sal Taylor Creek Bank Sites In response to FDEPs request to further assess the extent of excessively contaminated soil along the banks of Sal Taylor Creek, 52 soil borings (95I-55 through 95I-107) were advanced and sampled for OVA headspace from March 28 through April 10, 1995, in accordance with Chapter 62-770.200(2), FAC, guidelines. These supplemental soil borings were advanced to delineate the extent of excessively contaminated soil detected using an OVA during the initial CA in October and November, 1993, at soil boring locations 93I-6, 93I-10, 93I-18, 93I-20, 93I-36, 93I-37, 93I-45, 93I-51, and 93I-53 (Figure 1-1). Soil OVA screening data collected during this supplemental CA are summarized in Table 3-2. The following is a description of supplemental soil borings (95I-55 through 95I-107) advanced along the banks of Sal Taylor Creek at locations where OVA readings were equal to or greater than 50 ppm during the initial CA:

- Soil boring location 93I-6: No soil contamination was detected in any of the four soil borings advanced during this field investigation to assess the extent of soil contamination at 93I-6. The locations of the four supplemental soil borings (95I-55 through 95I-57 and 95I-107) and soil sample OVA readings are shown on Figure 3-2.
- Soil boring location 93I-10: Excessively contaminated soil was detected at 3 foot bls in soil borings 95I-58, 95I-62, and 95I-63. Soil boring 95I-58 had an OVA reading of 300 ppm, soil boring 95I-62 had an OVA reading of 200 ppm, and soil boring 95I-63 had an OVA



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- ◆ Soil boring location
- (80) Organic vapor analyzer (OVA) value in parts per million (ppm).
- 951-56 1995 soil boring
- 931-6 1993 soil boring
- 50 OVA isoconcentration line (50 ppm)
- ~~~~~ Treeline

NOTE:
NFFA = North Fuel Farm Area

FIGURE 3-2
SOIL CONTAMINATION DISTRIBUTION MAP,
SITE 931-6, MARCH 1995



CONTAMINATION ASSESSMENT
REPORT ADDENDUM
NFFA, JP-5 SPILL SITE, AND
SAL TAYLOR CREEK BANK SITES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

**Table 3-1
Supplemental Soil Sample Organic Vapor Analyzer (OVA) Results,
JP-5 Spill Site, March 23, 24, and 27, 1995**

Contamination Assessment Report Addendum
North Fuel Farm Area JP-5 Spill Site And Sal Taylor Creek Bank Sites
Naval Air Station Cecil Field
Jacksonville, Florida

Soil Boring Number	Depth (feet)	Year Sampled	Unfiltered Concentration (ppm)	Filtered Concentration (ppm)	Actual Concentration (ppm)
95A-38	0-1	1995	3	0	3
	1-1.5 (wet)	1995	0	0	0
95A-39	0-1	1995	44	0	44
	1-1.5 (wet)	1995	13	0	13
95A-40	0-1	1995	0	0	0
	1-1.5 (wet)	1995	0	0	0
95A-41	0-1	1995	1	0	1
	1-1.5 (wet)	1995	0	0	0
95A-42	0-1	1995	0	0	0
	1-1.5 (wet)	1995	0	0	0
95A-43	0-1	1995	5	0	5
	1-2 (wet)	1995	6	0	6
95A-44	0-1	1995	3	0	3
	1-1.5 (wet)	1995	15	0	15
95A-45	0-1	1995	2	0	2
	1-1.5 (wet)	1995	2	0	2
95A-46	0-1	1995	2	0	2
	1-1.5 (wet)	1995	5	0	5
95A-47	0-0.5 (wet)	1995	475	27	448
	0.5-1 (wet)	1995	2,800	65	2,735
95A-48	0-0.5 (wet)	1995	40	0	40
	0.5-1 (wet)	1995	70	0	70
95A-49	0-0.5	1995	12	5	7
	0.5-1 (wet)	1995	0	0	0
95A-50	0-0.5 (wet)	1995	70	0	70
95A-51	0-0.5 (wet)	1995	45	0	45
95A-52	0-0.5 (wet)	1995	20	0	20
95A-53	0-0.5 (wet)	1995	160	0	160
95A-54	0-0.5 (wet)	1995	40	0	40
95A-55	0-0.5 (wet)	1995	100	0	100
95A-56	0-0.5 (wet)	1995	1,300	300	1,000
95A-57	0-0.5 (wet)	1995	700	130	570
95A-58	0-0.5 (wet)	1995	800	24	776

Note: ppm = parts per million.

Table 3-2
Supplemental Soil Sample Organic Vapor Analyzer (OVA) Results,
Sal Taylor Creek Bank Sites, March 28 through April 10, 1995

Contamination Assessment Report Addendum
 North Fuel Farm Area JP-5 Spill Site And Sal Taylor Creek Bank Sites
 Naval Air Station Cecil Field
 Jacksonville, Florida

Boring Number	Depth (feet)	OVA Unfiltered Concentration (ppm)	OVA Filtered Concentrations (ppm)	OVA Actual Concentrations (ppm)	Boring Number	Depth (feet)	OVA Unfiltered Concentration (ppm)	OVA Filtered Concentrations (ppm)	OVA Actual Concentrations (ppm)
95I - 55	0-1	0	0	0	95I - 64	0-1	0	0	0
	3	0	0	0		3	0	0	0
	5 (wet)	0	0	0		4 (wet)	1,000	0	1,000
95I - 56	0-1	0	0	0	95I - 65	0-1	0	0	0
	3	0	0	0		3	0	0	0
	5 (wet)	0	0	0		4 (wet)	3,500	330	3,170
95I - 57	0-1	0	0	0	95I - 66	0-1	0	0	0
	3 (wet)	0	0	0		3	3	0	3
						4-5 (wet)	350	0	350
95I - 58	0-1	0	0	0	95I - 67	0-1	5	0	5
	3	300	0	300		3	0	0	0
	4 (wet)	2,000	0	2,000		4 (wet)	0	0	0
95I - 59	0-1	0	0	0	95I - 68	0-1	0	0	0
	3	0	0	0		3	0	0	0
	4 (wet)	0	0	0		4 (wet)	0	0	0
95I - 60	0-1	0	0	0	95I - 69	0-1	1	0	1
	3	0	0	0		3	0	0	0
	4-5 (wet)	3	0	3		4 (wet)	0	0	0
95I - 61	0-1	0	0	0	95I - 70	0-1	3	0	3
	3	0	0	0		3	0	0	0
	4-5 (wet)	460	0	460		4-5 (wet)	0	0	0
95I - 62	0-1	0	0	0	95I - 71	0-1	4	0	4
	3	200	0	200		3	0	0	0
	4-5 (wet)	700	0	700		4-5 (wet)	0	0	0
95I - 63	0-1	0	0	0	95I - 72	0-1	0	0	0
	3	170	0	170		3 (wet)	100	0	100
	4 (wet)	850	0	850		5 (wet)	10	0	10

See notes at end of table.

Table 3-2 (Continued)
Supplemental Soil Sample Organic Vapor Analyzer (OVA) Results,
Sal Taylor Creek Bank Sites, March 28 through April 10, 1995

Contamination Assessment Report Addendum
North Fuel Farm Area JP-5 Spill Site And Sal Taylor Creek Bank Sites
Naval Air Station Cecil Field
Jacksonville, Florida

Boring Number	Depth (feet)	OVA Unfiltered Concentration (ppm)	OVA Filtered Concentrations (ppm)	OVA Actual Concentrations (ppm)	Boring Number	Depth (feet)	OVA Unfiltered Concentration (ppm)	OVA Filtered Concentrations (ppm)	OVA Actual Concentrations (ppm)
95I - 73	0-1	0	0	0	95I - 82	0-1	7	1	6
	3	3	0	3		3	0	0	0
	5 (wet)	8	6	2		4 (wet)	0	0	0
95I - 74	0-1	0	0	0	95I - 83	0-1	0	0	0
	3	0	0	0		3	3	0	3
	4-5 (wet)	2	0	2		4-5 (wet)	12	0	12
95I - 75	0-1	2	0	2	95I - 84	0-1	2	0	2
	3	0	0	0		3	4	0	4
	5 (wet)	1	0	1		5 (wet)	12	0	12
95I - 76	0-1	10	0	10	95I - 85	0-1	5	0	5
	3	22	0	22		3	8	0	8
	5 (wet)	1	0	1		4 (wet)	2	0	2
95I - 77	0-1	9	0	9	95I - 86	0-1	6	0	6
	3	0	0	0		3	460	0	460
	5 (wet)	4	0	4		4 (wet)	50	0	50
95I - 78	0-1	0	0	0	95I - 87	0-1	3	0	3
	3	0	0	0		3	45	0	45
	5 (wet)	24	0	24		5 (wet)	800	0	800
95I - 79	0-1	0	0	0	95I - 88	0-0.5	3	0	3
	3	0	0	0		1 (water)			
	5 (wet)	12	0	12					
95I - 80	0-1	0	0	0	95I - 89	0-0.5	3	0	3
	3	0	0	0		1 (wet)	3	0	3
	5 (wet)	3	0	3					
95I - 81	0-1	1	0	1	95I - 90	0-1	2	0	2
	3	1	0	1		2 (wet)	9	0	9
	5 (wet)	60	0	60					

See notes at end of table.

Table 3-2 (Continued)
Supplemental Soil Sample Organic Vapor Analyzer (OVA) Results,
Sal Taylor Creek Bank Sites, March 28 through April 10, 1995

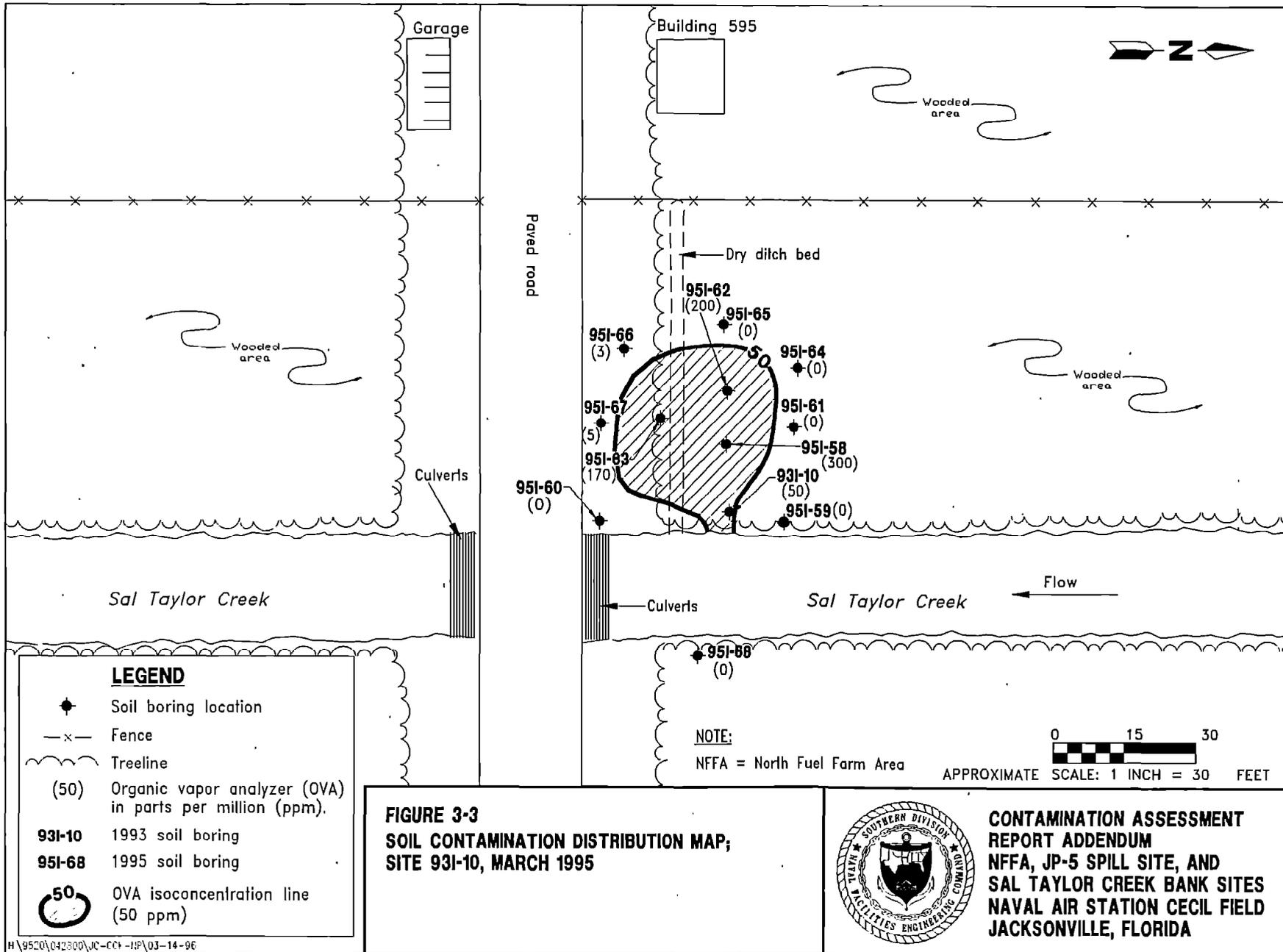
Contamination Assessment Report Addendum
 North Fuel Farm Area JP-5 Spill Site And Sal Taylor Creek Bank Sites
 Naval Air Station Cecil Field
 Jacksonville, Florida

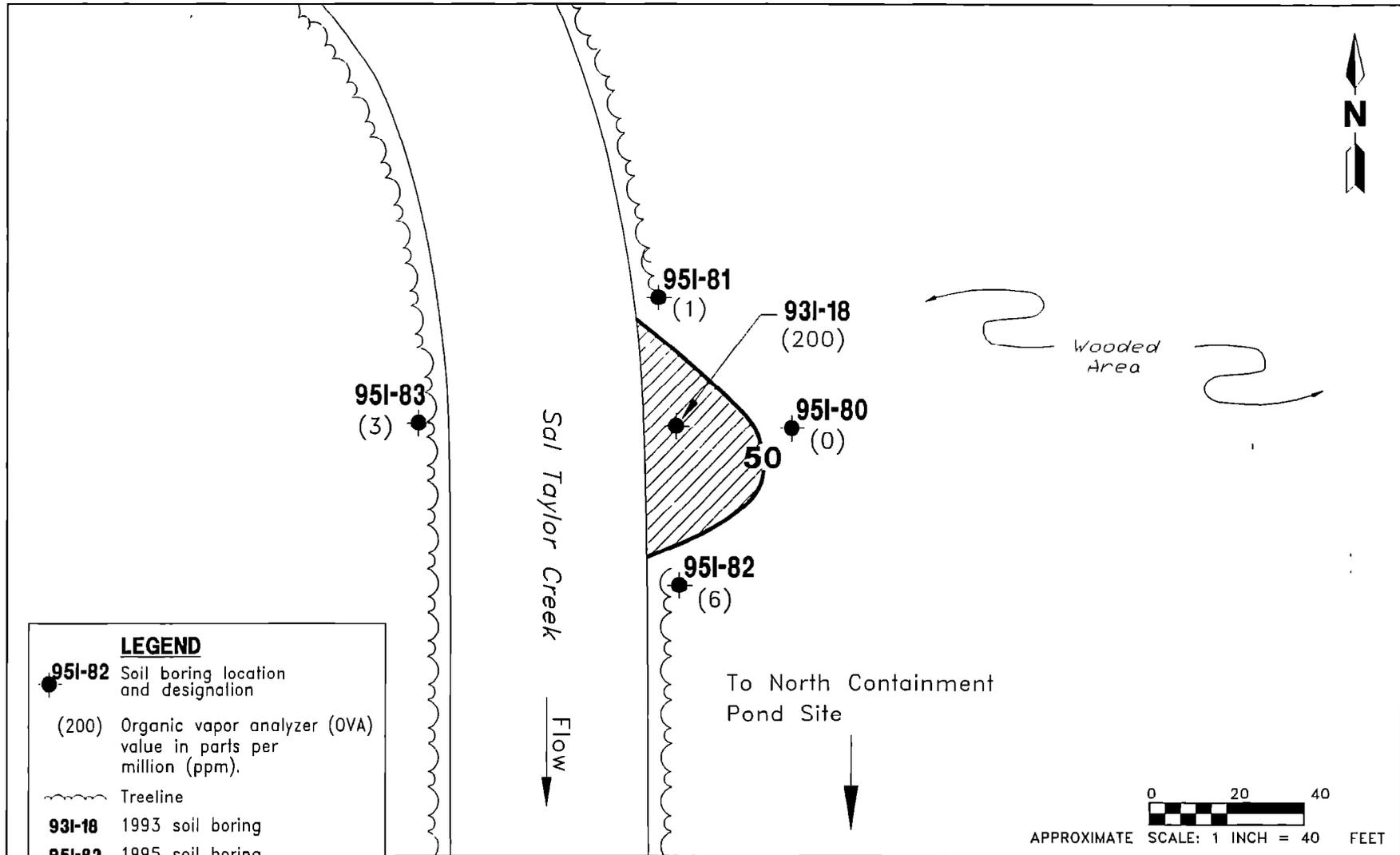
Boring Number	Depth (feet)	OVA Unfiltered Concentration (ppm)	OVA Filtered Concentrations (ppm)	OVA Actual Concentrations (ppm)	Boring Number	Depth (feet)	OVA Unfiltered Concentration (ppm)	OVA Filtered Concentrations (ppm)	OVA Actual Concentrations (ppm)
95I - 91	0-1	1	0	1	95I - 100	0-1	4	0	4
	2 (wet)	2	0	2		3 (wet)	0	0	0
95I - 92	0-1	2	0	2	95I - 101	1	1	0	1
	2 (wet)	17	0	17		3 (wet)	1	0	1
95I - 93	0-1	0	0	0	95I - 102	1	4	0	4
	3	0	0	0		3 (wet)	1	0	1
	4-5 (wet)	0	0	0					
95I - 94	0-1	0	0	0	95I - 103	1	6	0	6
	3	7	0	7		3 (wet)	0	0	0
	5 (wet)	8	0	8					
95I - 95	0-1	0	0	0	95I - 104	0-1	50	0	50
	3	0	0	0		3 (wet)	1	0	1
	4' (wet)	0	0	0					
95I - 96	1	0	0	0	95I - 105	0-1	0	0	0
	2 (wet)	55	0	55		3 (wet)	3	0	3
95I - 97	1	0	0	0	95I - 106	0-1	1	0	1
	3 (wet)	0	0	0		3 (wet)	2	0	2
95I - 98	1	28	0	28	95I - 107	0-1	0	0	0
	1.5 (wet)	95	0	95		3	0	0	0
						5 (wet)	0	0	0
95I - 99	0-1	0	0	0					
	2 (wet)	7	0	7					

Notes: ppm = parts per million.

reading of 170 ppm. To delineate the extent of excessively contaminated soil detected in these three soil borings and 93I-10, soil borings 95I-59, 95I-60, 95I-61, 95I-64, 95I-65, 95I-66, and 95I-67 were advanced approximately 20 to 25 feet radially away from and around soil borings 95I-10, 95I-58, 95I-62, and 95I-63 until the extent of soil contamination was assessed. Soil boring 95I-68 was advanced east of Sal Taylor Creek. No soil contamination was detected in any of these soil borings except soil boring 95I-66, which had an OVA reading of 3 ppm at 3 feet bls. The locations of the 11 supplemental soil borings (95I-58 through 95I-68) and soil sample OVA readings are shown on Figure 3-3.

- Soil boring location 93I-18: No soil contamination was detected in any of the four soil borings sampled during this field investigation to assess the extent of soil contamination at 93I-18. The locations of soil borings 95I-80 through 95I-83 and soil sample OVA readings are shown on Figure 3-4.
- Soil boring location 93I-20: Excessively contaminated soil was detected in soil boring 95I-86, which had an OVA value of 460 ppm at 3 feet bls. To assess the extent of soil contamination detected in soil borings 95I-20 and 95I-86, soil borings 95I-84, 95I-85, 95I-88, 95I-89, 95I-90, 95I-91, and 95I-92 were advanced radially outward and approximately 20 to 25 feet from soil borings 95I-20 and 95I-86. No soil contamination was detected in soil borings 95I-88 through 95I-92. OVA values ranged from 1 ppm in soil boring 95I-91 at 1 foot bls to 8 ppm in soil boring 95I-85 at 3 foot bls. Soil boring 95I-87 located on the west bank of Sal Taylor Creek, had an OVA value of 45 ppm at 3 foot bls. To assess the extent of soil contamination detected in soil boring 95I-87, soil borings 95I-93 through 95I-95 were advanced east, north, and south of soil boring 95I-87. Soil boring 95I-94 had an OVA reading of 7 ppm at 3 feet bls. No soil contamination was detected in soil borings 95I-93 or 95I-95. Locations of soil borings 95I-84 through 95I-95 and soil sample OVA readings are shown on Figure 3-5.
- Soil boring location 93I-36: No soil contamination was detected in any of the three soil borings sampled during this field investigation to assess the extent of spill contamination at 93I-36. Soil borings 95I-100 and 95I-101 had OVA readings of 4 ppm and 1 ppm at 1 foot bls, respectively. No soil contamination was detected in soil boring 95I-99. Soil boring locations were advanced approximately 20 to 25 feet from soil boring 93I-36. Soil borings 95I-99 through 95I-101 and soil sample OVA readings are shown on Figure 3-6.
- Soil boring location 93I-37: Contaminated soil less than the 50 ppm target level was detected in soil boring 95I-98, which had an OVA reading of 28 ppm at 1 foot bls. No soil contamination was detected in soil borings 95I-96 or 95I-97. Locations of soil borings 95I-96 through 95I-98 and soil sample OVA readings are shown on Figure 3-7.
- Soil boring location 93I-45: Trace amounts of soil contamination were detected in three of the four soil borings sampled during this field investigation to assess the extent of soil contamination at 93I-45.



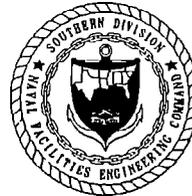


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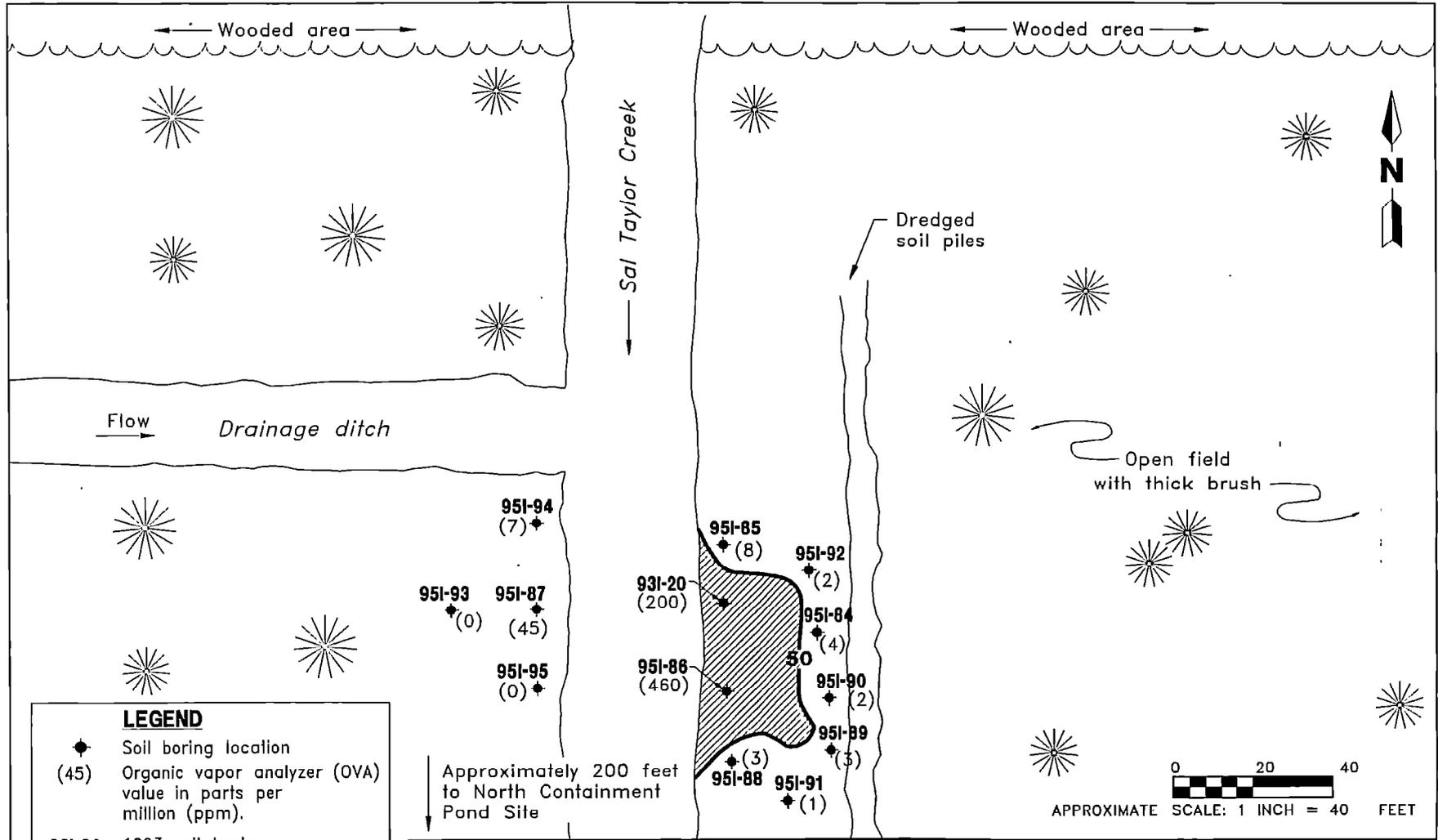
- 951-82 Soil boring location and designation
- (200) Organic vapor analyzer (OVA) value in parts per million (ppm).
- ~~~~~ Treeline
- 931-18 1993 soil boring
- 951-82 1995 soil boring
- 50 OVA isoconcentration line (50 ppm)

NOTE:
 NFFA = North Fuel Farm Area

FIGURE 3-4
SOIL CONTAMINATION DISTRIBUTION MAP,
SITE 931-18, APRIL 1995



CONTAMINATION ASSESSMENT
REPORT ADDENDUM
NFFA, JP-5 SPILL SITE, AND
SAL TAYLOR CREEK BANK SITES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA



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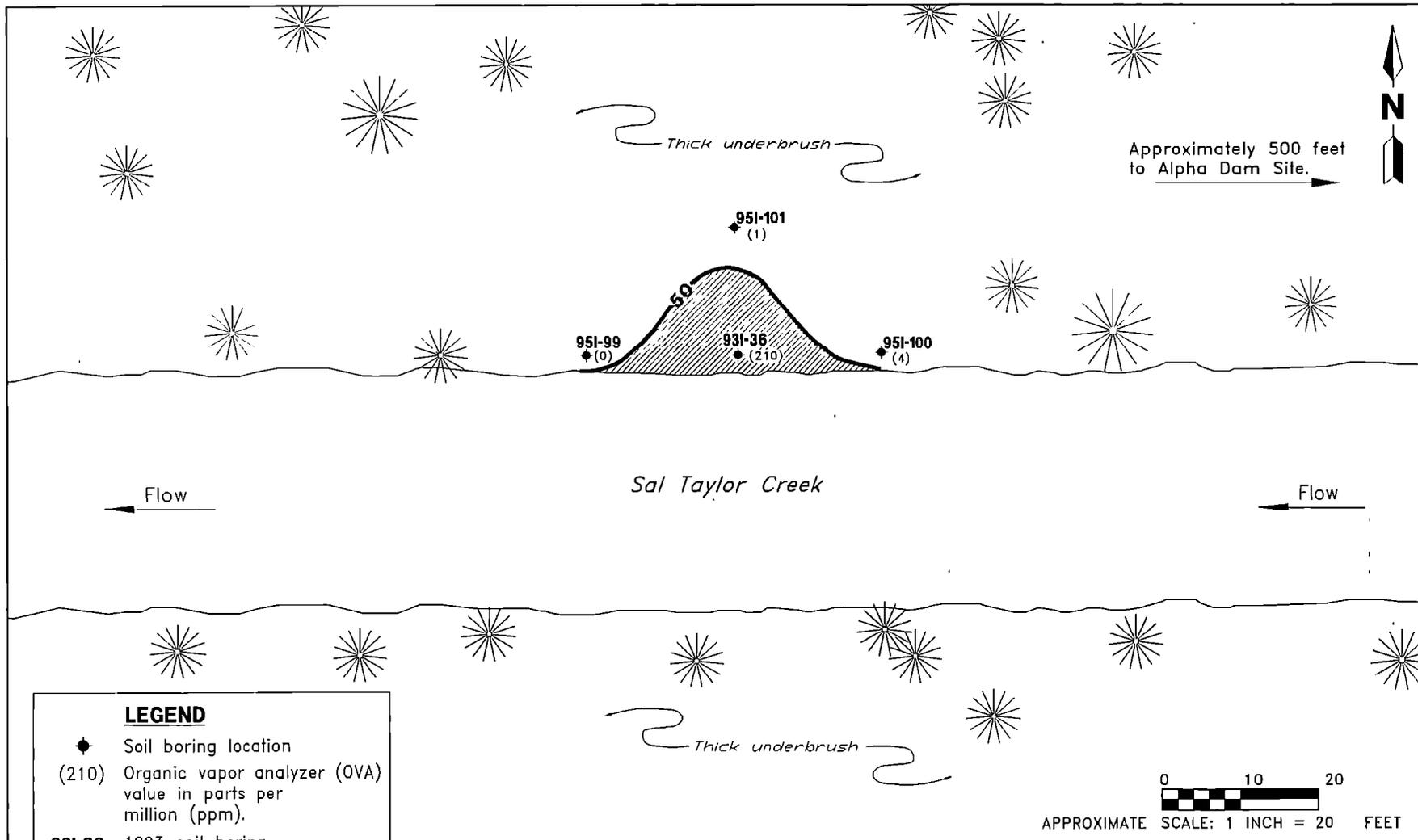
- ♦ Soil boring location
- (45) Organic vapor analyzer (OVA) value in parts per million (ppm).
- 931-20 1993 soil boring
- 951-95 1995 soil boring
- 50 OVA isoconcentration line (50 ppm)

NOTE:
NFFA = North Fuel Farm Area

FIGURE 3-5
SOIL CONTAMINATION DISTRIBUTION MAP;
SITE 931-20, APRIL 1995



CONTAMINATION ASSESSMENT
REPORT ADDENDUM
NFFA, JP-5 SPILL SITE, AND
SAL TAYLOR CREEK BANK SITES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA



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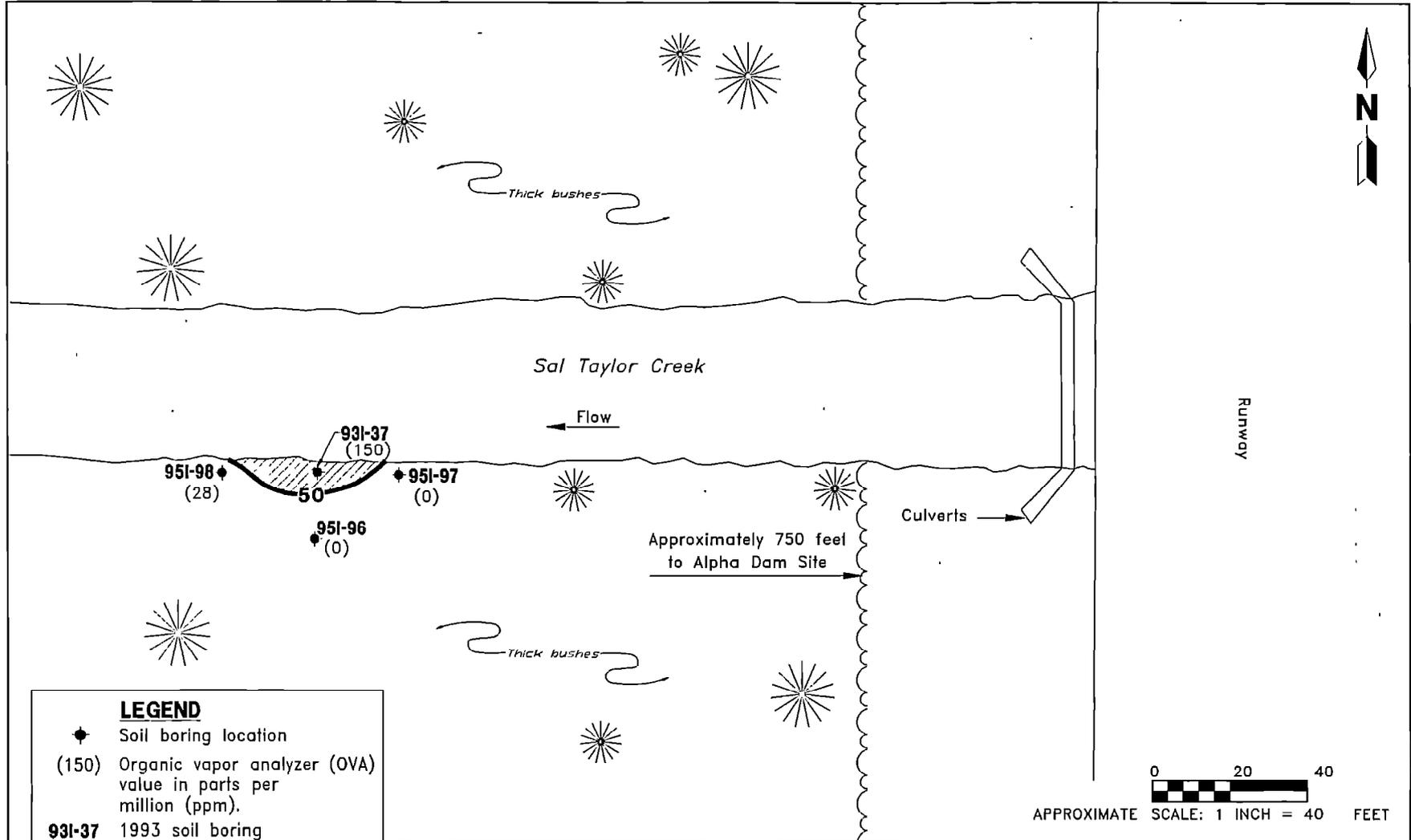
- ◆ Soil boring location
- (210) Organic vapor analyzer (OVA) value in parts per million (ppm).
- 931-36** 1993 soil boring
- 951-101** 1995 soil boring
-  OVA isoconcentration line (50 ppm)

NOTE:
NFFA = North Fuel Farm Area

FIGURE 3-6
SOIL CONTAMINATION DISTRIBUTION MAP;
SITE 931-36, APRIL 1995



CONTAMINATION ASSESSMENT
REPORT ADDENDUM
NFFA, JP-5 SPILL SITE, AND
SAL TAYLOR CREEK BANK SITES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

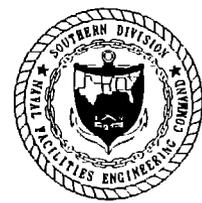


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- ◆ Soil boring location
- (150) Organic vapor analyzer (OVA) value in parts per million (ppm).
- 931-37 1993 soil boring
- 951-97 1995 soil boring
- Treeline
- 50 OVA isoconcentration line (50 ppm)

NOTE:
NFFA = North Fuel Farm Area

FIGURE 3-7
SOIL CONTAMINATION DISTRIBUTION MAP;
SITE 931-37, APRIL 1995



CONTAMINATION ASSESSMENT
REPORT ADDENDUM
NFFA, JP-5 SPILL SITE, AND
SAL TAYLOR CREEK BANK SITES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

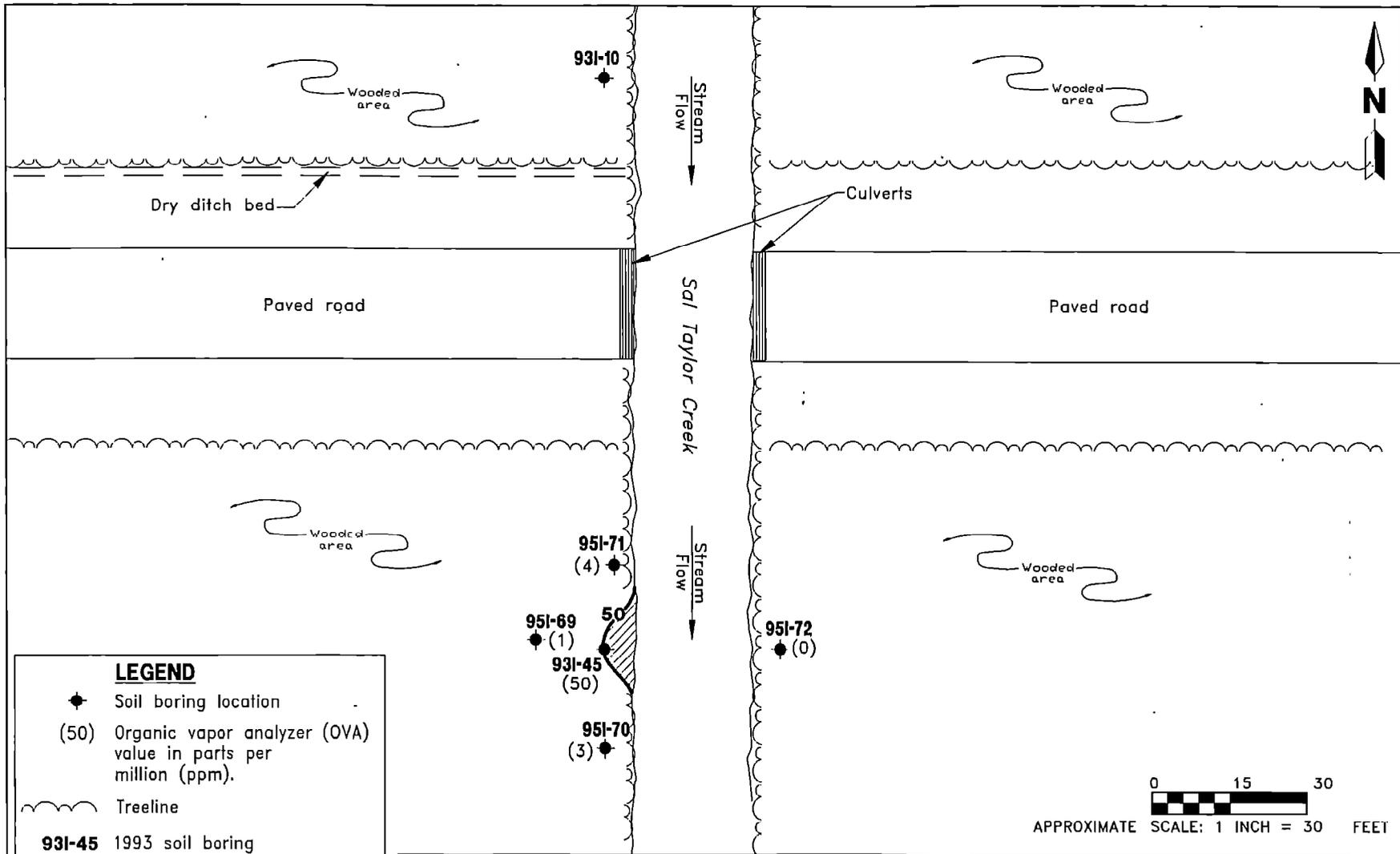
Soil borings 95I-69, 95I-70, and 95I-71 had OVA readings of 1 ppm, 3 ppm, and 4 ppm at 1 foot bls. No soil contamination was detected in soil boring 95I-72. Locations of soil borings 95I-69 through 95I-72 and soil sample OVA readings are shown on Figure 3-8.

- Soil boring location 93I-51: Excessively contaminated soil was detected in soil boring 95I-104. Soil boring 95I-104 had an OVA reading of 50 ppm at 1 foot bls. To delineate the extent of soil contamination detected in soil boring 95I-104, Soil borings 95I-102, 95I-103, 95I-105, and 95I-106 were advanced radially away from soil boring 95I-104, approximately 20 to 25 feet. Soil borings 95I-102 and 95I-106 had OVA readings of 4 ppm and 1 ppm at 1 foot bls, respectively. No soil contamination was detected in soil borings 95I-103 or 95I-105. Locations of soil borings 95I-102 through 95I-106 and soil sample OVA readings are shown on Figure 3-9.
- Soil boring location 93I-53: No excessively contaminated soil was detected in any of the soil borings (95I-73 through 95I-75) advanced in the vicinity of soil boring 93I-53 during the field investigation. Contaminated soil was detected in soil boring 95I-76 located on the north bank of Sal Taylor Creek. Soil boring 95I-76 had an OVA reading of 22 ppm at 3 feet bls. To assess soil contamination in the vicinity of soil boring 95I-76, soil borings 95I-77, 95I-78, and 95I-79 were advanced outward approximately 20 feet from 95I-76. Soil boring 95I-77 had an OVA reading of 9 ppm at 0 to 1 foot bls. No soil contamination was detected in soil borings 95I-78 or 95I-79. Locations of soil borings 95I-73 through 95I-79 and soil sample OVA readings are shown on Figure 3-10.

3.2 CONFIRMATORY SOIL SAMPLE RESULTS.

3.2.1 JP-5 Spill Site Results of the kerosene analytical group analysis of the five soil samples (CEF-JP5-SD1 through CEF-JP5-SD5) are summarized in Table 3-3. TRPH and lead were the only constituents detected. TRPH and lead were detected in all five soil samples with the exception of soil sample CEF-JP5-SD2. TRPH concentrations ranged from 25 ppm (sample CEF-JP5-SD3) to 130 ppm (sample CEF-JP5-SD1). Lead concentrations ranged from 1.1 ppm (sample CEF-JP5-SD5) to 6.6 ppm (samples CEF-JP5-SD2 and CEF-JP5-SD3). All TRPH and lead concentrations in the soil samples were below the state regulatory standards (TRPH of 50 ppm and lead concentration of 108 ppm) with the exception of soil samples CEF-JP5-SD1 (130 ppm) and CEF-JP5-SD4 (64 ppm). Figure 3-1 shows the contaminant concentrations for the 1995 soil samples. The complete set of laboratory analytical results of the five confirmatory soil samples is presented in Appendix C, Soil Sample Analytical Results.

3.3 GROUNDWATER ASSESSMENT RESULTS. Figure 3-11 shows the distribution of all contaminants detected in site monitoring wells from 1994 and the four monitoring wells that were sampled at the request of the FDEP on August 8 and 9, 1995. Groundwater contamination at the JP-5 spill site extends from NFF Tank 76E to the drainage ditch and encompasses the spill area. Figures 3-12, 3-13, and 3-14 show the extent of contamination for benzene, total VOAs, and total naphthalenes, respectively, based on the groundwater analytical data collected in 1994 and



LEGEND

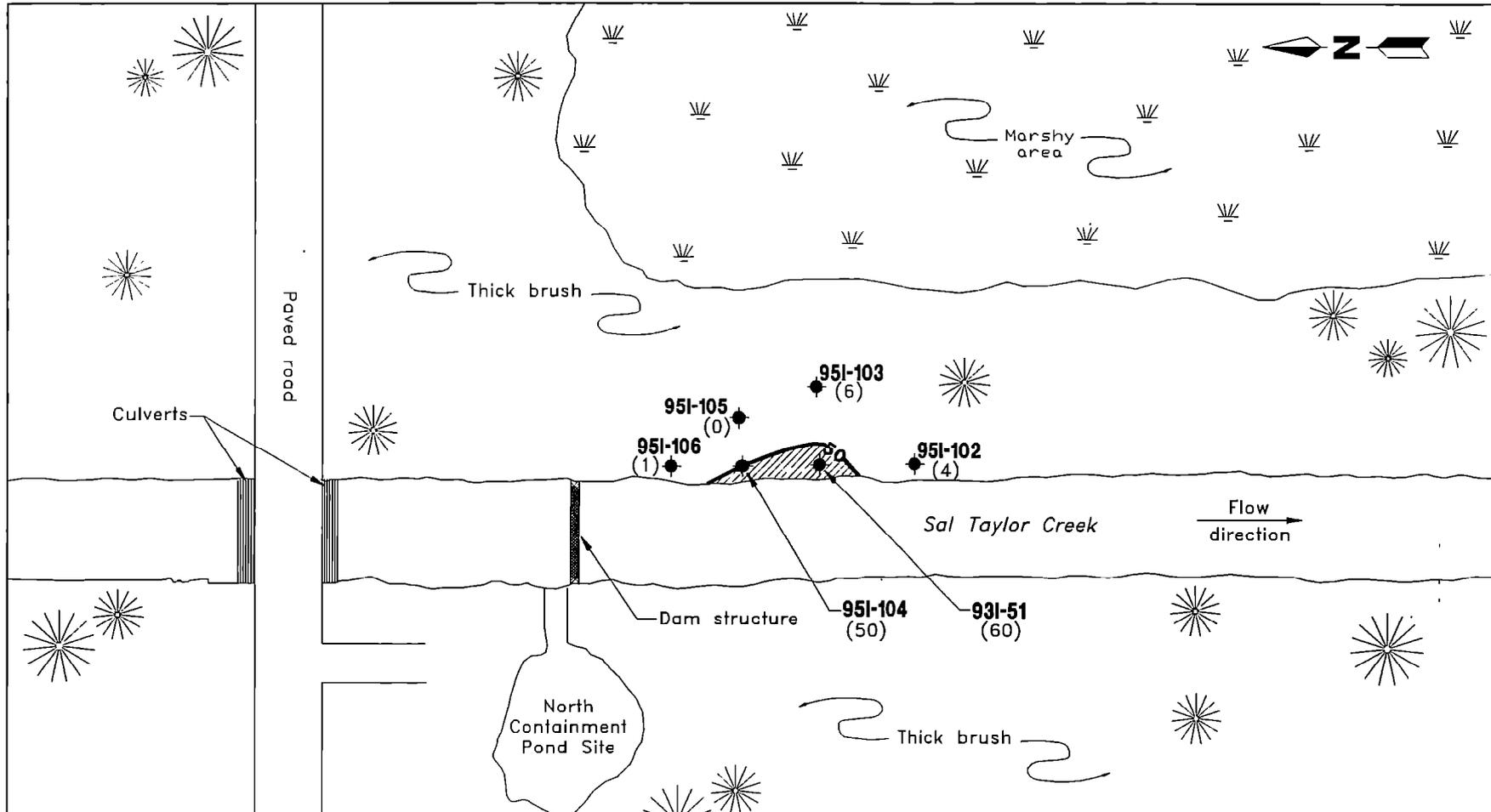
- ◆ Soil boring location
- (50) Organic vapor analyzer (OVA) value in parts per million (ppm).
- ~~~~~ Treeline
- 931-45** 1993 soil boring
- 951-70** 1995 soil boring
- 50** OVA isoconcentration line (50 ppm)

NOTE:
 NFFA = North Fuel Farm Area

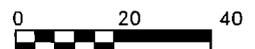
FIGURE 3-8
SOIL CONTAMINATION DISTRIBUTION MAP;
SITE 931-45, MARCH 1995



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Flow direction



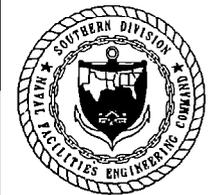
APPROXIMATE SCALE: 1 INCH = 40 FEET

LEGEND

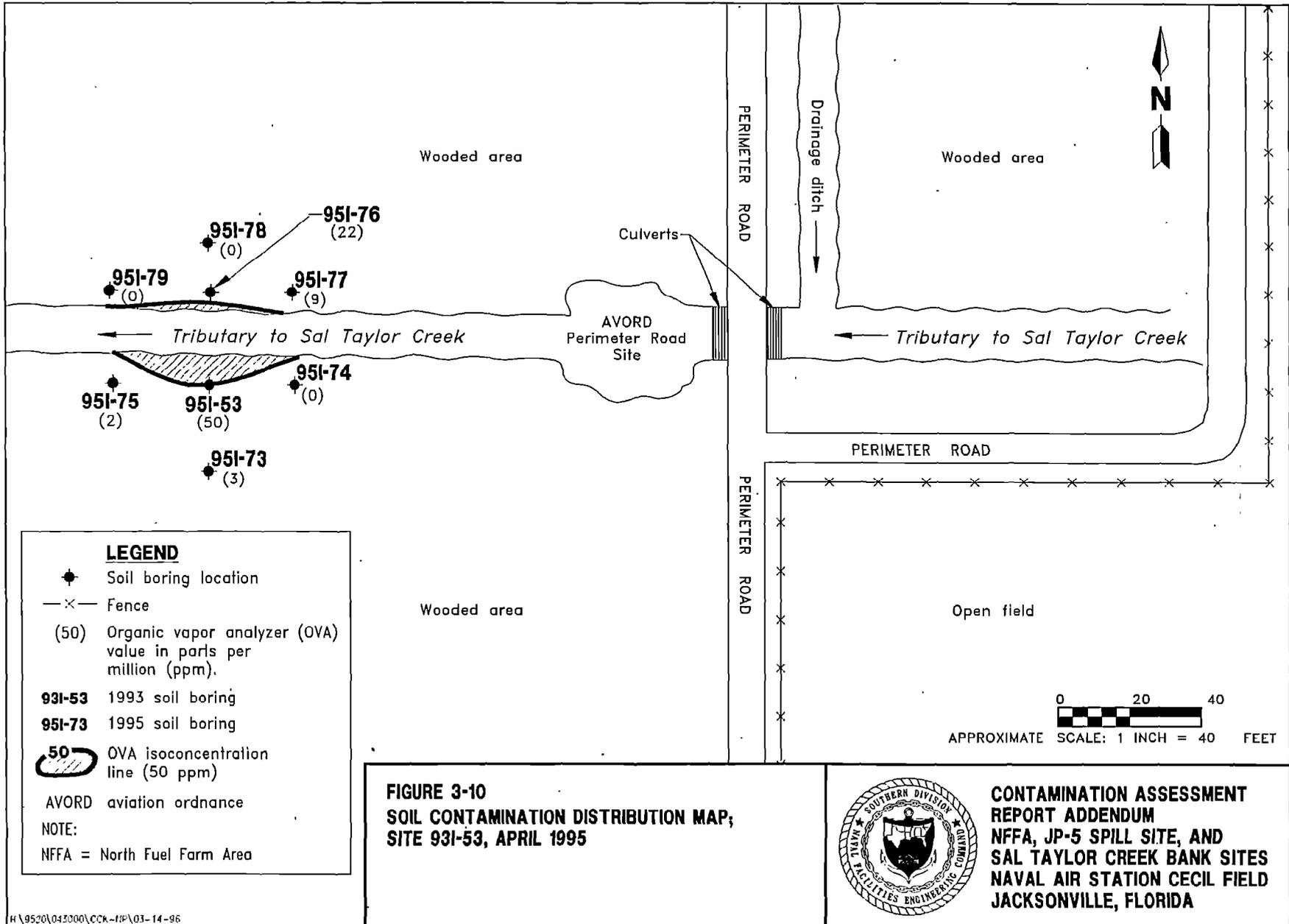
- ◆ Soil boring location
- (60) Organic vapor analyzer (OVA) value in parts per million (ppm).
- 951-103 1995 soil boring
- 931-51 1993 soil boring
- 50 OVA isoconcentration line (50 ppm)

NOTE:
NFFA = North Fuel Farm Area

FIGURE 3-9
SOIL CONTAMINATION DISTRIBUTION MAP,
SITE 931-51, APRIL 1995



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**Table 3-3
Summary of Soil Surface Sample Analytical Results,
JP-5 Spill Site, September 5, 1995**

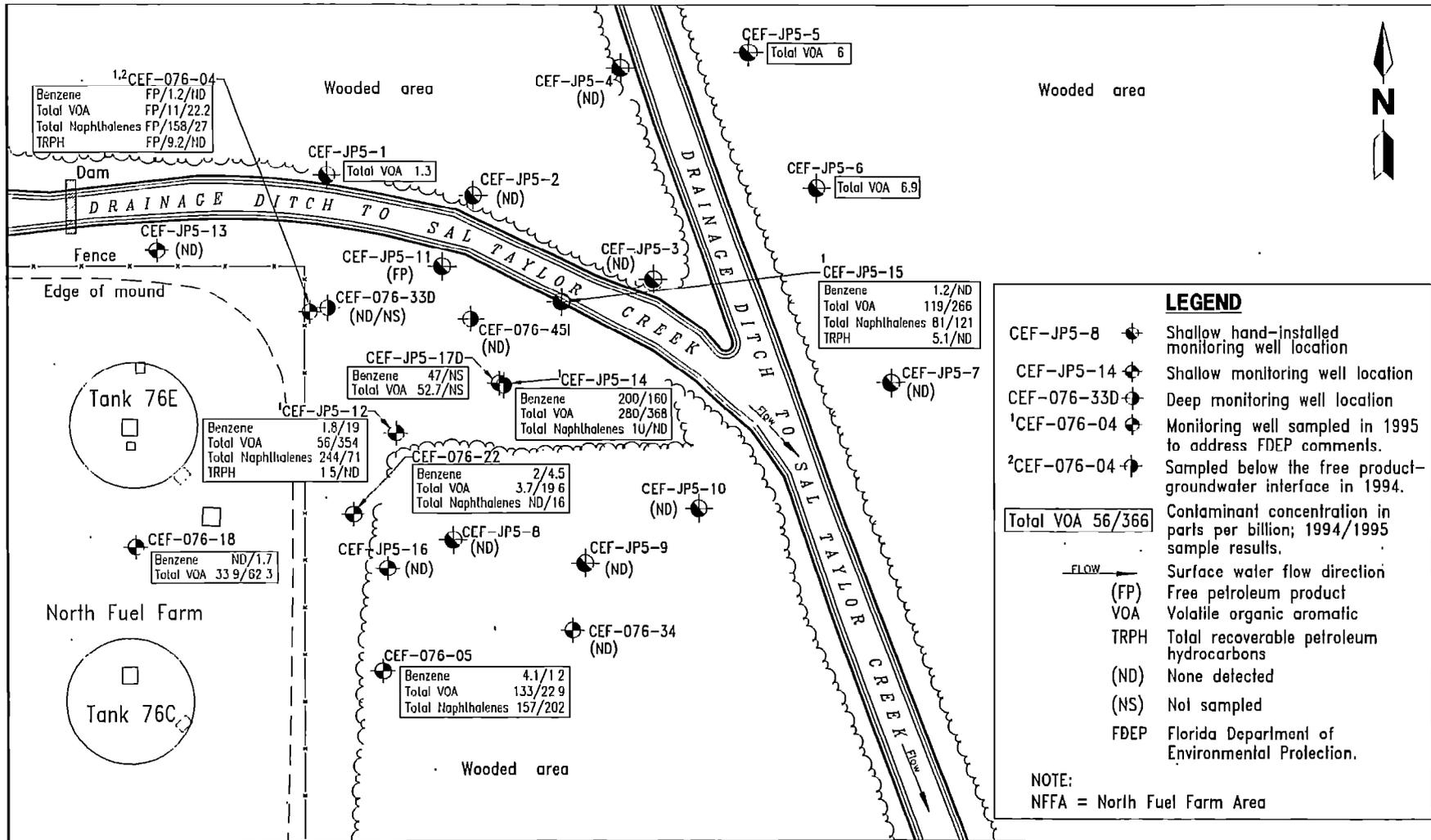
Contamination Assessment Report Addendum
North Fuel Farm Area JP-5 Spill Site And Sal Taylor Creek Bank Sites
Naval Air Station Cecil Field
Jacksonville, Florida

Contaminant	Location Identification, CEF-JP-5-					Regulatory Cleanup Standards for Soil Chapter 62-775.400, FAC ²
	SD-1	SD-2	SD-3	SD-4	¹ SD-5	
<u>Volatile Organic Aromatics (VOAs) (USEPA Method 8010A/8020), ppb</u>						
Benzene	ND	ND	ND	ND	ND/ND	
Ethylbenzene	ND	ND	ND	ND	ND/ND	
Toluene	ND	ND	ND	ND	ND/ND	
Xylenes	ND	ND	ND	ND	ND/ND	
Methyl tert	ND	ND	ND	ND	ND/ND	
Butyl ether	ND	ND	ND	ND	ND/ND	
Total VOAs	ND	ND	ND	ND	ND/ND	100 ppb/NA
<u>Polynuclear Aromatic Hydrocarbons (PAHs) (USEPA Method 6310), ppb</u>						
1-methylnaphthalene	ND	ND	ND	ND	ND/ND	
2-methylnaphthalene	ND	ND	ND	ND	ND/ND	
Naphthalene	ND	ND	ND	ND	ND/ND	
Total Naphthalenes	ND	ND	ND	ND	ND/ND	NA/1 ppm
<u>Total Recoverable Petroleum Hydrocarbons (TRPHs) (USEPA Method 418.1), ppm</u>						
TRPH	130	ND	25	64	29/42	10 ppm/50 ppm
<u>Volatile Organic Halocarbons (VOHs) (USEPA Method 8010), ppm</u>						
EDB	ND	ND	ND	ND	ND/ND	NA/50 ppb
<u>Metals (USEPA Method 7421), ppm</u>						
Lead	4.4	6.6	6.6	3.9	1.1/6.1	108 ppm

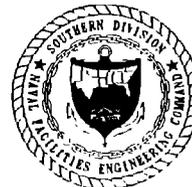
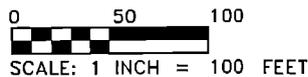
¹ Duplicate sample taken from CEF-JP5-SD5.

² TRPH shall not exceed 10 ppm or TRPH shall not exceed 50 PPM provided total PAH does not exceed 1 ppm and total volatile organic halocarbons does not exceed 50 ppb.

Notes: FAC = Florida Administrative Code.
USEPA = U.S. Environmental Protection Agency.
ppb = parts per billion.
ND = none detected.
Total VOAs = sum of benzene, ethylbenzene, toluene, and xylenes.
NA = not applicable.
Total Naphthalenes = sum of 1-methylnaphthalene, 2-methylnaphthalene and naphthalene.
ppm = parts per million.
EDB = ethylene dibromide.



**FIGURE 3-11
GROUNDWATER CONTAMINATION
DISTRIBUTION MAP, 1994 AND 1995**



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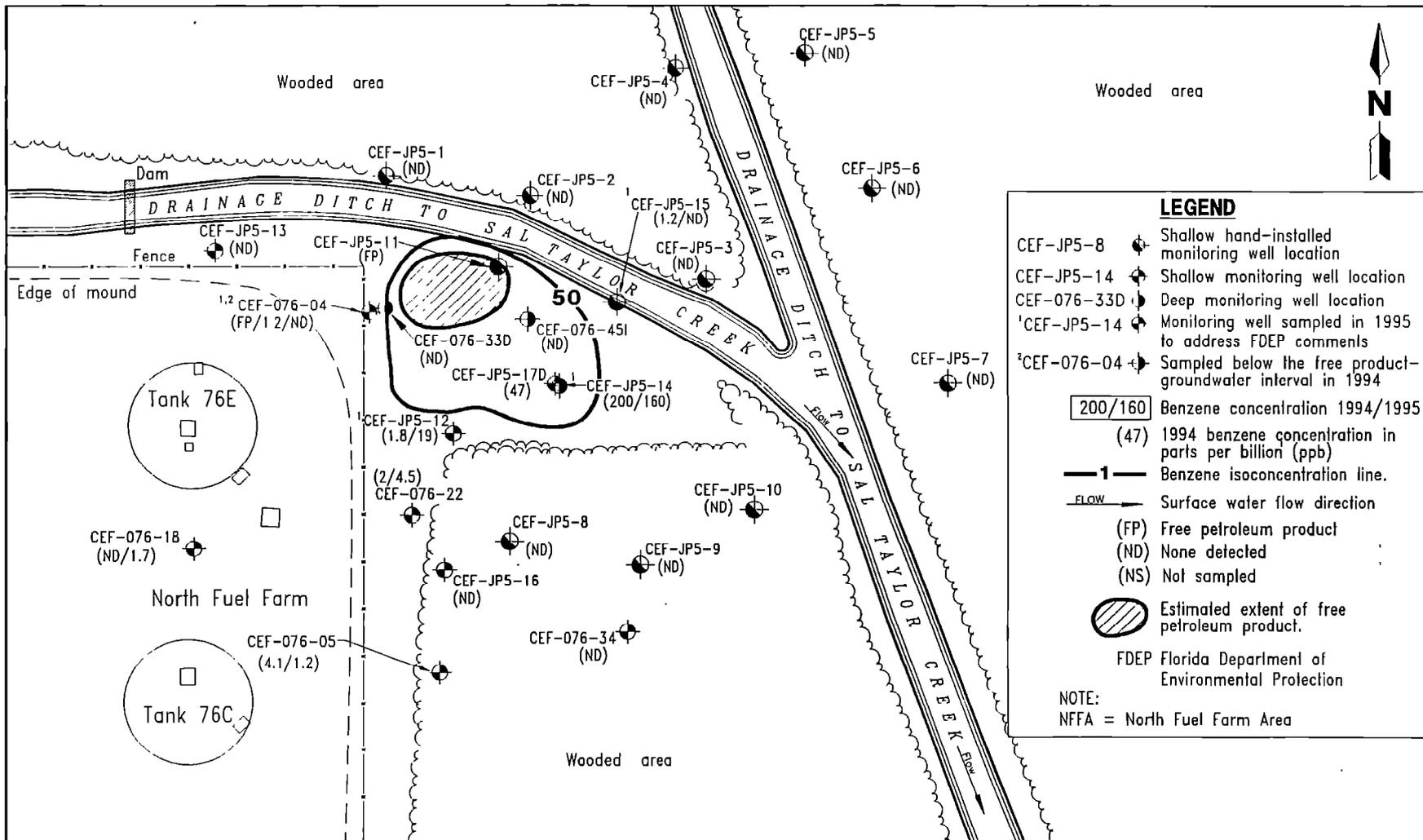
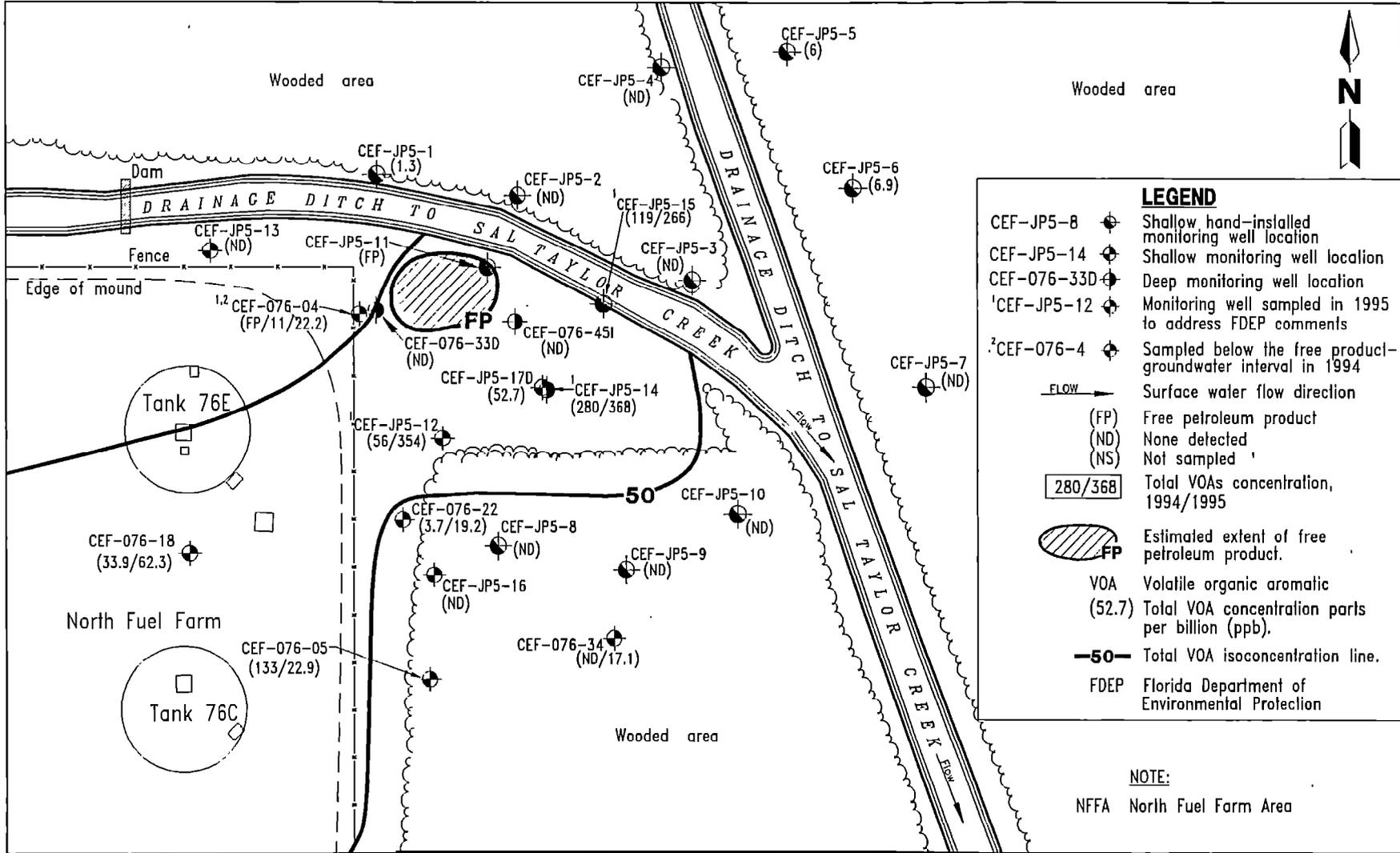


FIGURE 3-12
BENZENE CONTAMINATION DISTRIBUTION MAP,
1994 AND 1995

0 50 100
SCALE: 1 INCH = 100 FEET



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LEGEND

- CEF-JP5-8 Shallow hand-installed monitoring well location
- CEF-JP5-14 Shallow monitoring well location
- CEF-076-33D Deep monitoring well location
- ¹CEF-JP5-12 Monitoring well sampled in 1995 to address FDEP comments
- ²CEF-076-4 Sampled below the free product-groundwater interval in 1994
- FLOW → Surface water flow direction
- (FP) Free petroleum product
- (ND) None detected
- (NS) Not sampled
- 280/368 Total VOAs concentration, 1994/1995
- FP Estimated extent of free petroleum product.
- VOA Volatile organic aromatic
- (52.7) Total VOA concentration parts per billion (ppb).
- 50- Total VOA isoconcentration line.
- FDEP Florida Department of Environmental Protection

NOTE:
NFFA North Fuel Farm Area

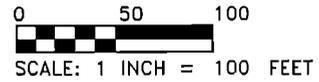
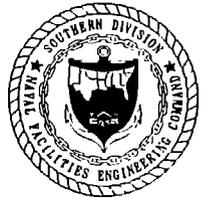
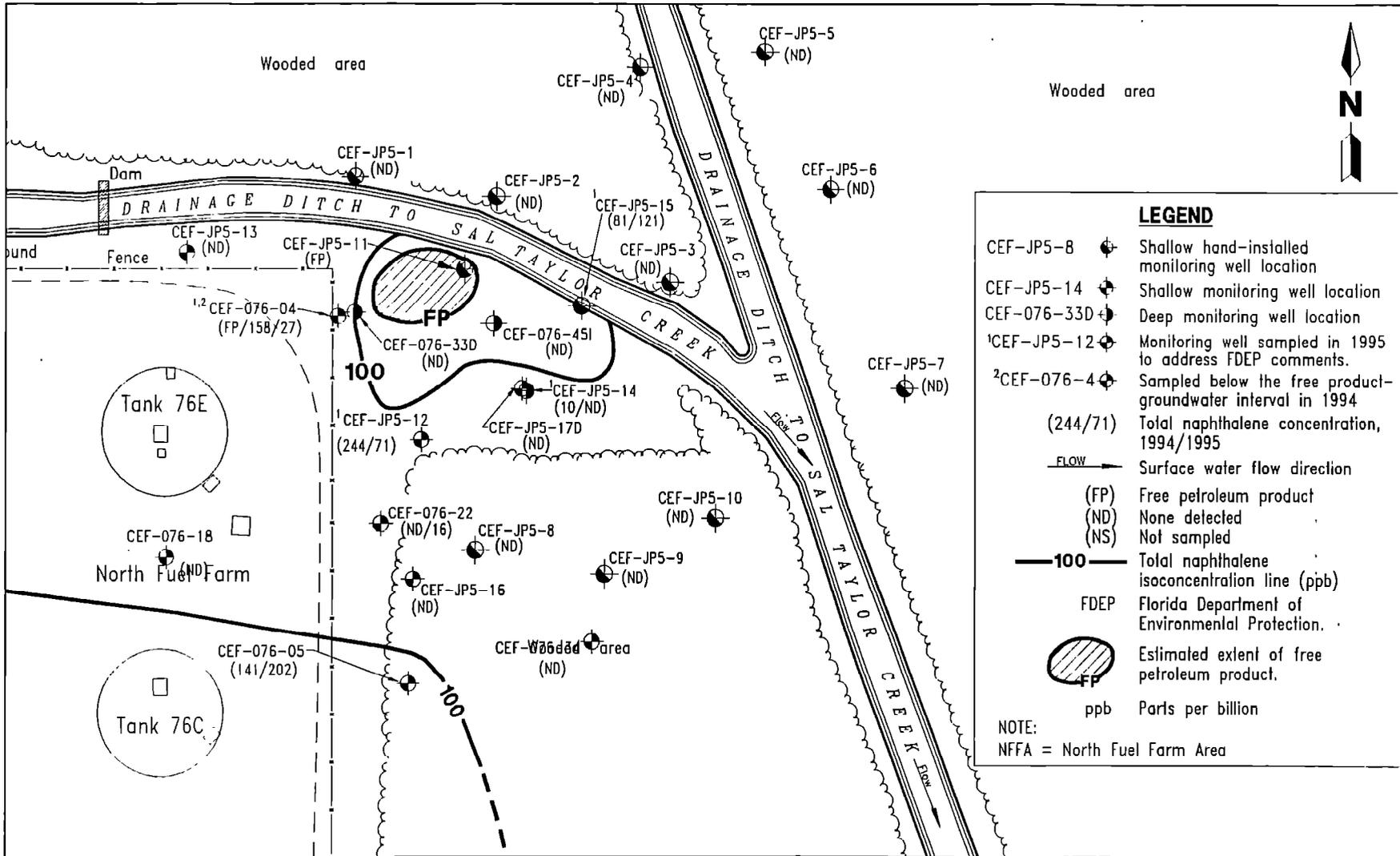


FIGURE 3-13
TOTAL VOLATILE ORGANIC AROMATICS
CONTAMINATION DISTRIBUTION MAP,
1994 AND 1995



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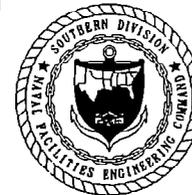
LEGEND

- CEP-JP5-8 Shallow hand-installed monitoring well location
- CEP-JP5-14 Shallow monitoring well location
- CEP-076-33D Deep monitoring well location
- ¹CEP-JP5-12 Monitoring well sampled in 1995 to address FDEP comments.
- ²CEP-076-4 Sampled below the free product-groundwater interval in 1994 (244/71)
- Total naphthalene concentration, 1994/1995
- Surface water flow direction
- (FP) Free petroleum product
- (ND) None detected
- (NS) Not sampled
- Total naphthalene isoconcentration line (ppb)
- FDEP Florida Department of Environmental Protection.
- Estimated extent of free petroleum product.
- ppb Parts per billion

NOTE:
NFFA = North Fuel Farm Area

FIGURE 3-14
TOTAL NAPHTHALENE CONTAMINATION
DISTRIBUTION MAP, 1994 AND 1995

0 50 100
SCALE: 1 INCH = 100 FEET



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1995. Compounds detected in groundwater samples from 1994 and 1995 are summarized in Table 3-4. The 1995 supplemental groundwater analytical data are presented in Appendix D of this report.

Groundwater contaminants detected during the supplemental assessment include benzene, ethylbenzene, toluene, xylenes, and MTBE. PAHs detected include naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene (total naphthalenes). Monitoring wells CEF-JP5-12, CEF-JP5-14, and CEF-JP5-15 had VOA concentrations of 354 parts per billion (ppb), 368 ppb, and 266 ppb, respectively.

Groundwater samples from monitoring wells CEF-JP5-12 and CEF-JP5-14 contained benzene concentrations of 19 ppb and 160 ppb, respectively. Total naphthalenes concentrations in groundwater samples from monitoring wells CEF-076-04, CEF-JP5-12, and CEF-JP5-15 were 27 ppb, 71 ppb, and 121 ppb, respectively. The lead concentrations detected in the groundwater samples from monitoring well CEF-JP5-15 was 10.8 ppb. TRPH was not detected in any of the groundwater samples. EDB, which is part of the kerosene analytical group, was not requested for analysis by the FDEP.

The state target level of 1 ppb for benzene was exceeded in monitoring wells CEF-JP5-12 and CEF-JP5-14. The state target level of 50 ppb for total VOAs was exceeded in monitoring wells CEF-JP5-12, CEF-JP5-14, and CEF-JP5-15. The state target level of 100 ppb for total naphthalenes was exceeded in monitoring well CEF-JP5-15.

Monitoring well CEF-JP5-11 contained 0.02 foot of free product. Free product had previously been detected in monitoring well CEF-076-04 during previous field investigations; however, free product was not detected in CEF-026-04 during this supplemental field investigation.

Groundwater contamination was detected in monitoring well CEF-JP5-17D, located in the spill area during the initial CA. Monitoring well CEF-JP5-17D had a benzene concentration of 47 ppb and a total VOA concentration of 52.7 ppb. Analytical laboratory results indicated the sample from monitoring well CEF-076-45I, which is near the location of hydropunch 4, was below method detection limits for all kerosene analytical group constituents. Monitoring well CEF-JP5-17D is screened from 30 to 35 feet bls. Monitoring well CEF-076-45I is screened from 65 to 70 feet bls.

Figures 3-12, 3-13, and 3-14 indicate the dissolved hydrocarbon plume is generally oriented northwest to southeast near Tank 76E and extends from the spill area near Tank 76E to the drainage ditch. No dissolved hydrocarbons were detected in perimeter monitoring wells CEF-JP5-01 through CEF-JP5-10 located outside the spill area, except for trace amounts of toluene or xylene in wells CEF-JP5-01, CEF-JP5-05, and CEF-JP5-06 during the initial CA.

3.4 HYDRAULIC GRADIENT AND GROUNDWATER FLOW DIRECTION. The hydraulic gradient and the groundwater flow direction were assessed using the measured groundwater elevations from monitoring wells at the JP-5 spill site. The hydraulic gradient

Table 3-4
Summary of Groundwater Analytical Results, JP-5 Spill Site
February and May 1994, and August 1995

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Jacksonville, Florida

Contaminant	Well Identification, CEF-JP-5-																Regulatory ¹ Standards for Class G-II Groundwater
	1	2	3	4	5	6	7	8	9	10	10DS	11	12 ²	13	14 ²	14DS	
<u>Volatile Organic Aromatics (VOAs) (USEPA Method 601/602), ppb</u>																	
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	1.8/19	ND	200/160	190	1 ppb
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	11/45	ND	19/48	18	
Toluene	ND	ND	ND	ND	6.0	6.9	ND	ND	ND	ND	ND	FP	3.2/ND	ND	3.0/ND	2.8	
Xylenes, total	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	40/290	ND	58/160	54	
Methyl tert-butyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	2.5/12	ND	ND/ND	ND	50 ppb
Total VOAs	1.3	ND	ND	ND	6.0	6.9	ND	ND	ND	ND	ND	FP	56/354	ND	280/368	265	50 ppb
<u>Polynuclear Aromatic Hydrocarbons (PAH) (USEPA Method 625), ppb</u>																	
1-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	70/12	ND	ND/ND	9.2	
2-Methylnaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	100/22	ND	10/ND	8.2	
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND/ND	ND	ND/ND	ND	
Phenanthrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND/ND	ND	ND/ND	ND	
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	74/37	ND	ND/ND	ND	
Total naphthalenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	244/71	ND	10/ND	17.4	100 ppb
<u>Total Recoverable Petroleum Hydrocarbons (TRPH), ppm</u>																	
TRPH	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	1.5/ND	ND	ND/ND	ND	5 ppm
<u>Ethylene Dibromide (EDB) (USEPA Method 601 Modified), ppb</u>																	
EDB	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	FP	ND/NS	ND	ND/NS	ND	0.02 ppb
<u>Metals, ppb</u>																	
Lead	19.4	15.4	188	7.4	14.4	80.0	175	15.0	7.7	130	85.0	FP	58.4/ND	312	960/ND	810	50 ppb
See notes at end of table.																	

Table 3-4 (Continued)
Summary of Groundwater Analytical Results, JP-5 Spill Site
February and May 1994, and August 1995

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 North Fuel Farm Area JP-5 Spill Site And Sal Taylor Creek Bank Sites
 Naval Air Station Cecil Field
 Jacksonville, Florida

Contaminant	Well Identification, CEF-JP-5-			Well Identification, CEF-076-								Regulatory ¹ Standards for Class G-II Groundwater
	15	16	17D	4 ^{2,3}	5	5DS	18	22	33D ⁴	33D DS	34	
<u>Volatile Organic Aromatics (VOAs) (USEPA Method 601/602), ppb</u>												
Benzene	1.2/ND	ND	47	FP/1.2/ND	4.1	3.7	ND	2.0	ND/NS	ND	ND	1 ppb
Ethylbenzene	8.7/15	ND	2.4	FP/ND/10	19	15	3.9	1.7	ND/NS	ND	ND	
Toluene	54/170	ND	ND	FP/ND/ND	17	15	ND	ND	ND/NS	ND	ND	
Xylenes, total	55/81	ND	3.3	FP/9.8/9.6	110	90	30	ND	ND/NS	ND	ND	
Methyl tert-butyl ether	ND/ND	ND	ND	FP/ND/2.6	ND	ND	1.5	4.1	ND/NS	ND	ND	50 ppb
Total VOAs	119/266	ND	52.7	FP/11.0/22.2	133	124	33.9	3.7	ND/NS	ND	ND	50 ppb
<u>Polynuclear Aromatic Hydrocarbons (PAH) (USEPA Method 625), ppb</u>												
1-Methylnaphthalene	ND/38	ND	ND	FP/44/4.3	39	43	ND	ND	ND/NS	ND	ND	
2-Methylnaphthalene	37/36	ND	ND	FP/57/6.7	51	56	ND	ND	ND/NS	ND	ND	
Fluoranthene	ND/ND	ND	ND	FP/ND/ND	ND	ND	5.1	ND	ND/NS	ND	ND	
Phenanthrene	ND/ND	ND	ND	FP/ND/ND	ND	ND	6.8	ND	ND/NS	ND	ND	
Naphthalene	44/47	ND	ND	FP/57/16	51	58	ND	ND	ND/NS	ND	ND	
Total naphthalenes	81/121	ND	ND	FP/158/27	141	157	ND	ND	ND/NS	ND	ND	100 ppb
<u>Total Recoverable Petroleum Hydrocarbons (TRPH), ppm</u>												
TRPH	5.1/ND	ND	ND	FP/9.2/ND	ND	ND	ND	ND	ND/NS	ND	ND	5 ppm
<u>Ethylene Dibromide (EDB) (USEPA Method 601 Modified), ppb</u>												
EDB	ND/NS	ND	ND	FP/ND/NS	ND	ND	ND	ND	ND/NS	ND	ND	0.02 ppb
See notes at end of table.												

Table 3-4 (Continued)
Summary of Groundwater Analytical Results, JP-5 Spill Sites
February and May 1994, and August 1995

Contamination Assessment Report Addendum
 North Fuel Farm Area JP-5 Spill Site And Sal Taylor Creek Bank Sites
 Naval Air Station Cecil Field
 Jacksonville, Florida

Contaminant	Well Identification, CEF-JP5-			Well Identification, CEF-076-							Regulatory ¹ Standards for Class G-II Groundwater
	15	16	17D	4 ^{2,3}	5	5DS	18	22	33D ⁴	33D DS ⁴	

Metals, ppb

Lead	46.0/10.8	19.0	12.5	FP/8.2/ND	5.1	44.4	192	ND	11.1/NS	12.3/NS	117	50 ppb
------	-----------	------	------	-----------	-----	------	-----	----	---------	---------	-----	--------

¹ Florida Department of Environmental Protection (FDEP) 62-770.730(5A).

² Monitoring well sampled in 1995 to address FDEP comments. Concentrations shown are for samples collected in February 1994, May 1994, and August 1995, respectively.

³ Monitoring well was sampled below the free product-groundwater interface in 1994.

⁴ Monitoring well damaged. Unable to collect groundwater sample.

Notes: DS = duplicate sample.

USEPA = U.S. Environmental Protection Agency.

ppb = parts per billion.

ND = not detected.

FP = free petroleum product in well, no sample collected.

Total VOAs = sum of benzene, ethylbenzene, toluene, and xylenes.

Total naphthalenes = sum of 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.

ppm = parts per million.

NS = not sampled.

D = deep monitoring well.

was calculated using the following equation:

$$i = \frac{h}{d_i} \quad (1)$$

where:

i = hydraulic gradient (ft/ft)

h = hydraulic head difference between two monitoring points (CEF-JP5-16 and CEF-JP5-10) parallel with groundwater flow direction

d_i = distance between gradient monitoring points (ft)

$$i = 1.0 \text{ feet} / 200 \text{ feet} = 5.5 \times 10^{-3} \text{ ft/ft}$$

Groundwater levels were measured on August 14, 1995, and February 7, 1996, in all existing monitoring wells at the site, except for monitoring well CEF-JP5-11, which contained free product. No groundwater levels were measured on February 7, 1996 from monitoring well CEF-JP5-12 because the well was abandoned prior to remediation activities. Groundwater elevations and monitoring well screen interval data are given in Table 3-5.

Depth to groundwater across the site varies seasonally from approximately 0.5 to 4.0 feet bls.

Piezometric surface maps prepared using groundwater elevations from shallow monitoring wells indicate that the general groundwater flow direction is south-southeast (Figures 3-15 and 3-16) which corresponds to the groundwater flow direction previously presented in the 1994 CAR.

Table 3-5
Water Table Elevation Data JP-5 Spill Site, August 14, 1995 and February 7, 1996

Contamination Assessment Report Addendum
 North Fuel Farm Area JP-5 Spill Site And Sal Taylor Creek Bank Sites
 Naval Air Station Cecil Field
 Jacksonville, Florida

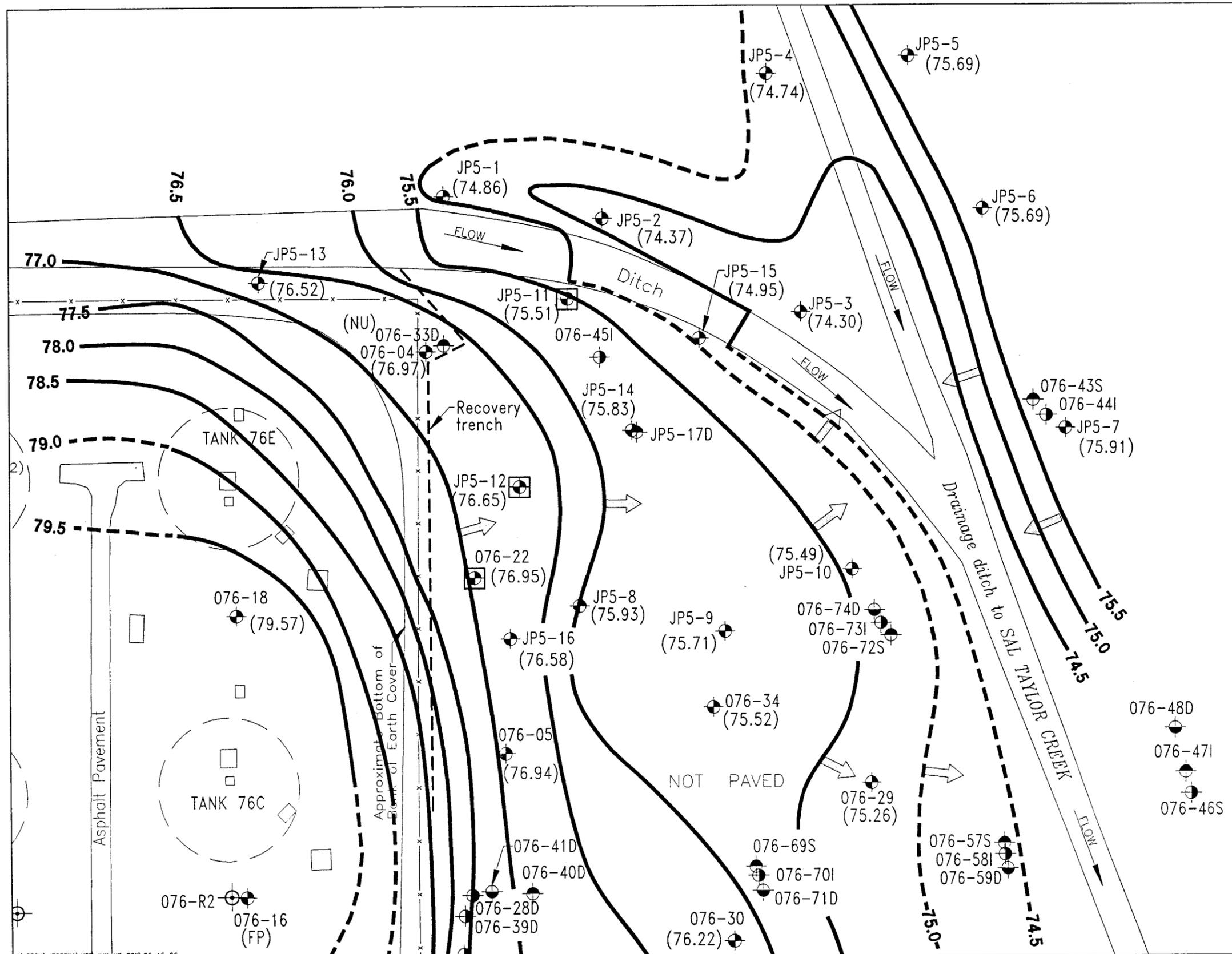
Monitoring Well No.	Total Well Depth (feet)	Screened Interval (feet)	TOC Elevation ¹ (feet)	August 14, 1995		February 7, 1996	
				Depth to Water (feet)	Water Level Elevation (feet)	Depth to Water (feet)	Water Level Elevation (feet)
² CEF-JP5-01	10.0	5.0 - 10.0	81.64	6.78	74.86	7.09	74.55
² CEF-JP5-02	7.0	2.0 - 7.0	81.27	6.90	74.37	6.98	74.29
² CEF-JP5-03	6.5	1.5 - 6.5	78.98	4.68	74.30	4.64	74.34
² CEF-JP5-04	6.0	1.0 - 6.0	78.09	3.35	74.74	3.61	74.48
² CEF-JP5-05	5.5	0.5 - 5.5	78.89	3.20	75.69	4.12	74.77
² CEF-JP5-06	6.5	1.5 - 6.5	78.87	3.18	75.69	3.56	75.31
² CEF-JP5-07	7.5	2.5 - 7.5	79.03	3.12	75.91	3.93	75.10
² CEF-JP5-08	7.5	2.5 - 7.5	79.88	3.95	75.93	4.65	75.23
² CEF-JP5-09	6.5	1.5 - 6.5	79.20	3.49	75.71	4.27	74.93
² CEF-JP5-10	5.5	0.5 - 5.5	78.38	2.89	75.49	3.69	74.69
² CEF-JP5-11	5.5	0.5 - 5.5	79.25	3.74	75.51	-	-
CEF-JP5-12	11.0	1.0 - 11.0	79.97	3.32	76.65	-	-
CEF-JP5-13	11.0	1.0 - 11.0	81.46	4.94	76.52	6.11	75.35
CEF-JP5-14	11.0	1.0 - 11.0	78.15	2.32	75.83	3.13	75.02
² CEF-JP5-15	5.5	0.5 - 5.5	77.72	2.77	74.95	3.17	74.55
CEF-JP5-16	12.0	2.0 - 12.0	81.13	4.55	76.58	5.63	75.50
CEF-JP5-17D	35.0	30.0 - 35.0	78.38	1.94	76.44	3.24	75.14
³ CEF-076-04	12.0	2.0 - 12.0	78.90	1.93	76.97	3.01	75.89
³ CEF-076-22	11.5	1.5 - 11.5	78.74	1.79	76.95	-	-
³ CEF-076-33D	35.5	30.5 - 35.5	80.33	***	***	***	***
³ CEF-076-05	15.0	5.0 - 15.0	79.35	2.41	76.94	3.79	75.56
³ CEF-076-16	30.0	20.0 - 30.0	96.88	19.43	77.45	FP	FP
³ CEF-076-18	33.0	18.0 - 33.0	97.08	17.51	79.57	20.21	76.87
³ CEF-076-21	12.0	2.0 - 12.0	79.62	2.50	77.12	4.09	75.53
³ CEF-076-29	13.0	3.0 - 13.0	76.43	1.17	75.26	1.72	74.71
^{2,3} CEF-076-30	12.0	2.0 - 12.0	76.77	0.55 (approx)	76.22	1.71	75.06
^{2,3} CEF-076-34	5.5	0.5 - 5.5	79.19	3.67	75.52	4.25	74.94

¹ Benchmark elevation of 79.48 feet is located in a concrete box cut in center top headwall at the northeast corner of Loop Road and "A" Avenue intersection.

² Hand-installed monitoring well.

³ North Fuel Farm monitoring well water level reading recorded August 14, 1995.

Notes: Monitoring well CEF-JP5-11 contained free product.
 TOC = top of casing.
 *** = damaged well, unable to measure water level.
 - = monitoring well abandoned prior to remediation.
 FP = free product.



LEGEND

- 076-36 Abandoned monitoring well location
- 076-R1 Recovery well location
- 076-29 Watertable monitoring well location
- 076-51D Deep monitoring well location
- 076-49S Shallow monitoring well location
- 076-50I Intermediate monitoring well location
- 75.5-** Water table contour line in feet
- (76.65)** Water table elevation in feet, mean sea level.
- Fence
- Groundwater flow direction
- (FP)** Free product

NOTE:
Monitoring wells without posted water level elevation values were not used.

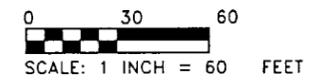
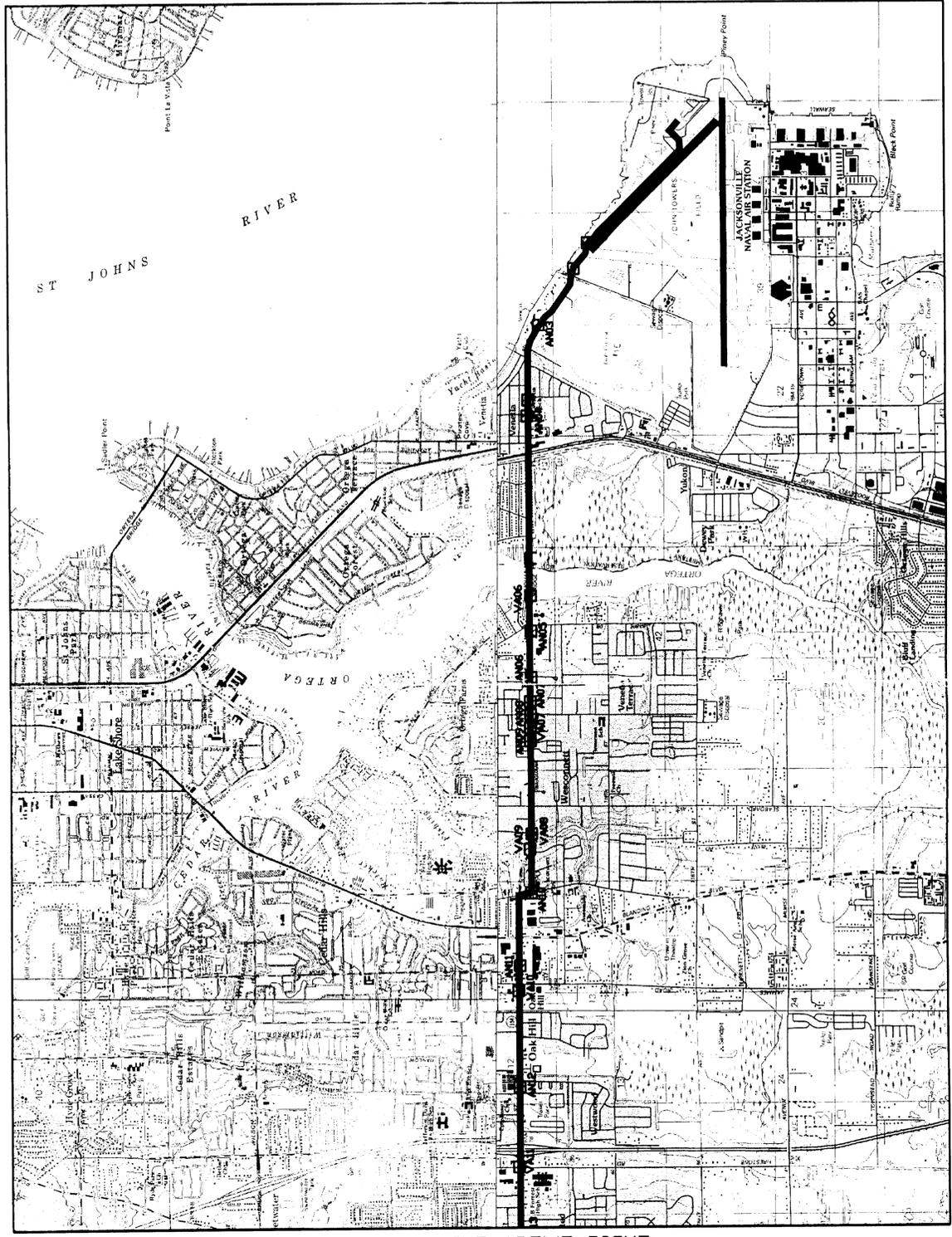


FIGURE 3-15
WATER TABLE ELEVATION MAP
AUGUST 14, 1995

CONTAMINATION ASSESSMENT
REPORT ADDENDUM
NFFA, JP-5 SPILL SITE, AND
SAL TAYLOR CREEK BANK SITES
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

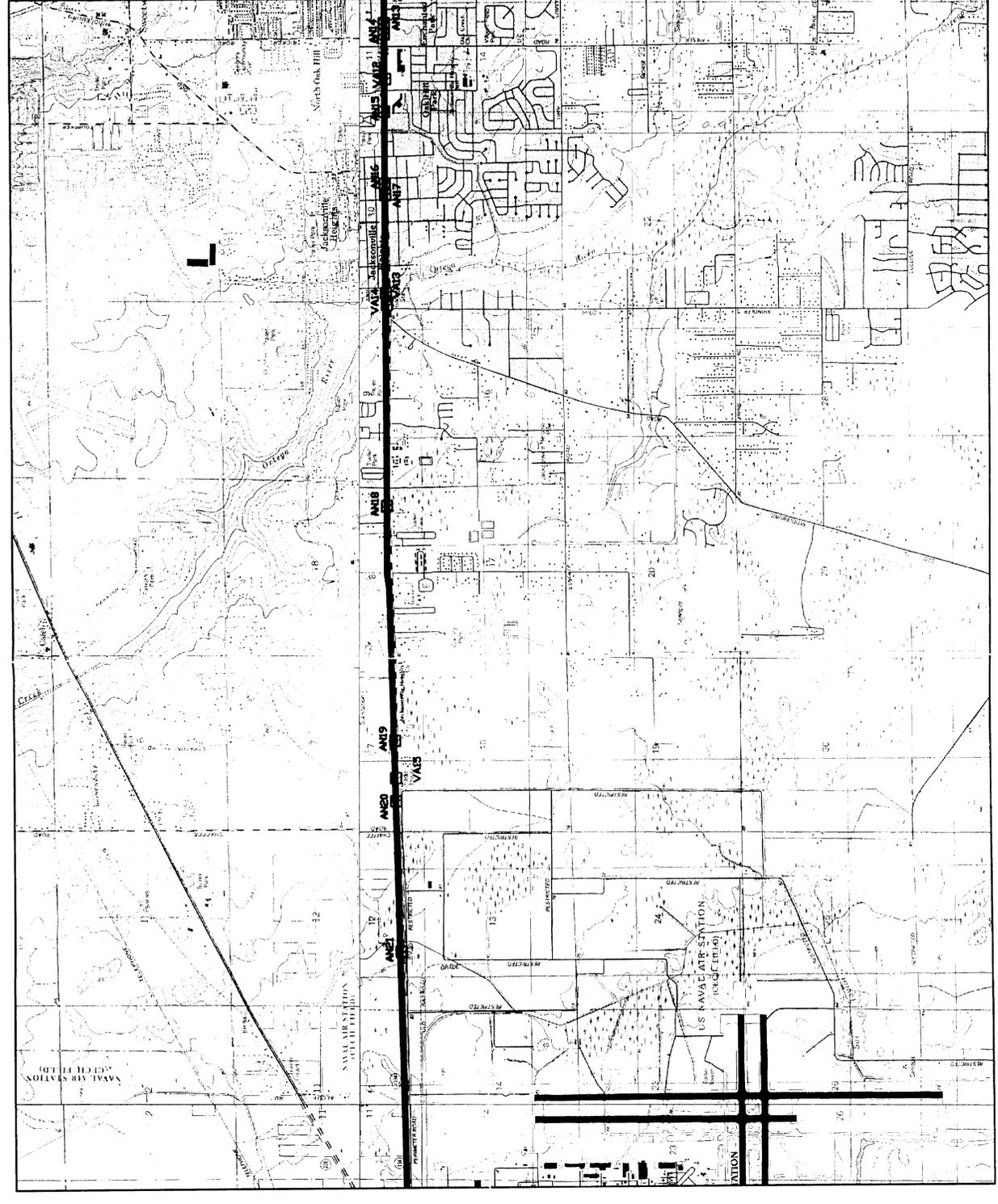


MATCH LINE ABOVE RIGHT

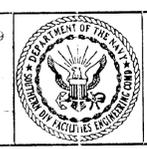
LEGEND
 ——— JET FUEL PIPELINE
 [Hatched Box] ANOMALY OR VALVE LOCATION
 AN10

SOURCE: UNITED STATES GEOLOGICAL SURVEY QUADRANGLE MAPS: BALWIN, FL., FIFSTONE, FL., JACKSONVILLE, FL., JACKSONVILLE HEIGHTS, FL., MARIETTA, FL., AND ORANGE PARK, FL.

MATCH LINE BELOW LEFT



DRAWN BY MF DATE 4/23/99
 CHECKED BY DATE
 REVISED BY DATE



SCALE AS NOTED

ST. VICINITY MAP
 FOR THE NASCF JET FUEL PIPELINE
 JACKSONVILLE, FLORIDA

CONTRACT NO. 0013
 OWNER NO.
 APPROVED BY DATE
 DRAWING NO. 1-1
 REV. 0

4.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

4.1 SUMMARY. The following findings for the JP-5 spill site and Sal Taylor Creek bank sites at NAS Cecil Field are based on the results of the 1995 supplemental CA.

4.1.1 JP-5 Spill Site

- Depth to water in the surficial aquifer at the JP-5 spill site ranges from 0.5 foot to 4.0 feet bls, and the general groundwater flow direction is to the south-southeast.
- Excessively contaminated soil was not detected at the JP-5 spill site during the supplemental assessment. However, water-saturated soil samples 95A-47, 95A-48, 95A-50, 95A-53, 95A-55, 95A-56, 95A-57, and 95A-58, collected on the east side of the drainage ditch that flows into Sal Taylor Creek, had OVA readings greater than 50 ppm. These samples could not be classified as excessively contaminated soil due to the saturated conditions.
- Five confirmatory soil samples were collected to verify if soil contamination, detected using an OVA, was present near the drainage ditch that flows from the access road to Sal Taylor Creek. TRPH and lead were the only kerosene analytical group parameters detected in the confirmatory soil samples collected at the JP-5 spill site. TRPH values ranged from below method detection limits (sample CEF-JP5-SD2) to 130 ppm (sample CEF-JP5-SD1). Lead concentrations ranged from 1.1 ppm (sample CEF-JP5-SD5) to 6.6 ppm (samples CEF-JP5-SD2 and CEF-JP5-SD3).
- Free product was observed in monitoring well CEF-JP5-11 during this supplemental field investigation. Free product thickness in monitoring well CEF-JP5-11 was 0.02 foot. Free product was not detected in monitoring well CEF-076-04. Free product, if present in monitoring wells CEF-JP5-11 and CEF-076-04, continues to be recovered on a weekly basis.
- Benzene concentrations ranged from below method detection limits in monitoring well CEF-076-04 to 160 ppb in monitoring well CEF-JP5-14. The FDEP target level of 1 ppb for benzene was exceeded in monitoring well CEF-JP5-12 and CEF-JP5-14.
- Total VOA concentrations ranged from 22.2 ppb in monitoring well CEF-076-04 to 368 ppb in monitoring well CEF-JP5-14. The FDEP target level of 50 ppb for VOAs was exceeded in monitoring wells CEF-JP5-12, CEF-JP5-14, and CEF-JP5-15.
- Total naphthalenes ranged from below method detection limits in monitoring well CEF-JP5-14 to 121 ppb in monitoring well CEF-JP5-15. The FDEP target level of 100 ppb for total naphthalenes was exceeded in monitoring well CEF-JP5-15.

- The vertical extent of petroleum contamination does not exceed 65 feet bls, which is the top of the screen interval of well CEF-076-45I.

4.1.2 Sal Taylor Creek Bank Sites

- Excessively contaminated soil was detected in the following soil borings advanced during this supplemental field investigation along the banks of Sal Taylor Creek: 95I-58, 95I-62, 95I-63, 95I-86, and 95I-104.

4.2 CONCLUSIONS. The information obtained during the initial CA in 1991 through 1994 and the 1995 supplemental field investigations at the JP-5 spill site appears to be sufficient to assess the horizontal and vertical extent of excessively contaminated soil and groundwater contamination. The contaminant distribution indicates that the majority of the area affected by the petroleum release is in the spill area, which extends from North Fuel Farm Tank 76E to the drainage ditch that discharges into Sal Taylor Creek. Soil north and east of the drainage ditch had OVA concentrations greater than 50 ppm, but could not be classified as excessively contaminated soil due to the saturated conditions.

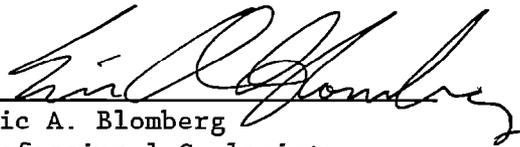
The areal extent of excessively contaminated soil detected at nine sites (93I-6, 93I-10, 93I-18, 93I-20, 93I-36, 93I-37, 93I-45, 93I-51, and 93I-53) along the banks of Sal Taylor Creek appears to be delineated in accordance with FDEP guidelines (FDEP, 1994). The extent of excessively contaminated soil at these sites is limited to one or two soil borings which are spaced at a distance of approximately 20 feet.

4.3 RECOMMENDATIONS. Due to the presence of free product, excessively contaminated soil, and contaminated groundwater that exceeds Chapter 62-770, FAC, regulatory criteria, the Navy recommends that a remedial action plan be prepared for the JP-5 spill site. The area north and east of the drainage ditch would not be included as part of the RAP because this area is in a wetland, the soil does not meet FDEP criteria for excessively contaminated soil, and TRPH concentrations in soil slightly exceeded State regulatory standards in only two soil samples. In addition, free product recovery should continue on a regular basis, and maintenance of all fuel tanks should be conducted on a routine schedule.

Excessively contaminated soil detected along the creek bank of Sal Taylor Creek is of limited areal extent and is located in a wetland. Therefore, the Navy recommends allowing natural biodegradation to proceed as a remedial action.

5.0 PROFESSIONAL REVIEW CERTIFICATION

This document, *Contamination Assessment Report Addendum, North Fuel Farm Area JP-5 spill site and Sal Taylor Creek Bank Site, Naval Air Station Cecil Field, Jacksonville, Florida*, has been prepared under the direction of a Professional Geologist registered in the state of Florida. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report or referenced in public literature. Recommendations are based upon interpretations of the applicable regulatory requirements, guidelines, and relevant issues discussed with regulatory personnel during the site investigation. If conditions that differ from those described are determined to exist, the undersigned geologist should be notified to evaluate the effects of any additional information on this assessment or the recommendations made in this report. This report meets the criteria set forth in Chapter 492 of the Florida Statutes with regard to good professional practices as applied to Chapter 62-770 of the Florida Administrative Code. This CAR Addendum was developed for the JP-5 spill site and Sal Taylor Creek Bank Sites at NAS Cecil Field, Jacksonville, Florida, and should not be construed to apply to any other site.


Eric A. Blomberg
Professional Geologist
P.G. No. 1695

3-15-96
Date

REFERENCES

ABB Environmental Services, Inc., 1994, North Fuel Farm Area, JP-5 Spill Site, NAS Cecil Field, Jacksonville, Florida: prepared for Southern Division Engineering Command, Charleston, South Carolina.

Florida Department of Environmental Protection, 1994, Guideline for Assessment and Remediation of Petroleum Contaminated Soil, Division of Waste Management, Bureau of Waste Cleanup, Engineering Support Section, May.

APPENDIX A
MONITORING WELL LITHOLOGIC LOG

TITLE: NAS-Cecil Field - NFF/JP5 Spill Area		LOG of WELL: CEF-076-451	BORING NO. CEF-076-451
CLIENT: U.S. Navy - SOUTHDIVNAVFACENCOM			PROJECT NO: 08520-82
CONTRACTOR: Professional Service Industries		DATE STARTED: 04-29-95	COMPLTD: 04-29-95
METHOD: Mud rotary	CASE SIZE: 6"/2"	SCREEN INT.: 65.0'-70.0'	PROTECTION LEVEL: D
TOC ELEV.: 79.68 FT.	MONITOR INST.: FID	TOT DPTH: 70FT.	DPTH TO ∇ 3.09 * FT.
LOGGED BY: J. Tarr	WELL DEVELOPMENT DATE: 05-15-95		SITE: North Fuel Farm

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5		50%	>5000	CLAYEY SAND WITH ROOTS: Light brown, fine grained, poorly graded, strong hydrocarbon odor.	[Diagonal Hatching]	SM	4,6,8,8	[Well Diagram]
10		55%	1,100	SILTY SAND: Light brown, very fine to fine grained, poorly graded, strong hydrocarbon odor.		SM	4,6,5,6	
15		50%	150	SILTY SAND: As above with petroleum staining in soil.		SM	4,5,10,8	
20		100%	1,800	SILTY SAND: As above.		SM	3,3,4,5	
25		60%	290	CLAYEY SAND: Gray, fine grained with clay stringers.	[Horizontal Dashes]	SC	5,7,6,8	
30		50%	70	SILTY SAND: Greenish-gray, very fine to fine grained, medium dense to dense, poorly graded. Strong hydrocarbon odor.	[Diagonal Hatching]	SM	10,20,38,25	
35		90%	250	SILTY SAND: Light gray, medium to fine grained, poorly graded.	[Diagonal Hatching]	SM	4,8,8,14	
40		70%	800	SILTY SAND: As above, fine to very fine grained.	[Diagonal Hatching]	SM	5,10,10,11	
45			3,500		[Horizontal Dashes]	SC	5,5,6,11	

TITLE: NAS Cecil Field - NFF/JP5 Spill Area		LOG of WELL: CEF-076-451	BORING NO. CEF-076-451
CLIENT: U.S. Navy - SOUTH DIV NAV FAC ENG COM			PROJECT NO: 08520-82
CONTRACTOR: Professional Service Industries		DATE STARTED: 04-29-95	COMPLTD: 04-29-95
METHOD: Mud rotary	CASE SIZE: 6"/2"	SCREEN INT.: 65.0'-70.0'	PROTECTION LEVEL: D
TOC ELEV.: 79.68 FT.	MONITOR INST.: FID	TOT DPTH: 70FT.	DPTH TO ∇ 3.09 * FT.
LOGGED BY: J. Tarr	WELL DEVELOPMENT DATE: 05-15-95		SITE: North Fuel Farm

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
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Continued from PAGE 1

		50%		CLAYEY SAND: Greenish gray with clay stringers.		SC		
50		50%	700	SILTY SAND: Greenish gray, fine grained, trace of clay. Strong hydrocarbon odor.		SC	28,85,82,50	
55		50%	310	CLAYEY SAND: Greenish-gray, fine grained, medium dense with soft clay.		SC	7,9,15,39	
60		50%	850	SAND: Light Gray, fine grained, loose to medium dense, trace of clay.		SM	5,8,7,7	
65		100%	150	SAND: As above, very dense, trace of clay.		CH	26,44,71,76	
70		100%	70	CLAY: Greenish-gray to dark gray, soft to medium stiff, high plasticity, fat clay.		CH	5,5,8,8	
75								
80				* = measured on 8-14-95				
85								
90								

APPENDIX B

SOIL SAMPLE ANALYTICAL RESULTS

UST COMPOUNDS -- SOIL

Lab Sample Number:
Site
Locator
Collect Date:

B510601110
JP5 SPILL
CEFJP5-SD1
05-SEP-95

B510601110
JP5 SPILL
CEFJP5-SD2
05-SEP-95

B510601110
JP5 SPILL
CEFJP5-SD3
05-SEP-95

B510601110
JP5 SPILL
CEFJP5-SD4
05-SEP-95

VALUE QUAL UNITS DL VALUE QUAL UNITS DL VALUE QUAL UNITS DL VALUE QUAL UNITS DL

BETX, MTBE, & DICHLOROBENZENES

Benzene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Ethylbenzene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Toluene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Xylenes (total)	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Methyl tert-butyl ether	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,2-Dichlorobenzene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,3-Dichlorobenzene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,4-Dichlorobenzene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Chlorobenzene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6

UST VOAs

Bromodichloromethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Bromoform	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	82	PERCE	
Bromomethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Carbon tetrachloride	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
2-Chloroethyl vinyl ether	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Chloroform	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Chloromethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Dibromochloromethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Dichlorodifluoromethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Dichloromethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,1-Dichloroethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,2-Dichloroethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,1-Dichloroethene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,2-Dichloropropane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,1,2,2-Tetrachloroethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,1,1-Trichloroethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1,1,2-Trichloroethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Tetrachloroethane	-			-			-			-		
Trichloroethane	-			-			-			-		
Trichlorofluoromethane	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Vinyl chloride	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
cis-1,3-Dichloropropene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
trans-1,2-Dichloroethene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
trans-1,3-Dichloropropene	7 U	ug/kg	7	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6

UST PAHS

Acenaphthene	140 U	ug/kg	140	64 U	ug/kg	64	66 U	ug/kg	66	66 U	ug/kg	66
Acenaphthylene	280 U	ug/kg	280	130 U	ug/kg	130	130 U	ug/kg	130	130 U	ug/kg	130
Anthracene	140 U	ug/kg	140	64 U	ug/kg	64	66 U	ug/kg	66	66 U	ug/kg	66
Benzo (a) anthracene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Benzo (b) fluoranthene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Benzo (k) fluoranthene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Benzo (a) pyrene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Chrysene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Dibenzo (a,h) anthracene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Fluoranthene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
Fluorene	140 U	ug/kg	140	64 U	ug/kg	64	66 U	ug/kg	66	66 U	ug/kg	66
Indeno (1,2,3-cd) pyrene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
1-Methylnaphthalene	140 U	ug/kg	140	64 U	ug/kg	64	66 U	ug/kg	66	66 U	ug/kg	66

NAS CECIL FIELD -- JP5 SPILL REPORT REQ. NO. 7474
 UST COMPOUNDS -- SOIL

Lab Sample Number:	B510601110	B510601110	B510601110	B510601110								
Site	JP5 SPILL	JP5 SPILL	JP5 SPILL	JP5 SPILL								
Locator	CEFJP5-SD1	CEFJP5-SD2	CEFJP5-SD3	CEFJP5-SD4								
Collect Date:	05-SEP-95	05-SEP-95	05-SEP-95	05-SEP-95								
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL

2-Methylnaphthalene	140 U	ug/kg	140	64 U	ug/kg	64	66 U	ug/kg	66	66 U	ug/kg	66
Naphthalene	140 U	ug/kg	140	64 U	ug/kg	64	66 U	ug/kg	66	66 U	ug/kg	66
Phenanthrene	140 U	ug/kg	140	64 U	ug/kg	64	66 U	ug/kg	66	66 U	ug/kg	66
Pyrene	14 U	ug/kg	14	6.4 U	ug/kg	6.4	6.6 U	ug/kg	6.6	6.6 U	ug/kg	6.6
TPH												
Total petroleum hydrocarbons	130	mg/kg	14	13 U	mg/kg	13	25	mg/kg	13	64	mg/kg	13
Lead												
Lead	4.4	mg/kg	.42	6.6	mg/kg	.64	6.6	mg/kg	.66	3.9	mg/kg	.4
Ethylene dibromide	.0028 U	mg/kg	.0028	.0025 U	mg/kg	.0025	.0026 U	mg/kg	.0026	.0026 U	mg/kg	.0026

U = NOT DETECTED, J = ESTIMATED VALUE
 UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
 R = RESULT IS REJECTED AND UNUSABLE

Lab Sample Number: B510601110
 Site: JP5 SPILL
 Locator: CEFJP5-SD5
 Collect Date: 05-SEP-95

VALUE QUAL UNITS DL

BETX, MTBE, & DICHLOROBENZENES

Benzene
 Ethylbenzene
 Toluene
 Xylenes (total)
 Methyl tert-butyl ether
 1,2-Dichlorobenzene
 1,3-Dichlorobenzene
 1,4-Dichlorobenzene
 Chlorobenzene

UST VOAs

Bromodichloromethane
 Bromoform
 Bromomethane
 Carbon tetrachloride
 2-Chloroethyl vinyl ether
 Chloroform
 Chloromethane
 Dibromochloromethane
 Dichlorodifluoromethane
 Dichloromethane
 1,1-Dichloroethane
 1,2-Dichloroethane
 1,1-Dichloroethene
 1,2-Dichloropropane
 1,1,2,2-Tetrachloroethane
 1,1,1-Trichloroethane
 1,1,2-Trichloroethane
 Tetrachloroethane
 Trichloroethane
 Trichlorofluoromethane
 Vinyl chloride
 cis-1,3-Dichloropropene
 trans-1,2-Dichloroethene
 trans-1,3-Dichloropropene

UST PAHs

Acenaphthene	670 U	ug/kg	670
Acenaphthylene	1300 U	ug/kg	1300
Anthracene	670 U	ug/kg	670

NAS CECIL FIELD -- JP5 SPILL REPORT REQ. NO. 7474
 UST COMPOUNDS -- SOIL

Lab Sample Number: B510601110
 Site: JP5 SPILL
 Locator: CEFJP5-SD5
 Collect Date: 05-SEP-95

VALUE QUAL UNITS DL

Benzo (a) anthracene	67 U	ug/kg	67
Benzo (b) fluoranthene	67 U	ug/kg	67
Benzo (k) fluoranthene	67 U	ug/kg	67
Benzo (a) pyrene	67 U	ug/kg	67
Chrysene	67 U	ug/kg	67
Dibenzo (a,h) anthracene	67 U	ug/kg	67
Fluoranthene	67 U	ug/kg	67
Fluorene	670 U	ug/kg	670
Indeno (1,2,3-cd) pyrene	67 U	ug/kg	67
1-Methylnaphthalene	670 U	ug/kg	670
2-Methylnaphthalene	670 U	ug/kg	670
Naphthalene	670 U	ug/kg	670
Phenanthrene	670 U	ug/kg	670
Pyrene	67 U	ug/kg	67

TPH

Total petroleum hydrocarbons 29 mg/kg 13

Lead

Lead 1.1 mg/kg .4

Ethylene dibromide

U = NOT DETECTED J = ESTIMATED VALUE
 UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
 R = RESULT IS REJECTED AND UNUSABLE

APPENDIX C

1995 SUPPLEMENTAL ASSESSMENT GROUNDWATER ANALYTICAL RESULTS

NAS CECIL FIELD -- JP5 SPILL REPORT REQ. NO. 7473
 UST COMPOUNDS -- GROUNDWATER

Lab Sample Number:
 Site
 Locator
 Collect Date:

B5H0901070
 NORTH FUEL FARM
 CEF07604
 08-AUG-95

B5G1201150
 NORTH FUEL FARM
 CEF076451
 11-JUL-95

B5H0901070
 JP5 SPILL
 CEFJP512
 08-AUG-95

B5H0901070
 JP5 SPILL
 CEFJP514
 08-AUG-95

VALUE QUAL UNITS DL VALUE QUAL UNITS DL VALUE QUAL UNITS DL VALUE QUAL UNITS DL

BETX, MTBE, & DICHLOROBENZENES

Compound	Value	Qual Units	DL									
Benzene	1 U	ug/l	1	1 U	ug/l	1	19	ug/l	10	160	ug/l	5
Ethylbenzene	10	ug/l	1	1 U	ug/l	1	45	ug/l	10	48	ug/l	5
Toluene	1 U	ug/l	1	1 U	ug/l	1	10 U	ug/l	10	5 U	ug/l	5
Xylenes (total)	9.6	ug/l	1	1 U	ug/l	1	290	ug/l	10	160	ug/l	5
Methyl tert-butyl ether	2.6	ug/l	1	1 U	ug/l	1	12	ug/l	10	5 U	ug/l	5
1,2-Dichlorobenzene	25	ug/l	1	1 U	ug/l	1	46	ug/l	10	5 U	ug/l	5
1,3-Dichlorobenzene	5.5	ug/l	1	1 U	ug/l	1	10 U	ug/l	10	5 U	ug/l	5
1,4-Dichlorobenzene	8.1	ug/l	1	1 U	ug/l	1	13	ug/l	10	5 U	ug/l	5
Chlorobenzene	1 U	ug/l	1	1 U	ug/l	1	10 U	ug/l	10	5 U	ug/l	5

UST VOAs

Compound	Value	Qual Units	DL									
Bromodichloromethane	-			1 U	ug/l	1	-			-		
Bromoform	-			1 U	ug/l	1	-			-		
Bromomethane	-			1 U	ug/l	1	-			-		
Carbon tetrachloride	-			1 U	ug/l	1	-			-		
2-Chloroethyl vinyl ether	-			1 U	ug/l	1	-			-		
Chloroform	-			1 U	ug/l	1	-			-		
Chloromethane	-			1 U	ug/l	1	-			-		
Dibromochloromethane	-			1 U	ug/l	1	-			-		
Dichlorodifluoromethane	-			1 U	ug/l	1	-			-		
Dichloromethane	-			1 U	ug/l	1	-			-		
1,1-Dichloroethane	-			1 U	ug/l	1	-			-		
1,2-Dichloroethane	-			1 U	ug/l	1	-			-		
1,1-Dichloroethene	-			1 U	ug/l	1	-			-		
1,2-Dichloropropane	-			1 U	ug/l	1	-			-		
1,1,2,2-Tetrachloroethane	-			1 U	ug/l	1	-			-		
1,1,1-Trichloroethane	-			1 U	ug/l	1	-			-		
1,1,2-Trichloroethane	-			1 U	ug/l	1	-			-		
Tetrachloroethane	-			-			-			-		
Trichloroethane	-			-			-			-		
Trichlorofluoromethane	-			1 U	ug/l	1	-			-		
Vinyl chloride	-			1 U	ug/l	1	-			-		
cis-1,3-Dichloropropene	-			1 U	ug/l	1	-			-		
trans-1,2-Dichloroethene	-			1 U	ug/l	1	-			-		
trans-1,3-Dichloropropene	-			1 U	ug/l	1	-			-		

UST PAHs

Compound	Value	Qual Units	DL									
Acenaphthene	2 U	ug/l	2									
Acenaphthylene	2 U	ug/l	2									
Anthracene	2 U	ug/l	2									
Benzo (a) anthracene	.1 U	ug/l	.1									
Benzo (b) fluoranthene	.1 U	ug/l	.1									
Benzo (k) fluoranthene	.15 U	ug/l	.15									
Benzo (a) pyrene	.1 U	ug/l	.1									
Chrysene	.1 U	ug/l	.1									
Dibenzo (a,h) anthracene	.1 U	ug/l	.1									
Fluoranthene	.2 U	ug/l	.2									
Fluorene	2 U	ug/l	2									
Indeno (1,2,3-cd) pyrene	.1 U	ug/l	.1									
1-Methylnaphthalene	4.3	ug/l	2	2 U	ug/l	2	12	ug/l	2	2 U	ug/l	2

NAS CECIL FIELD -- JP5 SPILL REPORT REQ. NO. 7473
 UST COMPOUNDS -- GROUNDWATER

Lab Sample Number:
 Site
 Locator
 Collect Date:

85H0901070
 NORTH FUEL FARM
 CEF07604
 08-AUG-95
 VALUE QUAL UNITS DL

85G1201150
 NORTH FUEL FARM
 CEF076451
 11-JUL-95
 VALUE QUAL UNITS DL

85H0901070
 JP5 SPILL
 CEFJP512
 08-AUG-95
 VALUE QUAL UNITS DL

85H0901070
 JP5 SPILL
 CEFJP514
 08-AUG-95
 VALUE QUAL UNITS DL

	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL
2-Methylnaphthalene	6.7	ug/l	2	2 U	ug/l	2	22	ug/l	2	2 U	ug/l	2
Naphthalene	16	ug/l	2	2 U	ug/l	2	37	ug/l	2	2 U	ug/l	2
Phenanthrene	2 U	ug/l	2	2 U	ug/l	2	2 U	ug/l	2	2 U	ug/l	2
Pyrene	.2 U	ug/l	.2	.2 U	ug/l	.2	.2 U	ug/l	.2	.2 U	ug/l	.2
TPH Total petroleum hydrocarbons	1 U	mg/l	1	-			1 U	mg/l	1	1 U	mg/l	1
Lead Lead	5 U	ug/l	5	5.2	ug/l	5	5 U	ug/l	5	5 U	ug/l	5
Ethylene dibromide	-			.02 U	ug/l	.02	-			-		

U = NOT DETECTED J = ESTIMATED VALUE
 UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
 R = RESULT IS REJECTED AND UNUSABLE

Lab Sample Number: B5H1001060
 Site: JP5 SPILL
 Locator: CEFJP515
 Collect Date: 09-AUG-95

VALUE QUAL UNITS DL

BETX, MTBE, & DICHLOROBENZENES

Compound	Value	Qual	Units	DL
Benzene	2	U	ug/l	2
Ethylbenzene	15		ug/l	2
Toluene	170		ug/l	2
Xylenes (total)	81		ug/l	2
Methyl tert-butyl ether	2	U	ug/l	2
1,2-Dichlorobenzene	11		ug/l	2
1,3-Dichlorobenzene	9.7		ug/l	2
1,4-Dichlorobenzene	16		ug/l	2
Chlorobenzene	2	U	ug/l	2

UST VOAs

Bromodichloromethane	-			
Bromoform	-			
Bromomethane	-			
Carbon tetrachloride	-			
2-Chloroethyl vinyl ether	-			
Chloroform	-			
Chloromethane	-			
Dibromochloromethane	-			
Dichlorodifluoromethane	-			
Dichloromethane	-			
1,1-Dichloroethane	-			
1,2-Dichloroethane	-			
1,1-Dichloroethene	-			
1,2-Dichloropropane	-			
1,1,2,2-Tetrachloroethane	-			
1,1,1-Trichloroethane	-			
1,1,2-Trichloroethane	-			
Tetrachloroethane	-			
Trichloroethane	-			
Trichlorofluoromethane	-			
Vinyl chloride	-			
cis-1,3-Dichloropropene	-			
trans-1,2-Dichloroethene	-			
trans-1,3-Dichloropropene	-			

UST PAHs

Acenaphthene	2	U	ug/l	2
Acenaphthylene	2	U	ug/l	2
Anthracene	2	U	ug/l	2

NAS CECIL FIELD -- JP5 SPILL REPORT REQ. NO. 7473
 UST COMPOUNDS -- GROUNDWATER

Lab Sample Number: B5H1001060
 Site: JP5 SPILL
 Locator: CEFJP515
 Collect Date: 09-AUG-95

	VALUE	QUAL	UNITS	DL
Benzo (a) anthracene	.1	U	ug/l	.1
Benzo (b) fluoranthene	.1	U	ug/l	.1
Benzo (k) fluoranthene	.15	U	ug/l	.15
Benzo (a) pyrene	.1	U	ug/l	.1
Chrysene	.1	U	ug/l	.1
Dibenzo (a,h) anthracene	.1	U	ug/l	.1
Fluoranthene	.2	U	ug/l	.2
Fluorene	.2	U	ug/l	.2
Indeno (1,2,3-cd) pyrene	.1	U	ug/l	.1
1-Methylnaphthalene	38		ug/l	2
2-Methylnaphthalene	36		ug/l	2
Naphthalene	47		ug/l	2
Phenanthrene	2	U	ug/l	2
Pyrene	.2	U	ug/l	.2
TPH				
Total petroleum hydrocarbons	1	U	mg/l	1
Lead				
Lead	10.8		ug/l	5
Ethylene dibromide				

U = NOT DETECTED, J = ESTIMATED VALUE
 UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
 R = RESULT IS REJECTED AND UNUSABLE