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FINAL ENGINEERING EVALUATION/COST ANALYSIS REPORT FOR OPERABLE UNIT 12 (OU 12) SITE 32 DEFENSE REUTILIZATION AND MARKETING OFFICE ASPHALT STORAGE YARD NAS CECIL FIELD FL

8/9/2002

TETRA TECH NUS INC

Engineering Evaluation/ Cost Analysis (EE/CA)

for

Operable Unit 12
Site 32
DRMO Asphalt Storage Yard

Naval Air Station Cecil Field

Jacksonville, Florida

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0078

August 2002

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ENGINEERING EVALUATION/COST ANALYSIS (EE/CA)

FOR

OPERABLE UNIT 12
SITE 32
DRMO ASPHALT STORAGE YARD

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
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Naval Facilities Engineering Command
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CONTRACT TASK ORDER 0078

AUGUST 2002

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CERTIFICATION OF TECHNICAL
DATA CONFORMITY

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

DATE: August 9, 2002

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

The professional opinions rendered in this decision document identified as Engineering Evaluation/Cost Analysis, Operable Unit 12, Site 32, Naval Air Station Cecil Field, Jacksonville, Florida were developed in accordance with commonly accepted procedures consistent with applicable standards of practice. Decision documents are based on information obtained from others and under the supervision of the signing engineer. If conditions are determined to exist differently than those described in this document, then the undersigned professional engineer should be notified to evaluate the effects of any additional information on this project described in this report.

Mark Speranza

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Date: 8/8/02

Mark Speranza

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ACRONYMS

µg/kg	Microgram per kilogram
ABB-ES	ABB Environmental Services, Inc.
AOI	Area of Interest
ARAR	Applicable or Relevant and Appropriate Requirement
BaP	Benzo(a)pyrene
BaPEq	Benzo(a)pyrene equivalent
BCT	BRAC Cleanup Team
bgs	Below ground surface
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	Chemical of concern
CPAH	Carcinogenic polynuclear aromatic hydrocarbon
CSF	Cancer Slope Factor
CTO	Contract Task Order
DOT	Department of Transportation
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Survey
EE/CA	Engineering Evaluation/Cost Analysis
EISOPQAM	Environmental Investigatons Standard Operating Procedures and Quality Assurance Manual
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater cleanup target level
GRA	General Response Actions
HLA	Harding Lawson Associates
IBDS	Inorganic Background Data Set
LUC	Land use control
MCL	Maximum Contaminant Level
mg/kg	Milligram per kilogram
NAS	Naval Air Station
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NEPA	National Environmental Policy Act
NFF	North Fuel Farm

NPW	Net present worth
O&M	Operation and maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
OVA	Organic vapor analyses
PAH	Polynuclear aromatic hydrocarbon
PPE	Personal protection equipment
PRE	Preliminary risk evaluation
PRG	Preliminary remediation goal
PSC	Potential Source of Contamination
QA/QC	Quality assurance/quality control
RAC	Remedial Action Contractor
RAO	Remedial action objective
RCRA	Resource Conservation and Recovery Act
RFD	Reference dose
RI	Remedial Investigation
SAR	Sampling and Analysis Report
SCTL	Soil cleanup target level
SDWA	Safe Drinking Water Act
SMCL	Secondary MCLs
SOUTHNAVFACENGCOM	Southern Division Naval Facilities Engineering Command
SVOC	Semivolatile organic compound
TAL	Target Analyte List
TBC	To Be Considered (criterion)
TCLP	Toxicity Characteristic Leaching Procedure
TEF	Toxicity equivalent factor
TSDF	Treatment, Storage, and Disposal Facility
TtNUS	Tetra Tech NUS, Inc.
U.S. EPA	United States Environmental Protection Agency
UCL	Upper confidence limit
VOC	Volatile organic compound

EXECUTIVE SUMMARY

This Engineering Evaluation/Cost Analysis (EE/CA) for Operable Unit (OU) 12, Site 32, Defense Reutilization and Marketing Office (DRMO) Asphalt Storage Yard, at Naval Air Station (NAS) Cecil Field has been prepared to comply with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements for a non-time-critical removal action, as identified in Section 300.415(b)(4)(I) of the National Oil and Hazardous Substance Pollution Contingency Plan. The goal of this EE/CA is to identify remedial action objectives (RAOs), develop remedial alternatives to achieve these RAOs, and then evaluate the alternatives with regard to cost, effectiveness, and implementability in order to select the most appropriate alternative.

E.1 SITE DESCRIPTION AND HISTORY

Site 32 was formerly referred to in the Base Realignment and Closure (BRAC) NAS Cecil Field Environmental Baseline Survey (EBS) (ABB-ES, 1994) as Area of Interest (AOI) 32, the Hazardous Material Warehouse Storage Area. The site was then designated as Potential Source of Contamination (PSC) 32, DRMO Asphalt Storage Yard (CH2M Hill, 2001; TtNUS, 1999b, 2000a, and 2000b). Currently the area is identified as Installation Restoration (IR) Site 32 within OU 12.

Site 32 is located in the Main Base Area of NAS Cecil Field, in the area north of the east-west flightline and includes Buildings 325 and 335 and the adjacent areas. The portion of the site in the vicinity of Building 325 (approximately 1.4 acres) is a paved and fenced storage area, and the remaining portion of the 2-acre site, located east of the fenced storage area and north of Building 335, is unpaved. Site 32 is bordered by paved parking lots to the north and south, by another DRMO Storage Yard to the west, and by Building 68 to the east. The site is an industrial area, and the reuse plan identifies that this area will continue to be used in that manner.

Site 32 was used for initial storage and warehousing of materials as they arrived at the base. The site was color-coded gray in the EBS (ABB-ES, 1994) because of hazardous material storage and reported hazardous material releases at the site. Historical usage of the property for unpermitted storage of hazardous materials and first-hand accounts of leaking and poorly maintained drums have been documented. ABB Environmental Services, Inc. (ABB-ES) performed a field investigation for the assessment of sediment, surface soil, and groundwater at AOI 32 in 1996 (ABB-ES, 1996).

E.2 SUMMARY OF PREVIOUS INVESTIGATIONS

Environmental investigations at Site 32 began in 1993 as part of a base-wide EBS (ABB-ES, 1994). An additional investigation was conducted based on the recommendation presented in the EBS. The results of that investigation were presented in the Sampling and Analysis Report (SAR) for AOI 32 (ABB-ES, 1996).

Subsequent to the SAR, Tetra Tech NUS, Inc. (TtNUS) conducted seven sampling events at Site 32 between June 1999 and April 2000 to supplement the results of previous investigations and to delineate the extent of metals- and polynuclear aromatic hydrocarbon (PAH)-contaminated soil. The results of these field investigations were used to develop a dig and haul package (remedial design plan) for a removal action consisting of soil excavation and off-site disposal of the contaminated soil (TtNUS, 2000b).

A previous action to remove soil contamination at levels in statistical excess of the Florida Department of Environmental Protection (FDEP) industrial soil cleanup target levels (SCTLs) was conducted on August 23, 2000, as described in the Source Removal Report for Site 32 (CH2M Hill, 2001). During that removal action soil exhibiting inorganic contamination in excess of FDEP SCTLs, but located beneath the asphalt pavement in the DRMO Storage Yard, was left in place.

E.3 SUMMARY OF RISK EVALUATION

Inorganic contamination, including antimony, barium, lead, nickel, selenium, and vanadium, concentrations in excess of FDEP SCTLs, was identified and remains at Site 32 under the DRMO asphalt pavement area. Benzo(a)pyrene (BaP) contamination exceeding FDEP SCTLs was also identified outside the paved area. The removal action removed soil with BaP concentrations in excess of the leachability SCTL or three times the FDEP commercial/industrial direct exposure, which resulted in a 95 percent upper confidence limit (UCL) less than the commercial/industrial SCTL in the area outside of the pavement; however, contamination above the residential SCTL still remains. To be protective of human health, the asphalt cap must remain and deed restrictions must be imposed to prevent residential-type exposures.

E.4 REMEDIAL ACTION OBJECTIVES AND PRELIMINARY REMDIAL ACTION GOALS

To protect the public from potential current and future health risks, as well as to protect the environment, the following RAOs were developed:

- Prevent unacceptable risk from exposure to soil with concentrations of PAHs and inorganics in excess of the FDEP residential SCTL.

- Address the potential risk of transfer of organic and inorganic contamination from soil to groundwater from soils with concentrations that exceed the FDEP SCTL for leachability.

A preliminary remediation goal (PRG) is the target concentration to which a chemical of concern (COC) must be reduced within a particular medium of concern to achieve one or more of the established RAOs. PRGs are developed to ensure that contaminant concentration levels remaining on site are protective of human and ecological receptors.

For Site 32, soil PRGs were established based on the following criteria:

- Protection of human health from direct exposure to contaminated soil
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBCs) criteria to the extent practicable

E.5 DEVELOPMENT OF REMEDIAL ALTERNATIVES

Based on the RAOs and PRGs, the following alternatives for soil remediation have been developed for Site 32:

- **Alternative 1: No Action.** This alternative is a "walk-away" alternative that is required under CERCLA to establish a basis for comparison with other alternatives. Under this alternative, the property would be released for unrestricted use. This alternative cannot be chosen for Site 32 because waste would remain on site without any use restrictions.

- **Alternative 2: Institutional Controls and Monitoring.** Institutional controls would consist of limiting land use to industrial purposes. Land use controls (LUCs) would be prepared and implemented to ensure that, prior to any development at Site 32, adequate measures would be taken to minimize adverse human health and environmental effects. In particular, land use controls would prevent residential development of Site 32, and the asphalt cap or pavement would be required to remain in good repair. Regular site inspections would be conducted to verify the dead restrictions and requirements were being followed.

  Monitoring of the soil would consist of advancing soil borings within the contaminated area and field testing the samples with an organic vapor analysis (OVA). For each boring, the sample with the highest OVA reading or highest inorganic concentration, based on previous sampling results, would also be analyzed for their location specific COCs by a fixed-base laboratory. Monitoring would also

consist of collecting groundwater samples from existing and proposed wells within and downgradient of the contaminated soil area and analyzing these samples for volatile organic compounds, semivolatile organic compounds, and inorganics.

Monitoring would be conducted for 30 years, and the data would be evaluated to determine the need for additional remedial action at the site. Sampling frequency would be every 5 years. Every 5 years, site reviews, including evaluation of sampling data, would be conducted to evaluate the continued adequacy of the remedial alternative. As part of the change of Site 32 from military to private ownership, provisions would be incorporated into the property transfer documents to ensure continuation of the above-described monitoring.

- **Alternative 3: Excavation and Off-Base Treatment and Disposal.** This alternative would allow unrestricted use of the site. Soil contaminated with concentrations of COCs that are in excess of the pick-up value needed to achieve the 95 percent UCL to obtain the FDEP SCTLs for direct residential exposure or FDEP leachability SCTLs would be excavated. Pre-excavation sampling would be conducted in order to determine the exact extent of the contamination. Post-excavation verification sampling would also be conducted and the excavated area would be backfilled with clean fill and restored to pre-excavation conditions.

  Because the majority of the area to be excavated is paved, it is assumed that on-site screening, crushing and grinding would be required to reduce the particle size of at least part of the excavated material to less than 3 inches, as typically required by treatment, storage, and disposal facilities (TSDFs). The excavated soil would be transported to an off-base permitted TSDF for treatment and disposal. The exact nature and extent of treatment would be determined by the TSDF, based upon actual analysis of the contaminated soil and the requirements of the TSDF's permit. It is assumed that soil with higher concentrations of inorganics would be chemically fixated and solidified. As may be required by the TSDF, bench-scale treatability tests may be performed to determine optimum treatment.

E.6 COMPARATIVE ANALYISIS OF REMEDIAL ALTERNATIVES

Overall protection of human health and the environment would not be met by Alternative 1, but both Alternatives 2 and 3 would be protective. Alternative 3 would be more protective because the risk would be removed rather than just restricted.

Alternative 1 would not achieve compliance with ARARs and TBCs. Alternative 2 would comply with location-specific and action-specific ARARs and TBCs but not chemical-specific ARARs and TBCs. Alternative 3 would comply with all three types of ARARs and TBCs.

Long-term effectiveness and permanence cannot be determined under Alternative 1. Both Alternatives 2 and 3 would have long-term effectiveness and would be permanent solutions.

Alternatives 1 and 2 would not reduce contaminant toxicity, mobility, or volume. Alternative 3 would remove 2,627 cubic yards of contaminated soil, thereby permanently reducing the volume of contamination at Site 32.

Alternative 1 would not result in any short-term risks to site workers, but it also would not be effective in the short term either. Alternative 2 would have a slight risk to site workers during field sampling efforts, but RAOs would be achieved immediately. PRGs could eventually be achieved in the long term through natural attenuation. However, these risks would be mitigated by appropriate health and safety procedures. Alternative 3 would result in a significant risk to site workers during excavation and disposal activities. The RAOs would be achieved immediately upon implementation and the PRGs would be attained within 2 months.

Alternative 1 would be simple to implement because no action would occur. Alternative 2 is relatively easy to implement through administrative means, and resources, materials, and equipment are readily available for the monitoring efforts. Alternative 3 would be more difficult, although still possible to implement, because contaminated soil would have to be excavated and transported off site for treatment and disposal.

There is no cost for Alternative 1. Alternative 2 would have an initial cost of $11,000, annual costs of $1,000 to verify implementation of institutional controls, and costs every five years of $13,000 for monitoring and reporting, for a net present worth of $50,000 over the projected 30 years. Alternative 3 would have total cost of $676,000 with no long-term costs.

E.7 RECOMMENDED REMEDIAL ALTERNATIVE

It is not acceptable to select Alternative 1, No Action. Both Alternatives 2 and 3 are effective in achieving their designed objectives, they are technically feasible, comply with regulatory requirements, and are relatively easy to implement. Alternative 2 is less expensive, but Alternative 3 would permit unrestricted use of the site.

Site 32 has been identified in the reuse plan as an industrial area, and it is anticipated that the asphalt pavement area will continue to be used in the manner for which it was constructed. It is therefore recommended that the lower-cost Alternative 2 be selected.

1.0 INTRODUCTION

This Engineering Evaluation/Cost Analysis (EE/CA) for Operable Unit (OU) 12, Site 32, Defense Reutilization and Marketing Office (DRMO) Asphalt Storage Yard, at Naval Air Station (NAS) Cecil Field, has been prepared by Tetra Tech NUS, Inc. (TtNUS) for the Department of the Navy Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). The work was conducted under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Program, Contract Number N62467-94-D-0888, Contract Task Order (CTO) 0078.

This EE/CA is being prepared to comply with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements for a non-time-critical removal action, as identified in Section 300.415(b)(4)(I) of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). The goal of this EE/CA is to identify remedial action objectives (RAOs), develop remedial alternatives to achieve these RAOs, and then evaluate the alternatives with regards to cost, effectiveness, and implementability in order to select the most appropriate alternative.

Extensive sampling and analysis were conducted to identify and delineate soil contamination at Site 32. Initial investigations identified soil contamination beneath the asphalt pavement area exceeding FDEP SCTLs and additional polynuclear aromatic hydrocarbon (PAH) outside the pavement area. Actions were taken to delineate, excavate, and dispose of soil in the non-paved areas that were contaminated with PAHs at levels exceeding the FDEP industrial direct exposure SCTLs as identified in Chapter 62-777 of the Florida Administrative Code (FAC); however, soil contamination above the Florida Department of Environmental Protection (FDEP) residential soil cleanup target levels (SCTLs) still exists. This EE/CA evaluates alternatives for leaving this contamination in place and implementing institutional controls, and for removing the contaminated soil thereby permitting unrestricted use.

2.0 SITE CHARACTERIZATION

2.1 SITE DESCRIPTION AND BACKGROUND

2.1.1 Physical Setting

Site 32 is located in the Main Base Area of NAS Cecil Field (Figure 2-1), just north of the western end of Crossover Street (formerly 2nd Street) and west of New World Avenue (formerly "D" Avenue) in the area north of the east-west flightline. The site includes Buildings 325 and 335 and the adjacent area. The portion of the site in the vicinity of Building 325 (approximately 1.4 acres) is a paved fenced storage area, and the remaining portion of the 2-acre site, located east of the fenced storage area and north of Building 335, is unpaved. Site 32 is bordered by paved parking lots to the north and south, by another DRMO Storage Yard to the west, and by Building 68 to the east (Figure 2-2). The site is an industrial area, and the reuse plan identifies that this area will continue to be used in that manner.

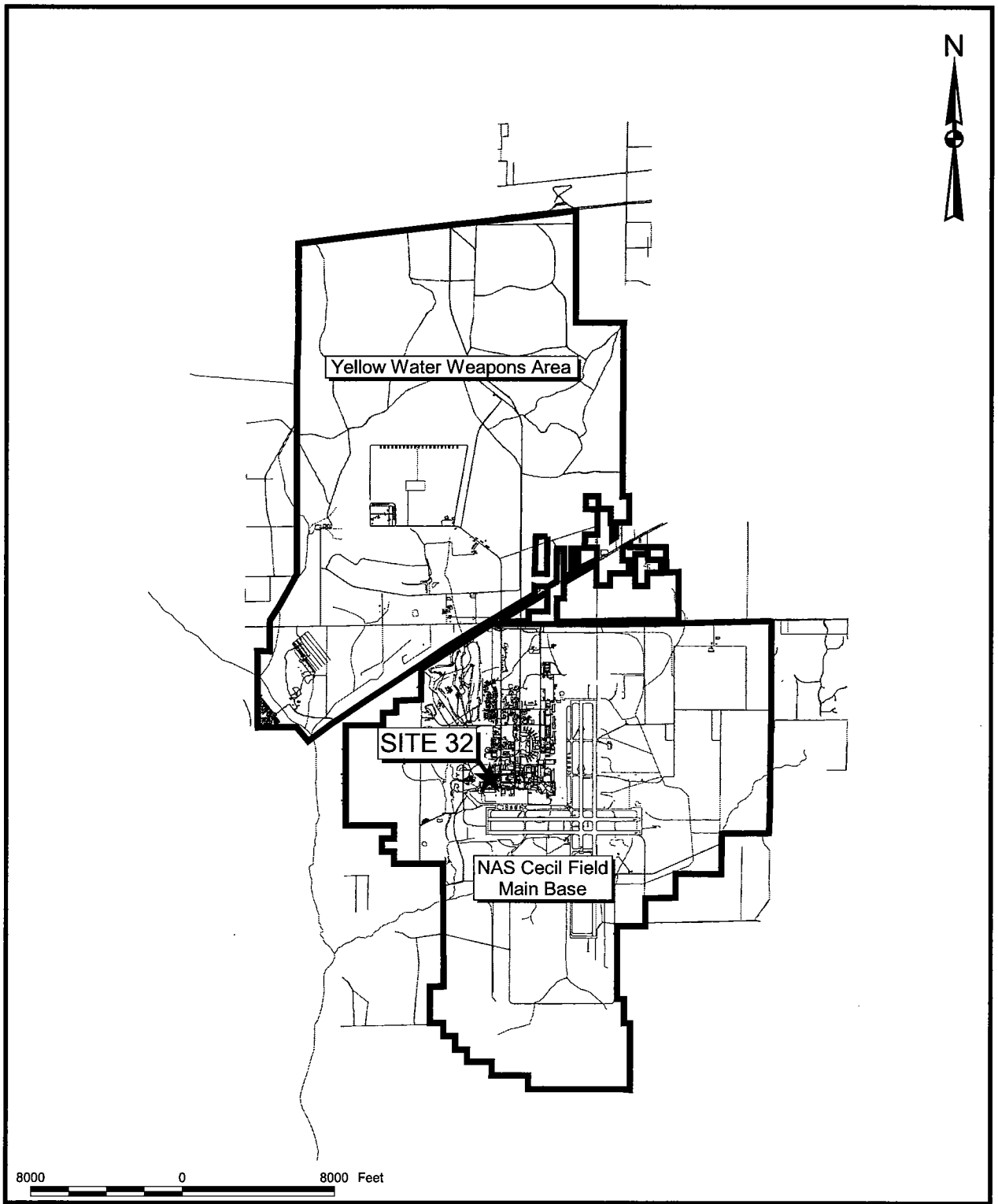
2.1.2 Site History

Site 32 was referred to in the Base Realignment and Closure (BRAC) NAS Cecil Field Environmental Baseline Survey (EBS) (ABB-ES, 1994) as Area of Interest (AOI) 32, the Hazardous Material Warehouse Storage Area. The site was then referred to as Potential Source of Contamination (PSC) 32 the DRMO Asphalt Storage Yard (CH2M Hill, 2001; TtNUS, 1999b, 2000a, and 2000b). Currently the area is identified as Site 32 and is one of four sites that have been incorporated into OU12 as part of the Installation Restoration (IR) Program at NAS Cecil Field.

Site 32 was used for initial storage and warehousing of materials as they arrived at the base. The site was color-coded gray in the EBS (ABB-ES, 1994) because of hazardous material storage and reported hazardous material releases at the site. Historical usage of the property for unpermitted storage of hazardous materials and first-hand accounts of leaking and poorly maintained drums have been documented. ABB Environmental Services, Inc. (ABB-ES) performed a field investigation for the assessment of sediment, surface soil, and groundwater at AOI 32 in 1996 (ABB-ES, 1996).

2.1.3 Site Geology and Hydrogeology

Site 32 is located between OU 3, Site 7 and OU 9, Site 37. No site-specific subsurface geologic investigation was performed at the DRMO Asphalt Storage Yard. The geological and hydrogeological characteristics of the site are assumed to be similar to those described in the Remedial Investigation (RI) Reports for OU 3, Sites 7 and 8 (ABB-ES, 1997) and OU 9, Sites 36 and 37 (TtNUS, 1999a).



DRAWN BY MJJ	DATE 08May00	GENERAL LOCATION MAP SITE 32, DRMO ASPHALT STORAGE YARD EE/CA NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE 8/2/02		APPROVED BY	DATE 8/8/02
COST/SCHEDULE-AREA			APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-1	REV 0

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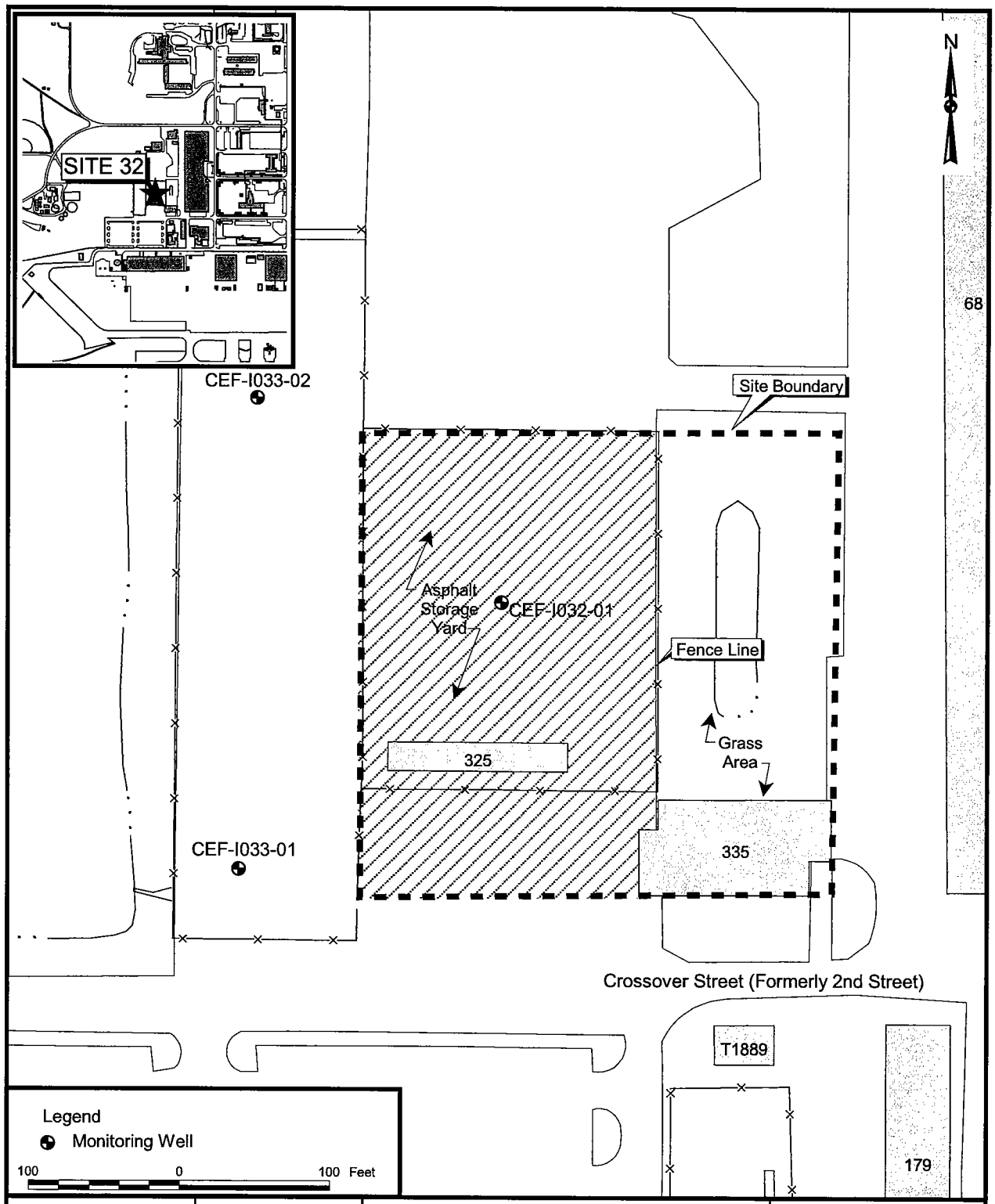

DRAWN BY MJJ	DATE 08May00	SITE LAYOUT MAP SITE 32, DRMO ASPHALT STORAGE YARD EE/CA NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
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COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-2 REV 0

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2.2 PREVIOUS INVESTIGATIONS

Environmental investigations at Site 32 began in 1993 as part of a base-wide EBS. The following reports describe the results of investigations conducted prior to the TtNUS investigation at this site:

- EBS Report (ABB-ES, 1994)
- Sampling and Analysis Report (SAR), Area of Interest 32 (ABB-ES, 1996)

The SAR indicated the following:

- 4-Methylphenol, antimony, barium, lead, nickel, selenium, and vanadium were detected in surface soil samples collected in the study area at concentrations in excess of the most restrictive of the FDEP industrial or leachability to groundwater SCTLs or the site-specific NAS Cecil Field Inorganic Background Data Set (IBDS) screening values (HLA, 1998). No hexavalent chromium was found in one reanalyzed surface soil sample that originally exhibited the highest concentration of total chromium.

- No human health or ecological screening criteria were exceeded in the sediment sample collected from the stormwater retention pond located in the unpaved area north of Building 335.

- One monitoring well was installed at the site, and all organic compounds and inorganic analytes in groundwater from this well were below FDEP groundwater cleanup target levels GCTLs (FDEP, 1999) or NAS Cecil Field IBDS screening values.

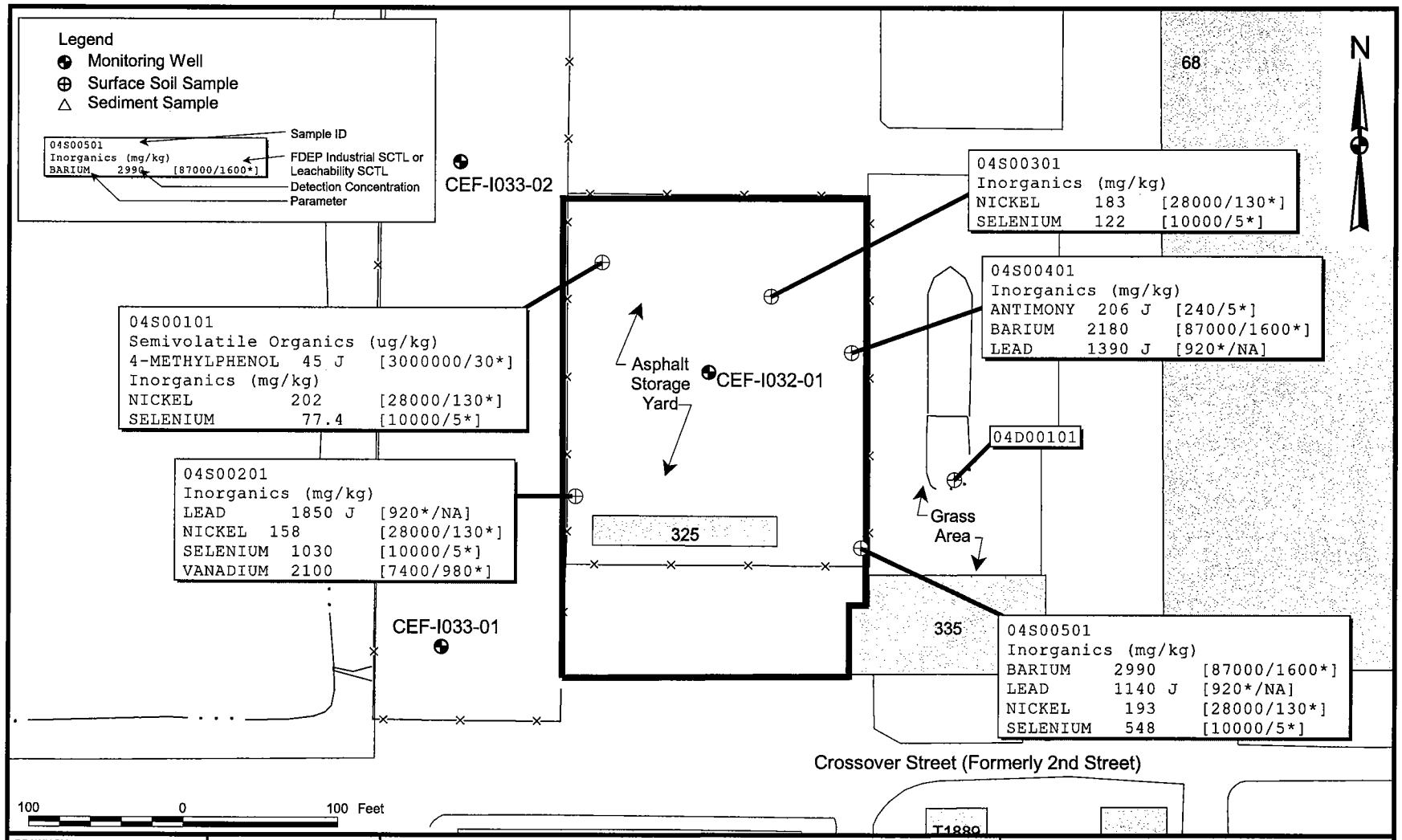
- No exposure pathways to human or ecological receptors were identified for groundwater.

- Concentrations of inorganic analytes detected in surface soil at the site might represent a hazard to human health or the environment if deterioration of the asphalt pavement resulted in an exposure pathway. Therefore, a reclassification of the color code from gray to red was recommended.

A summary of sampling locations and detected contaminants exceeding criteria from the previous investigations is shown on Figure 2-3.

2.3 RECENT FIELD INVESTIGATION

TtNUS conducted seven soil sampling and analysis events at Site 32 between May 1999 and April 2000 to delineate the extent of PAH- and inorganic-contaminated surface and subsurface soil. The field



DRAWN BY	DATE		CONTRACT NUMBER 0039
MJJ	06Mar01	SAMPLE LOCATION AND EXCEEDANCE MAP PREVIOUS INVESTIGATIONS SITE 32, DRMO ASPHALT STORAGE YARD EE/CA NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	APPROVED BY MPS DATE 8/8/02
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COST/SCHEDULE-AREA			DRAWING NO. FIGURE 2-3 REV 0
SCALE AS NOTED			

P:\GIS\NAS_CecilField\psc32_techmemo.apr 07Aug02 MJJ Previous Locations Layout

investigation was performed in accordance with the PSC 32 Sampling and Analysis Work Plans (TtNUS, 1999b and 2000a). A total of 39 soil samples were collected over the seven phases of the investigation.

- During Phase I, six surface soil samples were collected to determine the extent of contamination at the DRMO Asphalt Storage Yard. Two samples, one at a depth interval of 0 to 1 foot below ground surface (bgs) and one at a depth interval of 1 to 2 feet bgs, were collected at location CEF-P32-SS-001, which is the former location of sample 04S00201. The 0- to 1-foot sample (CEF-P32-SS-001-01) was analyzed for Target Analyte List (TAL) inorganics, Toxicity Characteristic Leaching Procedure (TCLP) inorganics, and PAHs, and the 1- to 2-foot sample (CEF-P32-SS-001-02) was analyzed for TAL inorganics and PAHs. In addition, four surface soil samples (CEF-P32-SS-002 through CEF-P32-SS-005) were collected at a depth interval of 0 to 1 foot bgs, from outside each of the four corners of the fenced-in area. These four samples were analyzed for TAL inorganics and PAHs.

- During Phase II, seven soil samples were collected, based on the results of Phase I sampling, to further delineate the extent of PAH and inorganic contamination. Two samples (CEF-P32-SS-101 and CEF-P32-SS-102) were collected 15 feet north and 15 feet east, respectively, of previous sampling location CEF-P32-SS-003, at a depth interval of 0 to 1 foot bgs. Each of these samples was analyzed for PAHs. Three samples (CEF-P32-SS-103 through CEF-P32-SS-105) were collected from the concrete parking lot, approximately 70 feet south of the fenced-in storage area, at equally spaced intervals. These samples were analyzed for PAHs and TAL inorganics. Finally, two soil samples (CEF-P32-SS-106 and CEF-P32-SS-107) were collected at depth intervals of 1 to 2 feet at former sampling locations CEF-P32-SS-002 and CEF-P32-SS-003, respectively. These two samples were also analyzed for TAL inorganics and PAHs.

- During Phase III, five soil samples were collected to further delineate the horizontal and vertical extent of PAH contamination. The three samples collected at the 0- to 1-foot depth interval included sample CEF-P32-SS-201, located 15 feet north of previous location CEF-P32-SS-101, sample CEF-P32-SS-203, located 15 feet east of previous location CEF-P32-SS-102, and sample CEF-P32-SS-202, located midway between samples CEF-P32-SS-201 and CEF-P32-SS-203. In addition, one sample, CEF-P32-SS-204, was collected at a 1- to 2-foot depth interval at previous sampling location CEF-P32-SS-102, and one subsurface soil sample (CEF-P32-SU-205) was collected at a 2- to 3-foot depth interval to establish the vertical extent of contamination at previous location CEF-P32-SS-003. The samples collected during this phase of the field investigation were analyzed for PAHs.

- During Phase IV, five soil samples were collected to further delineate the horizontal and vertical extent of PAH contamination. The four samples collected at the 0- to 1-foot depth interval included sample CEF-P32-SS-301, located 15 feet north of previous location CEF-P32-SS-201, sample CEF-P32-SS-302, located 15 feet north of previous location CEF-P32-SS-202, sample CEF-P32-SS-303, located 15 feet east of previous location CEF-P32-SS-202, and sample CEF-P32-SS-304, located 15 feet east of previous location CEF-P32-SS-203. In addition, one subsurface soil sample (CEF-P32-SU-305) was collected at a 2- to 3-foot depth interval to establish the vertical extent of contamination at previous location CEF-P32-SS-202. All samples collected during this phase of the field investigation were analyzed for PAHs.

- During Phase V, six soil samples were collected to further delineate the horizontal and vertical extent of PAH contamination. The four samples collected at the 0- to 1-foot depth interval included sample CEF-P32-SS-401, located 15 feet north of previous location CEF-P32-SS-301, sample CEF-P32-SS-402, located 15 feet north of previous location CEF-P32-SS-303, sample CEF-P32-SS-403, located 15 feet east of previous location CEF-P32-SS-303, and sample CEF-P32-SS-404, located 15 feet east of previous location CEF-P32-SS-304. In addition, one sample, CEF-P32-SS-405, was collected at a 1- to 2-foot depth interval at previous sampling location CEF-P32-SS-304, and one subsurface soil sample (CEF-P32-SU-406) was collected at a 2- to 3-foot depth interval to establish the vertical extent of contamination at previous location CEF-P32-SS-304. All samples collected during this phase of the field investigation were analyzed for PAHs.

- During Phase VI, five soil samples were collected to further delineate the extent of PAH contamination identified in previous sampling activities. The four samples collected at the 0- to 1-foot depth interval included sample CEF-P32-SS-501, located 15 feet north of previous location CEF-P32-SS-401, sample CEF-P32-SS-502, located 15 feet east of previous location CEF-P32-SS-401 (along the top bank of the sedimentation basin), sample CEF-P32-SS-503, located 15 feet north of previous location CEF-P32-SS-403, and sample CEF-P32-SS-504, located 15 feet east of previous location CEF-P32-SS-403. In addition, one sample, CEF-P32-SS-505, was collected at a 1- to 2-foot depth interval at previous sampling location CEF-P32-SS-202. All samples collected during this phase of the field investigation were analyzed for PAHs.

- Finally, during Phase VII, five soil samples were collected to further delineate the extent of PAH contamination. The four samples collected at the 0- to 1-foot depth interval included sample CEF-P32-SS-601, located 15 feet north of previous location CEF-P32-SS-501, sample CEF-P32-SS-602, located 15 feet east of previous location CEF-P32-SS-501, sample CEF-P32-SS-603, located 15 feet north of previous location CEF-P32-SS-504, and sample CEF-P32-SS-604, located 15 feet east of previous location CEF-P32-SS-504. In addition, one sample, CEF-P32-SS-605, was

collected at a 1- to 2-foot depth interval at previous sampling location CEF-P32-SS-201. All samples collected during this phase of the field investigation were analyzed for PAHs.

Over the seven phases of sampling, seven field duplicate soil samples were collected for quality assurance/ quality control (QA/QC) purposes. Sampling locations for the seven phases of field sampling are shown on Figure 2-4.

Soil samples were collected as grab samples using plastic, disposable trowels. Sampling activities were performed in accordance with the procedures described in the United States Environmental Protection Agency (U.S. EPA) Region IV Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM) (U.S. EPA Region IV, 1996) and the NAS Cecil Field Base-Wide Generic Work Plan (TtNUS, 1998). As agreed by the BRAC Cleanup Team (BCT), no rinsate and trip blanks were collected. In addition, field blanks were not collected because the decontamination of sampling equipment was minimal.

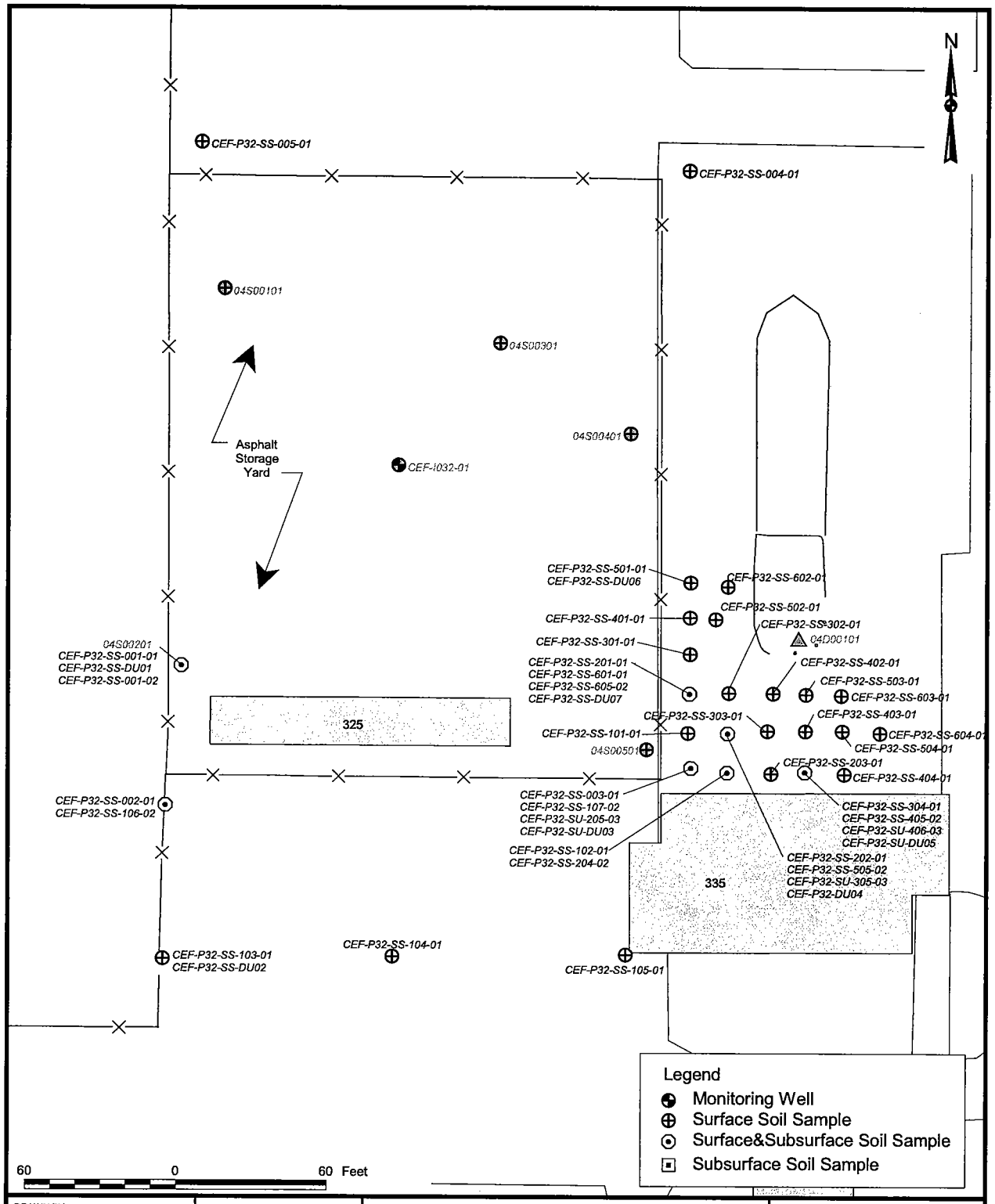
The soil samples were analyzed for PAHs by U.S. EPA Method SW-846 8310, for TAL inorganics by U.S. EPA Method SW-846 6010B, and for TCLP inorganics using U.S. EPA Method SW-846 1311 followed by SW 846 6010B/7000A. Accutest Southeast, in Orlando, Florida, performed the analyses.

2.4 NATURE AND EXTENT OF CONTAMINATION

Analytical results for the soil samples collected during the seven-phased field investigation are shown on Table 2-1 and 2-2, and complete laboratory data, including those from previous investigations, are included in Appendix A. Table 2-1 and 2-2 also compare the results to the most restrictive of the industrial direct exposure or the leachability to groundwater SCTLs (FDEP, 1999). This comparison was conducted to demonstrate the need for initial removal action conducted. Table 2-3 provides a summary of the positive analytical results for the soil samples collected at Site 32, the frequencies and ranges of detection and the locations of the maximum detections.

2.4.1 Risk Evaluation/Determination Of Cleanup Concentration for Industrial Use

The BCT decided to conduct a removal action to address potential exposures, to address hazardous substances that may pose a threat of release, and to comply with the reuse planned for this area. The reuse plan identified Site 32 as an industrial area. Some soil samples remaining on site after excavation activities may have concentrations exceeding FDEP SCTLs, however, land use controls (LUCs) (asphalt cap maintenance plan) will be put in place and monitored annually to ensure that the site remains free of risk. The following sections discuss the human health and ecological risks and identifies how the action level concentration to achieve industrial SCTLs was determined.



DRAWN BY MJJ	DATE 08May00	SAMPLE LOCATIONS MAP SITE 32, DRMO ASPHALT STORAGE YARD EE/CA NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE 8/2/02		APPROVED BY MPD DATE 8/8/02
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-4 REV 0

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TABLE 2-1

SURFACE SOIL ORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 1 OF 7

PARAMETER	FDEP SCTLs[1]		CEF-P32-						
	Industrial Direct Exposure	Leachability to Groundwater	SS-001-01	SS-001-02		SS-002-01	SS-003-01	SS-004-01	SS-005-01
				Sample	Duplicate				
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)									
Acenaphthene	18,000,000	2,100	50 U	50 U	52 U	1,400	710	42 U	48 U
Acenaphthylene	11,000,000	27,000	100 U	100 U	110 U	110 U	110 U	87 U	97 U
Anthracene	260,000,000	2,500,000	7.7 U	7.6 U	8 U	8.1 U	8.4 U	6.5 U	7.2 U
Benzo(a)anthracene	5,000	3,200	7.7 U	7.6 U	8 U	300	8.4 U	6.5 U	7.2 U
Benzo(a)pyrene	500	8,000	7.7 U	7.6 U	8 U	280	230	45	7.2 U
Benzo(b)fluoranthene	4,800	10,000	7.7 U	7.6 U	8 U	490	270	58	7.2 U
Benzo(g,h,i)perylene	41,000,000	32,000,000	10 U	10 U	11 U	340	290	49	9.7 U
Benzo(k)fluoranthene	52,000	25,000	7.7 U	7.6 U	8 U	160	140	6.5 U	7.2 U
Chrysene	450,000	77,000	7.7 U	7.6 U	200 J	420	200	6.5 U	3,100
Dibenzo(a,h)anthracene	500	30,000	13 U	12 U	13 U	13 U	220	11 U	12 U
Fluoranthene	48,000,000	1,200,000	10 U	10 U	11 U	15,000	650	8.7 U	9.7 U
Fluorene	28,000,000	160,000	10 U	10 U	11 U	11 U	11 U	8.7 U	9.7 U
Indeno(1,2,3-cd)pyrene	5,300	28,000	6.5 U	7.6 U	8 U	220	210	50	7.2 U
1-Methylnaphthalene	470,000	2,100	50 U	50 U	52 U	53 U	55 U	42 U	48 U
2-Methylnaphthalene	560,000	6,100	50 U	50 U	52 U	1,400	580	42 U	48 U
Naphthalene	270,000	17,000	50 U	50 U	52 U	53 U	55 U	42 U	48 U
Phenanthrene	30,000,000	250,000	7.7 U	7.6 U	8 U	780	330	6.5 U	7.2 U
Pyrene	37,000,000	880,000	10 U	10 U	11 U	980	530	8.7 U	9.7 U

TABLE 2-1

SURFACE SOIL ORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 2 OF 7

PARAMETER	FDEP SCTLs[1]		CEF-P32-						
	Industrial Direct Exposure	Leachability to Groundwater	SS-101-01	SS-102-01	SS-103-01		SS-104-01	SS-105-01	SS-106-02
					Sample	Duplicate			
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)									
Acenaphthene	18,000,000	2,100	365	171	111	72 UJ	360 U	74 U	71 U
Acenaphthylene	11,000,000	27,000	71 U	70 U	73 U	72 U	360 U	74 U	71 U
Anthracene	260,000,000	2,500,000	71 U	70 U	73 U	72 U	360 U	74 U	71 U
Benzo(a)anthracene	5,000	3,200	312	187	80.1 J	11 UJ	54 U	11 U	11 U
Benzo(a)pyrene	500	8,000	420	444	77.3 J	11 UJ	54 U	11 U	11 U
Benzo(b)fluoranthene	4,800	10,000	643	460	103 J	11 UJ	54 U	11 U	11 U
Benzo(g,h,i)perylene	41,000,000	32,000,000	454	840	55.2 J	11 UJ	54 U	11 U	11 U
Benzo(k)fluoranthene	52,000	25,000	279	212	58.8 J	11 UJ	54 U	11 U	11 U
Chrysene	450,000	77,000	351	205	99.5 J	11 UJ	54 U	11 U	11 U
Dibenzo(a,h)anthracene	500	30,000	19.3	97.6	11 U	11 UJ	54 U	11 U	11 U
Fluoranthene	48,000,000	1,200,000	423	296	206 J	11 UJ	54 U	11 U	11 U
Fluorene	28,000,000	160,000	130	77.6	73 U	72 U	360 U	74 U	71 U
Indeno(1,2,3-cd)pyrene	5,300	28,000	417	60.8	65.6 J	11 UJ	54 U	11 U	11 U
1-Methylnaphthalene	470,000	2,100	71 U	70 U	73 U	72 U	360 U	74 U	71 U
2-Methylnaphthalene	560,000	6,100	224	126	79.6 J	72 UJ	360 U	74 U	71 U
Naphthalene	270,000	17,000	76.7	72.5	73 U	72 U	360 U	74 U	71 U
Phenanthrene	30,000,000	250,000	135	136	125 J	72 UJ	360 U	74 U	71 U
Pyrene	37,000,000	880,000	421	261	162 J	11 UJ	54 U	11 U	11 U

TABLE 2-1

SURFACE SOIL ORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 3 OF 7

PARAMETER	FDEP SCTLs[1]		CEF-P32-						
	Industrial Direct Exposure	Leachability to Groundwater	SS-107-02	SS-201-01	SS-202-01	SS-203-01	SS-204-02	SU-205-03	
								Sample	Duplicate
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)									
Acenaphthene	18,000,000	2,100	195	1,150	2,430	404	73 U	70 U	71 U
Acenaphthylene	11,000,000	27,000	69 U	98.9	504	68 U	73 U	70 U	71 U
Anthracene	260,000,000	2,500,000	69 U	168	239	82.5	73 U	70 U	71 U
Benzo(a)anthracene	5,000	3,200	155	739	2,290	354	18.9	10 U	11 U
Benzo(a)pyrene	500	8,000	204	1,350	4,640	1,520	42.7	10 U	11 U
Benzo(b)fluoranthene	4,800	10,000	266	1,130	3,790	1,320	37.8	10 U	11 U
Benzo(g,h,i)perylene	41,000,000	32,000,000	186	768	2,280	886	11 U	10 U	11 U
Benzo(k)fluoranthene	52,000	25,000	109	462	1,540	538	17.9	10 U	11 U
Chrysene	450,000	77,000	199	812	2,340	434	21.9	10 U	11 U
Dibenzo(a,h)anthracene	500	30,000	10 U	10 U	35.2	10 U	81.4	10 U	11 U
Fluoranthene	48,000,000	1,200,000	313	2,280	4,980	865	90.1	10 UJ	35.6
Fluorene	28,000,000	160,000	69 U	93.5	908	185	73 U	70 U	71 U
Indeno(1,2,3-cd)pyrene	5,300	28,000	192	834	3,000	1,140	22.6	10 U	11 U
1-Methylnaphthalene	470,000	2,100	69 U	638	1,860	68 U	73 U	70 U	71 U
2-Methylnaphthalene	560,000	6,100	131	257	490	68 U	73 U	70 U	71 U
Naphthalene	270,000	17,000	69 U	69 U	232	90.4	73 U	70 U	71 U
Phenanthrene	30,000,000	250,000	123	884	338	129	73 U	70 U	71 U
Pyrene	37,000,000	880,000	280	1,580	3,560	1,950	29.4	10 U	11 U

TABLE 2-1

SURFACE SOIL ORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 4 OF 7

PARAMETER	FDEP SCTLs[1]		CEF-P32-						
	Industrial Direct Exposure	Leachability to Groundwater	SS-301-01	SS-302-01	SS-303-01	SS-304-02	SU-305-03 Sample	SU-305-03 Duplicate	SS-401-01
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)									
Acenaphthene	18,000,000	2,100	70 U	158	708	12,200	70 U	71 U	147
Acenaphthylene	11,000,000	27,000	70 U	70 U	72 U	ND	70 U	71 U	71 U
Anthracene	260,000,000	2,500,000	70 U	70 U	72 U	2,090	70 U	71 U	71 U
Benzo(a)anthracene	5,000	3,200	384	120	317	4,200	10 U	10 U	410
Benzo(a)pyrene	500	8,000	728	139	601	3,880	10 U	10 U	467
Benzo(b)fluoranthene	4,800	10,000	522	78.4	359	2,960	10 U	10 U	740
Benzo(g,h,i)perylene	41,000,000	32,000,000	504	110	497	2,350	270 J	10 UJ	388
Benzo(k)fluoranthene	52,000	25,000	131	31.3	104	744	10 U	10 U	382
Chrysene	450,000	77,000	412	10 U	309	3,270	10 U	10 U	541
Dibenzo(a,h)anthracene	500	30,000	10 U	10 U	11 U	226	10 U	10 U	11 U
Fluoranthene	48,000,000	1,200,000	686	284	522	12,200	10 U	10 U	586
Fluorene	28,000,000	160,000	70 U	70 U	72 U	862	70 U	71 U	71 U
Indeno(1,2,3-cd)pyrene	5,300	28,000	337	10 U	11 U	1,470	138 J	10 UJ	392
1-Methylnaphthalene	470,000	2,100	158	72.2	188	3,360	70 U	71 U	71 U
2-Methylnaphthalene	560,000	6,100	344	70 U	72 U	ND	70 U	71 U	76.4
Naphthalene	270,000	17,000	70 U	70 U	72 U	623	70 U	71 U	76.4
Phenanthrene	30,000,000	250,000	70 U	138	72 U	6,570	70 U	71 U	71 U
Pyrene	37,000,000	880,000	370	188	460	8,010	10 U	10 U	602

TABLE 2-1

SURFACE SOIL ORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 5 OF 7

PARAMETER	FDEP SCTLs[1]		CEF-P32-					
	Industrial Direct Exposure	Leachability to Groundwater	SS-402-01	SS-403-01	SS-404-01	SS-405-02	SU-406-03	
							Sample	Duplicate
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)								
Acenaphthene	18,000,000	2,100	70 U	181	71 U	76 U	80.1 J	70 UJ
Acenaphthylene	11,000,000	27,000	70 U	219	107	76 U	156 J	70 UJ
Anthracene	260,000,000	2,500,000	70 U	72 U	71 U	76 U	71 U	70 U
Benzo(a)anthracene	5,000	3,200	16.5	336	85.1	14	182 J	10 UJ
Benzo(a)pyrene	500	8,000	10 U	292	61.6	11 U	111 J	10 UJ
Benzo(b)fluoranthene	4,800	10,000	25.8	488	114	11 U	165 J	10 UJ
Benzo(g,h,i)perylene	41,000,000	32,000,000	25.9	336	78	11 U	118 J	10 UJ
Benzo(k)fluoranthene	52,000	25,000	12.6	275	54.7	11 U	97.4 J	10 UJ
Chrysene	450,000	77,000	21	398	105	13.1	184 J	10 UJ
Dibenzo(a,h)anthracene	500	30,000	10 U	21.2	11 U	11 U	34.1 J	10 UJ
Fluoranthene	48,000,000	1,200,000	32.3	656	237	92.6	517 J	10 UJ
Fluorene	28,000,000	160,000	70 U	72 U	71 U	76 U	71 U	70 U
Indeno(1,2,3-cd)pyrene	5,300	28,000	10 U	330	75.3	11 U	117 J	10 UJ
1-Methylnaphthalene	470,000	2,100	70 U	72 U	71 U	76 U	71 U	70 U
2-Methylnaphthalene	560,000	6,100	70 U	105	71 U	76 U	96.5 J	70 UJ
Naphthalene	270,000	17,000	70 U	72 U	88.8	76 U	89.6 J	70 UJ
Phenanthrene	30,000,000	250,000	70 U	141	130	76 U	217 J	70 UJ
Pyrene	37,000,000	880,000	29.8	552	211	18.3	360 J	10 UJ

TABLE 2-1

SURFACE SOIL ORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 6 OF 7

PARAMETER	FDEP SCTLs[1]		CEF-P32-					
	Industrial Direct Exposure	Leachability to Groundwater	SS-501-01		SS-502-01	SS-503-01	SS-504-01	SS-505-02
			Sample	Duplicate				
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)								
Acenaphthene	18,000,000	2,100	170 U	180 U	170 U	170 U	245	180 U
Acenaphthylene	11,000,000	27,000	170 U	180 U	170 U	170 U	180 U	180 U
Anthracene	260,000,000	2,500,000	170 U	180 U	170 U	170 U	180 U	180 U
Benzo(a)anthracene	5,000	3,200	78.5	92.6	26 U	26 U	304	26 U
Benzo(a)pyrene	500	8,000	296	301	26 U	35.3	939	26 U
Benzo(b)fluoranthene	4,800	10,000	236	255	26 U	26 U	604	26 U
Benzo(g,h,i)perylene	41,000,000	32,000,000	179	174	26 U	26 U	511	27.3
Benzo(k)fluoranthene	52,000	25,000	91.3	103	26 U	26 U	235	26 U
Chrysene	450,000	77,000	135	145	26 U	26 U	400	52.3
Dibenzo(a,h)anthracene	500	30,000	26 U	26 U	26 U	26 U	31.6	26 U
Fluoranthene	48,000,000	1,200,000	211	249	26 U	43.1	828	91.9
Fluorene	28,000,000	160,000	170 U	180 U	170 U	170 U	180 U	26 U
Indeno(1,2,3-cd)pyrene	5,300	28,000	169 J	26 UJ	26 U	30.6	534	26 U
1-Methylnaphthalene	470,000	2,100	170 U	180 U	170 U	170 U	180 U	180 U
2-Methylnaphthalene	560,000	6,100	170 U	180 U	170 U	170 U	316	180 U
Naphthalene	270,000	17,000	170 U	180 U	170 U	170 U	180 U	180 U
Phenanthrene	30,000,000	250,000	170 U	180 U	170 U	170 U	180 U	180 U
Pyrene	37,000,000	880,000	144	171	26 U	29	662	26 U

TABLE 2-1

SURFACE SOIL ORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 7 OF 7

PARAMETER	FDEP SCTLs(1)		CEF-P32-					
	Industrial Direct Exposure	Leachability to Groundwater	SS-601-01	SS-602-01	SS-603-01	SS-604-01	SS-605-02	
							Sample	Duplicate
POLYNUCLEAR AROMATIC HYDROCARBONS (ug/kg)								
Acenaphthene	18,000,000	2,100	340 U	340 U	350 U	349 J	360 U	350 U
Acenaphthylene	11,000,000	27,000	680 U	680 U	700 U	740 U	710 U	700 U
Anthracene	260,000,000	2,500,000	340 U	340 U	350 U	370 U	360 U	350 U
Benzo(a)anthracene	5,000	3,200	32.1 J	252	70 U	530	18.3 J	15.5 J
Benzo(a)pyrene	500	8,000	62.9 J	200	24.9 J	640	30 J	17.6 J
Benzo(b)fluoranthene	4,800	10,000	52.9 J	196	70 U	534	14.2 J	17 J
Benzo(g,h,i)perylene	41,000,000	32,000,000	58.7 J	164	42.4 J	633	42.6 J	20.5 J
Benzo(k)fluoranthene	52,000	25,000	39.6 J	143	70 U	420	13.4 J	11.6 J
Chrysene	450,000	77,000	37.3 J	211	70 U	556	15.6 J	15.6 J
Dibenzo(a,h)anthracene	500	30,000	15.7 J	68 U	70 U	62.5 J	71 U	70 U
Fluoranthene	48,000,000	1,200,000	340 U	343	350 U	783	360 U	350 U
Fluorene	28,000,000	160,000	340 U	340 U	350 U	370 U	360 U	350 U
Indeno(1,2,3-cd)pyrene	5,300	28,000	60.9 J	176	24.3 J	638	20 J	20.4 J
1-Methylnaphthalene	470,000	2,100	340 U	340 U	350 U	164 J	360 U	350 U
2-Methylnaphthalene	560,000	6,100	340 U	340 U	350 U	255 J	360 U	350 U
Naphthalene	270,000	17,000	340 U	340 U	350 U	370 U	360 U	350 U
Phenanthrene	30,000,000	250,000	340 U	103 J	350 U	186 J	360 U	350 U
Pyrene	37,000,000	880,000	340 U	302 J	350 U	600	360 U	350 U

(1) FDEP SCTLs = Florida Department of Environmental Protection Soil Target Cleanup Levels, Florida Administrative Code (F.A.C.) 62-777 (FDEP, 1999).
* = Excavation limits were determined using a benzo(a)pyrene concentration of greater than 1,500 ug/kg based on three times the industrial SCTL value.
Shaded values exceed STCLs.

TABLE 2-2

SURFACE SOIL INORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 1 OF 2

PARAMETER	FDEP SCTLs[1]		Inorganic Background Data Set Value(2)	CEF-P32-						
	Industrial Direct Exposure	Leachability to Groundwater		SS-001-01	SS-001-02		SS-002-01	SS-003-01	SS-004-01	SS-005-01
					Sample	Duplicate				
INORGANICS (mg/kg)										
Aluminum	NC	NC	4,430	1490 J	1910 J	737 J	5560 J	1570 J	2400 J	142 J
Antimony	240	5	9.44	0.27 U	0.27 U	0.25 U	5.8	0.24 U	0.13 U	0.28 U
Arsenic	3.7	29	2.04	0.38 U	0.39 U	0.37 U	3.8	0.35 U	0.45 U	0.14 U
Barium	87,000	1,600	14.4	2.3	3.7	2.2	62.8	7.4	5.1	3.5
Beryllium	800	63	0.35	0.28 U	0.18 U	0.24 U	1.2 U	0.30 U	0.31 U	0.24 U
Cadmium	1,300	8	1.72	0.04 U	0.04 U	0.04 U	30.2	0.37	0.11 U	0.04 U
Calcium	NC	NC	9.44	435	844	461	42,600	11,500	1,190	0.35 U
Chromium	NC	NC	7.75	6.7	1.7	0.80 U	72.5	4.9	3.1	ND
Cobalt	110,000	NC	3.11	0.19	0.12	0.12	3.8	0.23	0.2	0.12
Copper	76,000	NC	5.97	0.44	0.65	1.1	48.5	4.6	1.2	0.72
Iron	480,000	NC	1,490	382	383	239	6,970	666	766	115
Lead	920	NC	197	1.7	3	2.7	370	21.6	6.6	2.4
Magnesium	NC	NC	329	76.3	75.4	54.9	1,820	358	125	66.1
Manganese	22,000	NC	22	3.5	2.4	2.1	303	19.2	5.3	3.2
Mercury	26	2	0.16	0.05 U	0.05 U	0.04 U	0.04 U	0.04 U	0.05 U	0.05 U
Nickel	28,000	130	3.89	3.7	0.73 U	0.39 U	16.4	1.3	1.2 U	0.34 U
Potassium	NC	NC	102	27.9 U	32.1 U	20.2 U	438	72.3	51.3 U	23 U
Selenium	10,000	5	1.68	0.23 U	0.24 U	0.22 U	0.52 U	0.21 U	0.27 U	0.24 U
Silver	9,100	17	2.13	0.19 U	0.25 U	0.13 U	0.55 U	0.37 U	0.26 U	0.15 U
Sodium	NC	NC	343	17.0 U	17.2 U	16.3 U	76.1 U	31.3 U	21.1 U	29.1 U
Thallium	NC	NC	2.84	0.30 U	0.30 U	0.29 U	0.28 U	0.27 U	0.35 U	0.32 U
Vanadium	7,400	980	6.3	1.8	1.6	0.78	24.3	2.3	2.9	0.26 U
Zinc	560,000	6,000	37	4.4	3.6	3.6	557	34.1	6.9	4.8

TABLE 2-2

SURFACE SOIL INORGANIC ANALYTICAL RESULTS
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 2 OF 2

PARAMETER	FDEP SCTLs(1)		Inorganic Background Data Set Value(2)	CEF-P32-					
	Industrial Direct Exposure	Leachability to Groundwater		SS-103-01		SS-104-01	SS-105-01	SS-106-02	SS-107-02
				Sample	Duplicate				
INORGANICS (mg/kg)									
Aluminum	NC	NC	4,430	1,320	1,770	1,180	962	1,050	1770
Antimony	240	5	9.44	0.26 U	0.26 U	0.64 U	0.42 U	0.33 U	0.25 U
Arsenic	3.7	29	2.04	1.5 U	1.0 U	0.57 U	0.52 U	0.36 U	0.57 U
Barium	87,000	1,600	14.4	16.1	15.4	17.6	6.6	5.4	6.8
Beryllium	800	63	0.35	0.39 U	0.44 U	0.18 U	0.20 U	0.19 U	0.21 U
Cadmium	1,300	8	1.72	2.7	1.3	0.04 U	0.04 U	0.03 U	0.07 U
Calcium	NC	NC	9.44	170,000	156,000	660	2,180	702	9,050
Chromium	NC	NC	7.75	12.7	9.3	7.2	1.5	1.1 U	2.2
Cobalt	110,000	NC	3.11	0.61 U	0.53 U	0.11 U	0.09 U	0.09 U	0.13 U
Copper	76,000	NC	5.97	14.5	7.7	0.51	0.29	0.34	2.5
Iron	480,000	NC	1,490	1320 J	730 J	174 J	401 J	161 J	308 J
Lead	920	NC	197	47.9 J	19.4 J	31.5 J	2.0 J	1.1 J	3.7 J
Magnesium	NC	NC	329	1,940	1,790	41.6	29.1	36.9	151
Manganese	22,000	NC	22	66.5	52.7	10.8	0.69 U	1.1	6.3
Mercury	26	2	0.16	0.02	0.01 U	0.01	0.01	0.01	0.01
Nickel	28,000	130	3.89	2.5	2	1.1 U	0.43 U	0.57 U	0.90 U
Potassium	NC	NC	102	75	133	18.7	8.8 U	16.2	30.9
Selenium	10,000	5	1.68	1.4 U	1.5 U	0.35 U	0.38 U	0.32 U	0.40 U
Silver	9,100	17	2.13	0.10 U	0.10 U	0.10 U	0.11 U	0.10 U	0.10 U
Sodium	NC	NC	343	391	363	242	326	235	259
Thallium	NC	NC	2.84	0.29 U	0.29 U	0.29 U	0.29 U	0.28 U	0.28 U
Vanadium	7,400	980	6.3	6.4	6.5	0.86	1.2	1.2	1.7
Zinc	560,000	6,000	37	125 J	49.7 J	24.2 J	2.8 J	3.0 J	10.0 J

(1) FDEP SCTLs = Florida Department of Environmental Protection Soil Target Cleanup Levels, Florida Administrative Code (F.A.C.) 62-777 (FDEP, 1999).
(2) NAS Cecil Field Inorganic Background Data Set (HLA, 1998).
* = Excavation limits were determined using a benzo(a)pyrene concentration of greater than 1,500 ug/kg based on three times the industrial SCTL value.
Shaded values exceed STCLs.

TABLE 2-3

**SOIL ANALYTICAL RESULTS SUMMARY
SITE 32, DRMO ASPHALT STORAGE YARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA**

Parameter	Frequency of Detection	Range of Detections	Sample of Maximum Detection	Average of Positive Detections
Volatile Organic Compounds (ug/kg)				
Tetrachloroethene	1/5	2	04S00101	2
Semivolatile Organic Compounds (ug/kg)				
1-Methylnaphthalene	7/39	72.2 - 3360	CEF-P32-SS-304-01	920.0286
2-Methylnaphthalene	14/43	76.4 - 1400	CEF-P32-SS-002-01	316.2821
4-Methylphenol	1/5	45	04S00101	45
Acenaphthene	17/44	80.1 - 12200	CEF-P32-SS-304-01	1232.0029
Acenaphthylene	5/43	98.9 - 504	CEF-P32-SS-202-01	204.88
Anthracene	4/44	82.5 - 2090	CEF-P32-SS-304-01	644.875
Benzo(a)anthracene	25/44	14 - 4200	CEF-P32-SS-304-01	463.814
Benzo(a)pyrene	27/44	17.6 - 4640	CEF-P32-SS-202-01	654.3741
Benzo(b)fluoranthene	26/44	14.2 - 3790	CEF-P32-SS-202-01	597.6635
Benzo(g,h,i)perylene	28/44	20.5 - 2350	CEF-P32-SS-304-01	437.7036
Benzo(k)fluoranthene	25/44	11.6 - 1540	CEF-P32-SS-202-01	248.924
Bis(2-ethylhexyl)phthalate	1/5	100	04S00501	100
Chrysene	28/44	13.1 - 3270	CEF-P32-SS-304-01	529.0393
Dibenzo(a,h)anthracene	11/44	15.7 - 226	CEF-P32-SS-304-01	75.4591
Fluoranthene	27/44	32.3 - 15000	CEF-P32-SS-002-01	1588.8537
Fluorene	6/44	77.6 - 908	CEF-P32-SS-202-01	376.0167
Indeno(1,2,3-cd)pyrene	26/44	20 - 3000	CEF-P32-SS-202-01	403.6058
Naphthalene	8/44	72.5 - 623	CEF-P32-SS-304-01	165.2625
Phenanthrene	16/44	103 - 6570	CEF-P32-SS-304-01	645.5938
Pyrene	25/44	18.3 - 8010	CEF-P32-SS-304-01	881.97
Pesticides (ug/kg)				
4,4'-DDE	1/5	0.5	04S00301	0.5
4,4'-DDT	3/5	0.26 - 0.41	04S00101	0.3167
Alpha-Chlordane	1/5	0.1	04S00101	0.1
Endosulfan II	1/5	0.18	04S00101	0.18
Heptachlor Epoxide	1/5	0.08	04S00101	0.08
Inorganics (mg/kg)				
Aluminum	16/16	142 - 5560	CEF-P32-SS-002-01	1795.7813
Antimony	2/16	5.8 - 206	04S00401	105.9
Arsenic	1/17	3.8	CEF-P32-SS-002-01	3.8
Barium	16/17	2.2 - 2990	04S00501	543.325
Cadmium	3/17	0.37 - 30.2	CEF-P32-SS-002-01	10.8567
Calcium	16/16	435 - 170000	CEF-P32-SS-103-01	21248.0938
Chromium	14/17	1.5 - 1460	04S00501	416.4393
Cobalt	11/16	0.12 - 70.5	04S00401	23.3327
Copper	11/16	0.29 - 48.5	CEF-P32-SS-002-01	6.4614
Iron	16/16	115 - 6970	CEF-P32-SS-002-01	809.125
Lead	16/17	1.1 - 1850	04S00201	379.2563
Magnesium	16/16	29.1 - 90400	04S00101	17964.6344
Manganese	15/16	1.1 - 2560	04S00201	408.9567
Mercury	5/17	0.01 - 0.02	CEF-P32-SS-103-01	0.0105
Nickel	9/16	1.3 - 202	04S00101	96.5167
Potassium	11/16	16.2 - 59600	04S00201	15843.6273
Selenium	4/17	77.4 - 1030	04S00201	444.35
Sodium	10/16	235 - 34900	04S00201	8604.9
Vanadium	15/16	0.78 - 2100	04S00201	357.3267
Zinc	16/16	2.8 - 1710	04S00201	425.8219
Miscellaneous Parameters (mg/kg)				
Hexavalent Chromium	2/3	0.07	04S00502D	0.07
Hexavalent Chromium	2/3	0.07	04S00502S	0.07

2.4.1.1 Human Health Risks

The results of the sampling at Site 32 delineated the extent of benzo(a)pyrene (BaP) contamination in excess of the FDEP industrial SCTL of 500 µg/kg. It was decided that soil samples with a BaP concentration greater than three times the FDEP industrial SCTL would be excavated. Excavation of these soils ensures protection of human health and groundwater. Some soil samples remaining on site after excavation activities were completed may have concentrations in excess of the industrial SCTL, but the post-excavation exposure concentration was determined to be less than the industrial SCTL. If the 95 percent upper confidence level (UCL) of the mean is less than the industrial SCTL, protection of human health is ensured.

Because BaP, a carcinogenic PAH (CPAH), was detected at concentrations greater than its industrial SCTL, the BCT agreed that CPAHs should be regarded as a family of compounds and their concentrations should be defined in terms of benzo(a)pyrene equivalents (BaPEqs). To ensure protection of human health and groundwater, the post-excavation exposure concentration of BaPEqs also should be less than the industrial SCTL. Total BaPEq concentrations were derived for each sample using the U.S. EPA toxicity equivalent factors (TEFs) (U.S. EPA, 1995). If a specific PAH within a sample was not detected, one-half its detection limit was used in the calculation of BaPEq. If no CPAHs were detected within a sample, one-half the detection limit of BaP was used in the calculation.

The exposure concentration is represented best by the 95 percent UCL of the mean. The excavated sample points were replaced with clean fill from the North Fuel Farm (NFF) (Clean Pile 7). The data for this clean fill are presented in Appendix B. BaP was not detected in this soil. Therefore, to calculate the post-excavation exposure concentration for BaP, the removed samples were replaced with a BaP concentration of 19 µg/kg, a value equal to one-half its detection limit. To calculate the post-excavation exposure concentration for BaPEq, the BAPEq concentrations of removed samples were replaced with a BaPEq concentration of 124 µg/kg, based on data collected from the NFF (Clean Pile 7), as demonstrated in Table 2-4.

Samples with BaP concentration in excess of 1,500 µg/kg (three times the industrial SCTL of 500 µg/kg) were excavated and disposed in a permitted solid waste disposal facility. The removal of these samples, in combination with other samples that were excavated, resulted in post-remediation concentrations of 218 µg/kg for BaP and 304 µg/kg for BaPEq, values less than industrial SCTL for BaP. Therefore, a human health Preliminary Risk Evaluation (PRE) is not required.

TABLE 2-4

ATTAINMENT OF SCTLs - SITE 32
NAVAL AIR STATION, CECIL FIELD
JACKSONVILLE, FLORIDA

ANALYTICAL PARAMETERS	PRE-EXCAVATION		POST-EXCAVATION	
nsample	BaP	BaPEq	BaP	BaPEq
MIN	3.6000	5.5000	3.6000	5.5000
MAX	4,640.00	4,980.00	1,350.00	1,631.00
MEAN	468.03	575.57	205.83	289.90
t 0.95, n-1	0.237540922	0.235078079	0.247856559	0.246544665
STANDARD DEVIATION	980.94	1,103.14	304.23	363.31
COEFFICIENT OF VARIATION	2.10	1.92	1.48	1.25
n	38	38	38	38
UCL $_{0.95}$	505.82	617.64	218.06	304.43
Goal remediation level	**500.00**	**500.00**	**500.00**	**500.00**
SS-001-02	3.8	11.92	3.8	11.92
SS-002-01	280	390	280	390
SS-003-01	230	500	230	500
SS-004-01	45	61.7	45	61.7
SS-005-01	3.6	13.8	3.6	13.8
SS-101-01	420	580	420	580
SS-102-01	444	615	444	615
SS-103-01	38.65	108	38.65	108
SS-104-01	27	27	27	27
SS-105-01	5.5	5.5	5.5	5.5
SS-106-02	5.5	5.5	5.5	5.5
SS-107-02	204	272	204	272
SS-201-01	1350	1631	1350	1631
SS-202-01	**4640**	**4640**	**19**	**124**
SS-203-01	**1520**	**1812**	**19**	**124**
SS-204-02	42.7	132	42.7	132
SS-205-03	5	5.5	5	5.5
SS-301-01	728	859	728	859
SS-302-01	139	165	139	165
SS-303-01	601	676	601	676
SS-304-01	**3880**	**4980**	**19**	**124**
SU-305-03	5	24.9	5	24.9
SS-501-01	304	355	304	355
SS-502-01	13	13	13	13
SS-503-01	35.3	54.1	35.3	54.1
SS-504-01	939	1121	939	1121
SS-505-02	**13**	**30.1**	**19**	**124**
SS-401-01	467	631	467	631
SS-402-01	5	14.9	5	14.9
SS-403-01	292	432	292	432
SS-404-01	61.6	95.2	61.6	95.2
SS-405-02	**5.5**	**13.6**	**19**	**124**
SU-406-03	111	193	111	193
SS-601-01	32.1	93.6	32.1	93.6
SS-602-01	200	298	200	298
SS-603-01	24.9	69.7	24.9	69.7
SS-604-01	640	877	640	877
SS-605-02	23.8	64.7	23.8	64.7

Bold indicates removed samples.

2.4.1.2 Ecological Risks

Site 32 is located in a highly developed portion of Cecil Field. The site consists largely of the asphalt storage yard and Buildings 325 and 335. Parking lots, paved streets, and other buildings surround the site. Ecological habitat consists of an area of turf grass north of Building 335 and a retention pond. The retention pond is approximately 110 feet in length and 30 feet wide. The northern two-thirds of the pond are normally dry, except immediately following rain events. There is no aquatic vegetation in this portion of the pond; instead, it is gravel covered. The southern two-thirds of the pond are vegetated by a thick growth of cattails. Water in the southern portion of the pond is generally shallow. The use of Site 32 by ecological receptors is limited to the turf grass area and the retention pond. The turfgrass area is utilized by receptors typically found in urban and industrial areas, such as various terrestrial invertebrates, lizards, songbirds, and exotic rodents such as the Norway rat, black rat, and house mouse. Aquatic invertebrates, minnows, reptiles, and amphibians probably utilize the retention pond. Wading birds probably forage occasionally in the pond.

Ecological risks to receptors in the retention pond were previously investigated and sediment analytes did not exceed ecological screening criteria (ABB-ES, 1996). Therefore, no further investigation of ecological risk associated with the retention pond was conducted.

A drainage ditch is located to the west of the paved DRMO Storage Yard. At its closest point to the site, approximately 150 feet from the western edge of the paved yard, the ditch flows north to south. South of the site, the ditch bends to the west and after several hundred feet eventually proceeds past the wastewater treatment plant and into Lake Fretwell. Runoff from the paved storage yard could proceed to the drainage ditch, however, this runoff does not contact the impacted soil beneath the asphalt pavement.

Groundwater beneath the site could enter the ditch during seasonal high water table levels, however, samples collected from two monitoring wells located between the paved storage yard and the drainage ditch did not exceed FDEP GCTLs and/or IBDS background criteria. An extensive ecological risk evaluation was performed on the ditch from the DRMO to the wastewater treatment plant and the results of this evaluation can be found in the Draft Technical Memorandum for PSC 44 (TtNUS, 2001).

Table 2-4 summarizes the analytical results of surface soil samples collected at Site 32. Surface soil samples from the excavated area are excluded from Table 2-4, as are soil samples collected in 1995 from underneath the pavement of the asphalt storage yard. Thus, the data in Table 2-3 differ from data shown in Table 2-4. Ecological screening values in Table 2-5 are those of U.S. EPA Region IV (U.S. EPA, 2000a; U.S. EPA, 2000b). As shown in Table 2-5, concentrations of all metals were less than NAS Cecil IBDS concentrations (HLA, 1998). Concentrations of several PAHs exceeded Region IV ecological screening values. Contaminants generally fall into two classes: chemicals for which the exposure route

TABLE 2-5

ECOLOGICAL CONTAMINANTS OF POTENTIAL CONCERN
SURFACE SOIL - SITE 32
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency of Detection	Range of Detection		Location of Maximum	Average Value	Ecological Screening Value*	Maximum Hazard Quotient	IBDS Value	Maximum Concentration Exceeds Background ?
		Minimum	Maximum						
Semivolatile Organic Compounds (ug/kg)									
1-Methylnaphthalene	5/20	72.2	638	CEF-P32-SS-201-01	126	100[a]	6.4	NA	NA
2-Methylnaphthalene	9/20	76.4	580	CEF-P32-SS-003-01	170	100[a]	5.8	NA	NA
Acenaphthene	10/20	147	1150	CEF-P32-SS-201-01	263	20,000	0.1	NA	NA
Acenaphthylene	3/20	98.9	219	CEF-P32-SS-403-01	145	100[b]	2.2	NA	NA
Anthracene	1/20	168	168	CEF-P32-SS-201-01	78	100	1.7	NA	NA
Benzo(a)anthracene	15/20	16.5	739	CEF-P32-SS-201-01	210	100[a]	7.4	NA	NA
Benzo(a)pyrene	18/20	24.9	1350	CEF-P32-SS-201-01	351	100	13.5	NA	NA
Benzo(b)fluoranthene	17/20	25.8	1130	CEF-P32-SS-201-01	331	100[a]	11.3	NA	NA
Benzo(g,h,i)perylene	17/20	25.9	840	CEF-P32-SS-102-01	297	100[a]	8.4	NA	NA
Benzo(k)fluoranthene	16/20	12.6	462	CEF-P32-SS-201-01	156	100[a]	4.6	NA	NA
Chrysene	15/20	21	812	CEF-P32-SS-201-01	240	100[a]	8.1	NA	NA
Dibenzo(a,h)anthracene	7/20	15.7	220	CEF-P32-SS-003-01	33	100[a]	2.2	NA	NA
Fluoranthene	17/20	32.3	2280	CEF-P32-SS-201-01	467	100	22.8	NA	NA
Fluorene	3/20	77.6	130	CEF-P32-SS-101-01	82	100[b]	1.3	NA	NA
Indeno(1,2,3-cd)pyrene	15/20	24.3	834	CEF-P32-SS-201-01	214	100[a]	8.3	NA	NA
Naphthalene	4/20	72.5	88.8	CEF-P32-SS-404-01	90	100	0.9	NA	NA
Phenanthrene	9/20	103	884	CEF-P32-SS-201-01	152	100	8.8	NA	NA
Pyrene	17/20	29	1580	CEF-P32-SS-201-01	371	100	15.8	NA	NA
Inorganics (mg/kg)									
Aluminum	1/1	1570	1570	CEF-P32-SS-003-01	1570	50	31.4	4,430	No
Barium	1/1	7.4	7.4	CEF-P32-SS-003-01	7.4	165	0.04	14.4	No
Cadmium	1/1	0.37	0.37	CEF-P32-SS-003-01	0.37	1.6	0.2	1.72	No
Chromium	1/1	4.9	4.9	CEF-P32-SS-003-01	4.9	0.4	12.3	7.75	No
Cobalt	1/1	0.23	0.23	CEF-P32-SS-003-01	0.23	20	0.01	3.11	No
Copper	1/1	4.6	4.6	CEF-P32-SS-003-01	4.6	40	0.1	5.97	No
Iron	1/1	666	666	CEF-P32-SS-003-01	666	200	3.3	1,490	No
Lead	1/1	21.6	21.6	CEF-P32-SS-003-01	21.6	50	0.4	197	No
Manganese	1/1	19.2	19.2	CEF-P32-SS-003-01	19.2	100	0.2	22	No
Nickel	1/1	1.3	1.3	CEF-P32-SS-003-01	1.3	30	0.04	3.89	No
Vanadium	1/1	2.3	2.3	CEF-P32-SS-003-01	2.3	2	1.2	6.3	No
Zinc	1/1	34.1	34.1	CEF-P32-SS-003-01	34.1	50	0.7	37	No

NA Background value not available.
a Benzo(a)pyrene used as a surrogate for high molecular weight polynuclear aromatic hydrocarbons.
b Naphthalene used as a surrogate for low molecular weight polynuclear aromatic hydrocarbons.
IBDS = Nas Cecil Field Inorganic Background Data Set (HLA, 1998).
* U.S. EPA, 2000a and U.S. EPA, 2000b.

of concern is direct contact, and chemicals for which the exposure route of concern is the food chain (U.S. EPA, 2000b). PAH compounds fall in the first category, because PAHs do not biomagnify in the food web and PAHs present at the concentrations measured at Site 32 would not bioaccumulate. Thus, toxicity through direct contact is the only applicable exposure route for PAHs at the site. Based on the terrestrial habitat at Site 32 and on measured concentrations from PAH, potential risks of PAHs at Site 32 are limited to soil invertebrates such as earthworms. Extensive use of the site by larger receptors such as birds and mammals is negligible due to the industrial character of the site.

In summary, Site 32 and the adjacent areas provide only limited terrestrial habitat of poor quality in an industrial setting. Terrestrial receptors consist of species acclimated to urban and industrial conditions. Based on analytical data from surface soil samples, potential risks are minor and are limited to soil invertebrates from PAHs. The area of contamination is relatively small (approximately 100 feet by 40 feet). With the above factors in mind, ecological risks appear to be negligible.

2.5 PREVIOUS REMOVAL ACTION

Based on the results of the sampling and analysis and the statistical analysis discussed in Section 6.0, a remedial design (dig and haul package) was prepared for excavation of the delineated area of BaP contamination greater than 1,500 µg/kg (TtNUS, 2000b).

A single excavation area of approximately 702 square feet was delineated based on sample locations where the analytical results were less than a BaP concentration of 1,500 µg/kg, a value equal to three times the industrial SCTL. The estimated excavation volume for an excavation 3 feet deep is approximately 78 cubic yards (TtNUS, 2000b). The excavation limits are shown on Figure 2-5.

In addition to the removal action described above, the parking lot asphalt pavement, which acts as a cap over contaminated soil near Building 325, must be left in place and intact. LUCs for this area will include the requirement that the pavement must be left in place and maintained in good condition by the owner of the property.

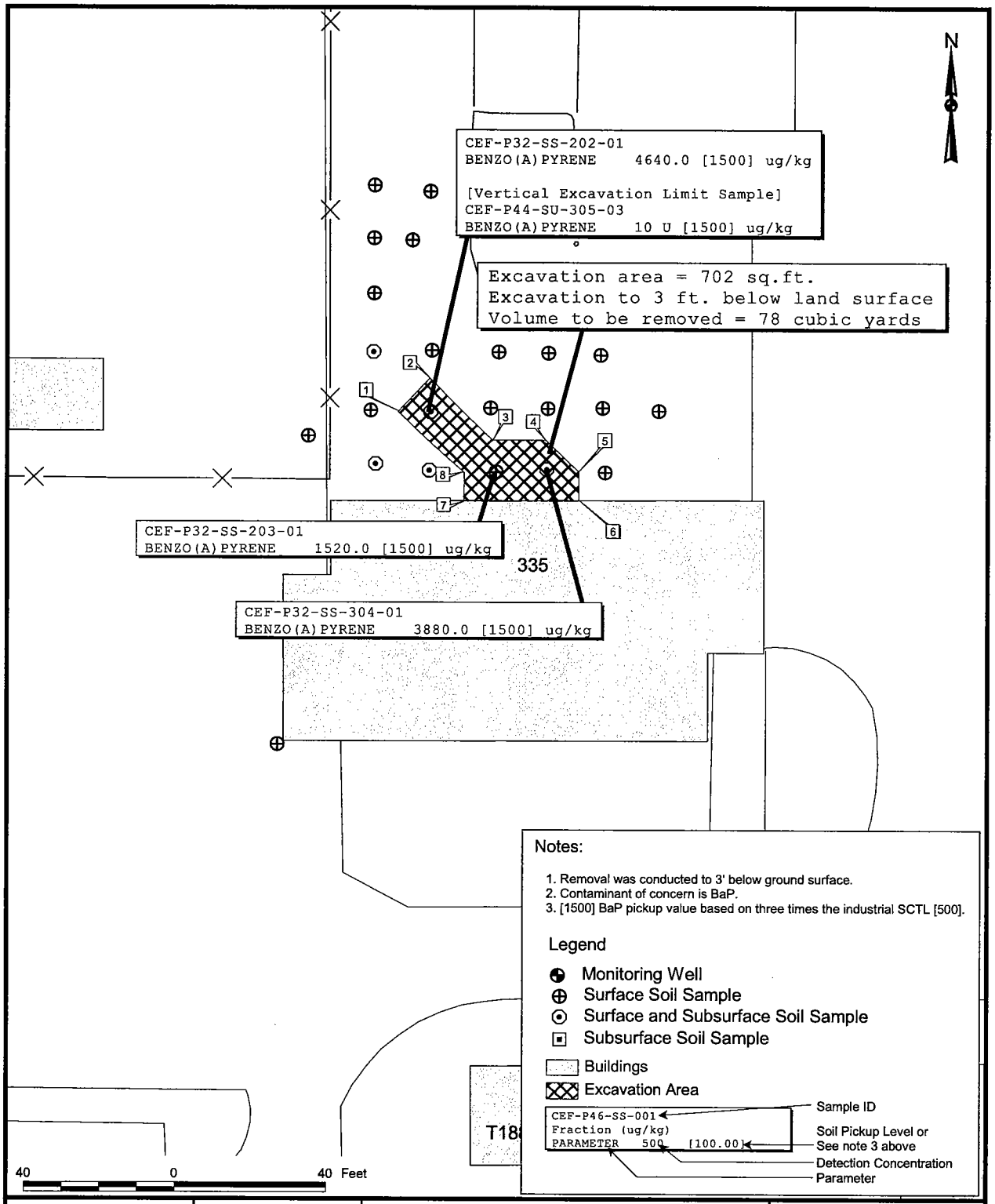
The Navy's Remedial Action Contractor (RAC), CH2M Hill Constructors, Inc., conducted the source removal activities for Site 32 on August 23, 2000. The RAC excavated, transported, and disposed of 141.51 tons of PAH-contaminated soil and restored the site to pre-excavation conditions. Soil samples were collected and analyzed for waste characterization before the excavation began. The excavated soil was transported and disposed off site on the same day that it was excavated.

The soil was excavated using a hydraulic track excavator and direct loaded into a tarp-covered dump truck, provided by Beaver Bulk Trucking for transportation and disposal. Soils were excavated to the

horizontal excavation limits shown on Figure 2-5 and the vertical excavation limit of 3 feet bgs, as specified in the Removal Action Design Package, which was included in the Action Memorandum for PSC 32 (TtNUS, 2000b). The excavated soil was transported to the Broadhurst Landfill in Jessup, Georgia.

The material used to backfill the excavation was certified clean fill brought in from the NFF at NAS Cecil Field (Clean Pile 7). The site was then graded and seeded with a mixture of brown millet, rye, bahia grass, fertilizer, and mulch. No confirmatory sampling and analyses were required based on the specifications outlined in the Action Memorandum for PSC 32 (TtNUS, 2000b).

Detailed information on the remedial activities, including photographs, copies of the soil manifests, certificates of disposal, and certificate of clean fill is provided in the Source Removal Report (CH2M Hill, 2001).



DRAWN BY MJJ	DATE 08May00	CONTAINANTS GREATER THAN CRITERIA AND LIMITS OF SOIL EXCAVATION SITE 32, DRMO ASPHALT STORAGE YARD EE/CA NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE 8/2/02		APPROVED BY MPS DATE 8/8/02
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-5 REV 0

P:\GIS\NAS_CecilField\psc32_techmemo.apr 07Aug02 MJJ 4_Excavation Area Layout

3.0 IDENTIFICATION OF REMEDIAL ACTION OBJECTIVES

This section develops the RAOs and derives preliminary remediation goals (PRGs) for the contaminated media. The regulatory requirements and guidances [e.g., Applicable or Relevant and Appropriate Requirements (ARARs)] that may potentially govern remedial activities are presented in this section. In addition, this section presents the chemicals of concern (COCs) identified at the site and the conceptual pathways through which these chemicals may affect human health and derives the environmental media of concern. The PRGs for the contaminated media are developed in this section, and general response actions (GRAs) that may be suitable to achieve the PRGs are presented. Finally, this section presents an estimate of the volumes of contaminated media.

3.1 REMEDIAL ACTION OBJECTIVES

The purpose of this section is to develop RAOs for Site 32 at NAS Cecil Field, Jacksonville, Florida. The RAOs are medium-specific goals that define the objective of conducting remedial actions to protect human health and the environment. The RAOs specify the COCs, potential exposure routes and receptors, and an acceptable range contaminant level (i.e., PRGs) for the site. RAOs may be developed to permit consideration of a range of treatment and containment alternatives. This EE/CA addresses soil contamination at Site 32. To protect the public from potential current and future health risks, as well as to protect the environment, the following RAOs have been developed:

- Prevent unacceptable risk from exposure to soil with concentrations of PAHs and inorganics in excess of the FDEP residential SCTL.

- Address the potential risk of transfer of organic and inorganic contamination from soil to groundwater from soils with concentrations that exceed the FDEP SCTL for leachability.

3.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs) AND TO BE CONSIDERED CRITERIA (TBCs)

3.2.1 Chemical-Specific ARARs and TBCs

The tables contained within this section present a summary of Federal and State chemical-specific ARARs and TBCs. These ARARs and TBCs provide some medium-specific guidance on “acceptable” or “permissible” concentrations of contaminants. Tables 3-1 and 3-2 present a list of Federal and State of Florida chemical-specific ARARs and TBCs for this EE/CA.

3.2.2 Location-Specific ARARs and TBCs

Tables 3-3 and 3-4 present a list of Federal and State of Florida location-specific ARARs and TBCs for this EE/CA. These ARARs and TBCs place restrictions on concentrations of contaminants or the conduct of activities based upon the site's particular characteristics or location.

3.2.3 Action-Specific ARARs and TBCs

Action-specific ARARs and TBCs are presented in Section 3.5, along with a discussion of GRAs.

3.3 MEDIUM OF CONCERN

Based upon the discussion in Section 2.0 involving toxicity and risk assessment for both human and ecological receptors, the medium of concern at Site 32 was determined to be soil.

3.4 CHEMICALS OF CONCERN FOR REMEDIATION

Previous sampling identified several chemicals in the soil as a concern to human receptors. Post-removal action soil analytical data were compared to the FDEP SCTLs for direct residential exposure and leachability to groundwater. BaPEq and lead were detected in soil above the FDEP SCTLs for direct residential exposure and 4-methlyphenol, nickel, selenium, antimony, vanadium, and barium were detected in soil above the FDEP SCTLs for leachability to groundwater and were therefore retained as COCs.

3.5 PRELIMINARY REMEDIATION GOALS

A PRG is the target concentration to which a COC must be reduced within a particular medium of concern to achieve one or more of the established RAOs. PRGs are developed to ensure that contaminant concentration levels left on site are protective of human and ecological receptors.

For Site 32, soil PRGs were established based on the following criteria:

- Protection of human health from direct exposure to contaminated soil in excess of residential criteria.
- Compliance with ARARs and TBCs to the extent practicable.

TABLE 3-1

FEDERAL CHEMICAL-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Safe Drinking Water Act (SWDA) Regulations, Maximum Contaminant Levels (MCLs)	40 CFR Part 141	Relevant and Appropriate	Establishes enforceable standards for potable water for specific contaminants that have been determined to adversely affect human health.	Would be used as protective levels for groundwater or surface waters that are current or potential drinking water sources if soil contamination would potentially leach to groundwater sources.
SDWA Regulations, National Secondary Drinking Water Standards (SMCLs)	40 CFR Part 143	TBC	Establishes welfare-based standards for public water systems for specific contaminants or water characteristics that may affect the aesthetic qualities of drinking water.	Would be used as protective levels for groundwater or surface waters that are current or potential drinking water source if soil contamination would potentially leach to groundwater sources.
U.S.EPA Office of Drinking Water, Health Advisories	---	Potential TBC	Health advisories are estimates of non-carcinogenic risk due to consumption of contaminated drinking water.	These advisories would be considered for contaminants in surface water and groundwater that is or could be used as a potable water source if soil contamination would potentially leach to groundwater sources.
Cancer Slope Factors (CSFs)	---	TBC	CSFs are guidance values used to evaluate the potential carcinogenic hazard caused by exposure to contaminants.	CSFs would be considered for development of human health protection PRGs for soil at this site.
Reference Doses (RfDs)	---	TBC	RfDs are guidance values used to evaluate the potential noncarcinogenic hazard caused by exposure to contaminants.	RfDs would be considered for development of human health protection PRGs for soil at this site.

TABLE 3-2

STATE CHEMICAL-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Surface Water Quality Standards	FAC Chapter 62-302	Potentially Applicable	This rule distinguishes surface water into five classes based on designated uses and establishes ambient water quality standards (called Florida Water Quality Standards) for listed pollutants.	Because these standards are specifically tailored to Florida waters, they should be used to establish cleanup levels rather than the federal AWQC.
Groundwater Classes, Standards and Exemptions	FAC Chapter 62-520	Applicable	This rule designates the groundwater of the state into five classes and establishes minimum "free from" criteria. This rule also specifies that Classes I and II must meet the primary and secondary drinking water standards listed in Chapter 62-550.	This rule would be used to establish PRGs for groundwater that is a potential source of drinking water if soil contamination would potentially leach and impact groundwater source.
Drinking Water Criteria	FAC Chapter 62-550	TBC	This rule provides primary and secondary drinking water quality criteria.	This rule would be considered for the establishment of PRGs.
Contaminant Cleanup Target Levels Rule	FAC Chapter 62-777	TBC	This rule provides guidance for soil, groundwater, and surface water cleanup levels that can be developed on a site-by-site basis.	This rule would be considered for the establishment of PRGs.

TABLE 3-3

FEDERAL LOCATION-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 1 OF 2

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Endangered Species Act Regulations	50 CFR Parts 81, 225, 402	Potentially Applicable	Requires federal agencies to act to avoid jeopardizing the continued existence of federally listed endangered or threatened species.	If a site investigation or remediation could potentially affect an endangered species, these regulations would apply.
Historic Sites Act Regulations	36 CFR Part 62	Potentially Applicable	Requires federal agencies to consider to existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks.	The existence of natural landmarks would be identified prior to remedial activities on site, including remedial investigations.
Fish and Wildlife Coordination Act Regulations	33 CFR Subsection 320.3	Potentially Applicable	Requires that the United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service, and related state agencies be consulted prior to structural modification of any body of water, including wetlands. If modifications must be conducted, the regulation requires that adequate protection be provided for fish and wildlife resources.	If a remedial alternative involves the alteration of a stream or wetland, these agencies would be consulted.
National Environmental Policy Act (NEPA) Regulations, Wetlands, Floodplains, etc.	40 CFR Subsection 6.302 [a]	Potentially Applicable	These regulations contain the procedures for complying with Executive Order 11990 on wetlands protection. Appendix A states that no remedial alternative may adversely affect a wetland if another practicable alternative is available. If no alternative is available, impacts from implementing the chosen alternative must be mitigated.	If remedial action affects a wetland, these regulations would apply.

TABLE 3-3

FEDERAL LOCATION-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 2 OF 2

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
NEPA Regulations, Floodplain Management, Executive Order 11988	40 CFR Part 6, Appendix A	Potentially Applicable	Appendix A describes the policy for carrying out the Executive Order regarding floodplains. If no practicable alternative exists to performing cleanup in a floodplain, potential harm must be mitigated and actions taken to preserve the beneficial value of the floodplain.	If removal actions take place in a floodplain, alternatives would be considered that would reduce the risk of flood loss and restore and preserve the floodplain.
Fish and Wildlife Conservation Act	40 CFR Section 6.302	Potentially Applicable	Requires action to be taken to protect fish and wildlife from projects affecting streams or rivers.	U.S. Fish and Wildlife Service officials would be consulted on how to minimize impacts of any remedial activities on any wildlife.

TABLE 3-4

STATE LOCATION-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken

There are no State Location-Specific ARARs

Accordingly, the following soil PRGs were established:

COC	PRGs(1) (µg/kg)		Pick-up Level(2)
	Residential Exposure	Leachability to Groundwater	
ORGANIC			
BaP	100	8,000	204
4-methylphenol	3×10^6	30	30
BaPEq	100	8,000	272
INORGANIC			
Lead	400	NA	400
Nickel	110	130	110
Selenium	390	5	5
Vanadium	15	980	15
Barium	110	1600	110
Antimony	26	5	5

1 FDEP SCTLs for direct residential exposure and leachability from soil to groundwater (FAC 62-777, August 1999).
2 Concentration requiring removal to achieve 95% UCL to be in compliance with FDEP SCTLs.

3.6 GENERAL RESPONSE ACTIONS AND ACTION-SPECIFIC ARARs

GRAs are broadly defined remedial approaches that may be used (by themselves or in combination with one or more of the others) to attain the RAO. Action-specific ARARs and TBCs are those regulations, criteria, and guidances that must be complied with or taken into consideration during remedial activities on site.

3.6.1 General Response Actions

GRAs describe categories of actions that could be implemented to satisfy or address a component of the RAOs for the site. Remedial action alternatives will then be composed using GRAs singly or in combination to meet the RAOs. The remedial action alternatives, composed of GRAs, will be capable of achieving the RAOs for each contaminated medium at the site.

The following GRAs will be considered for soil at Site 32:

- No action
- Limited action (institutional controls and monitoring)
- Removal
- Treatment
- Disposal

3.6.2 Action-Specific ARARs

Action-specific ARARs and TBCs are technology- or activity-based regulatory requirements or guidance that would control or restrict remedial action. Tables 3-5 and 3-6 present a list of Federal and State action-specific ARARs and TBCs for this EE/CA.

3.7 ESTIMATED VOLUMES OF CONTAMINATED MEDIA EXCEEDING RESIDENTIAL CRITERIA

Based on previous sampling results, it is assumed that the first foot of soil below the asphalt pavement area has inorganic contamination exceeding residential and/or leachability FDEP SCTLs. BaP contamination outside the paved area (in the area where the previous removal action was conducted to industrial criteria) also exists above the residential criteria. The previous removal action removed soil samples with a BaP concentration greater than three times the FDEP industrial SCTL or leachability SCTL.

Additional soil removal would be needed to ensure compliance with the residential SCTL. Some soil samples remaining on site after an excavation to residential criteria would have concentrations in excess of the residential SCTL, but the resulting exposure concentration would be less than the residential SCTL. If the upper confidence level (UCL) is less than the residential SCTL, protection of human health is ensured.

Calculation of the pickup level for the residential scenario was conducted as previously agreed upon by the BCT for the industrial removal action and discussed in Section 2.4.1.1 of this document. The additional soil samples requiring removal are presented in Table 3-7.

Samples with BaP concentration in excess of 200 µg/kg would be excavated and disposed in a permitted solid waste disposal facility. The removal of these samples would result in post-remediation concentrations of 32 µg/kg for BaP and 100 µg/kg for BaPEq, values less than BaP's residential SCTL. Therefore, a human health PRE would not be required.

TABLE 3-5

FEDERAL ACTION-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 1 OF 3

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Occupational Safety and Health Act (OSHA) Regulations, General Industry Standards	29 CFR Part 1910	Applicable	Requires establishment of programs to assure worker health and safety at hazardous waste sites, including employee training requirements.	These regulations would apply to all response activities.
OSHA Regulations, Occupational Health and Safety Regulations	29 CFR Part 1910, Subpart Z	Potentially Applicable	Establishes permissible exposure limits for workplace exposure to a specific listing of chemicals.	Standards are applicable for worker exposure to OSHA hazardous chemicals during remedial activities.
OSHA Regulations, Recordkeeping, Reporting, and Related Regulations	29 CFR Part 1904	Potentially Applicable	Provides recordkeeping and reporting requirements applicable to remedial activities.	These requirements apply to all site contractors and subcontractors and must be followed during all site work.
OSHA Regulations, Health and Safety Standards	29 CFR Part 1926	Potentially Applicable	Specifies the type of safety training, equipment, and procedures to be used during the site investigation and remediation.	All phases of the remedial response project would be executed in compliance with this regulation.
Resource Conservation and Recovery Act (RCRA) Regulations, Contingency Plan and Emergency Procedures	40 CFR 264, Subpart D	Potentially Relevant and Appropriate	Outlines requirements for emergency procedures to be followed in case of an emergency.	The administrative requirements established in this rule would be met for remedial actions involving the management of hazardous waste.

TABLE 3-5

FEDERAL ACTION-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 2 OF 3

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
RCRA Regulations, General Facility Standards	40 CFR Subpart B, 264.10-264.18	Potentially Relevant and Appropriate	Sets the general facility requirements including general waste analysis, security measures, inspections, and training requirements. Section 264.18 establishes that a facility located in a 100-year floodplain must be designed, constructed, and maintained to prevent washout of any hazardous wastes by a 100-year flood.	If the remedial action involves construction of an on-site treatment facility, such as a groundwater treatment facility, the substantive requirements of this rule would be applicable requirements. A permitted treatment facility must be selected for off-site treatment. These regulations do not apply to the above-ground treatment or storage of hazardous waster before it is injected into underground. However, this rule may be an applicable requirement for alternatives that do not involve groundwater reinjection.
RCRA Regulations, Miscellaneous Units	40 CFR Part 264, Subpart X	Potentially Relevant and Appropriate	These standards are applicable to miscellaneous units not previously defined under existing RCRA regulations. Subpart X outlines performance requirements that miscellaneous units be designed, constructed, operated, and maintained to prevent releases to the subsurface, groundwater, and wetland that may have adverse effects on human health and the environment.	The design of proposed treatment alternatives, not specifically regulated under other subparts of RCRA, must prevent the release of hazardous constituents and future impacts on the environment. This subpart would apply to on-site construction of any treatment facility that is not previously defined under the RCRA regulation.
RCRA Regulations, Preparedness and Prevention	40 CFR Part 264, Subpart C	Potentially Relevant and Appropriate	Outlines requirements for safety equipment and spill control for hazardous waste facilities. Facilities must be designed, maintained, constructed, and operated to minimize the possibility of an unplanned release that could threaten human health or the environment.	Safety and communication equipment would be incorporated into all aspects of the remedial process and local authorities would be familiarized with site operations.

TABLE 3-5

FEDERAL ACTION-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 3 OF 3

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
RCRA Regulations, Releases from Solid Waste Management Units (SWMUs)	40 CFR Part 264, Subpart F	Potentially Relevant and Appropriate	Establishes the requirements for SWMUs at RCRA regulated treatment, storage, and disposal facilities (TSDFs). The scope of the regulation encompasses groundwater protection standards, point of compliance, compliance period, and requirements for groundwater monitoring.	These regulations would be followed for the treatment of hazardous waste.
RCRA Regulations, Standards for Owners and Operators of Hazardous Waste TSD Facilities	40 CFR Part 264	Potentially Relevant and Appropriate	Establishes minimum national standards defining the acceptable management of hazardous wastes for owners and operators of facilities that treat, store, or dispose of hazardous wastes.	If remedial actions involving management of RCRA wastes at an off-site (TSDF) or if RCRA wastes are managed onsite, the requirements of this rule would be followed.
RCRA Regulations, Use and Management of Containers	40 CFR Part 264, Subpart I	Potentially Relevant and Appropriate	Sets standards for the storage of containers of hazardous waste.	This requirement would apply if a remedial alternative involves the storage of a hazardous waste (i.e. contaminated groundwater) in containers, prior to treatment.

TABLE 3-6

STATE ACTION-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 1 OF 2

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Florida Hazardous Waste Rules – October, 1993	FAC Chapter 62-730	Potentially Applicable	Adopts by reference sections of the Federal hazardous waste regulations and establishes minor additions to these regulations concerning the generation, storage, treatment, transportation, and disposal of hazardous wastes.	These regulations would apply if waste on site were deemed hazardous and needed to be stored, transported, or disposed properly.
Florida Drinking Water Standards	FAC Chapter 62-550	Potentially Applicable	This rule adopts Federal primary and secondary drinking water standards.	These regulations would apply to remedial activities that have the potential to impact sources of drinking water.
Florida Wetland Application Regulations – November, 1989	FAC Chapter 62-611	Potentially Applicable	Sets requirements for discharge of domestic wastewater to wetland. This rule mainly addresses the discharge of domestic wastewater to wetlands. Discharge limits are established for BOD, TSS, nitrogen, and phosphorus.	This rule would be considered for remedial alternatives that would result in discharges to wetlands where these limits may be approached.
Florida Wastewater Facility Permits	FAC Chapter 62-620	Potentially Applicable	This rule establishes requirements for wastewater permits. It was published in November 1994; however, it is not effective until Florida is recognized as a "delegated" state.	Upon delegation, facilities in Florida requiring a wastewater permit will meet the permitting requirements under this rule. Upon Florida becoming a "delegated" state, facilities will be allowed to have a single permit to meet both Federal and State discharge requirements.
Florida Regulation of Stormwater Discharge –May, 1993	FAC Chapter 62-25	Potentially Relevant and Appropriate	Establishes requirements for discharges of untreated stormwater to ensure protection of the surface water of the state.	Remedial actions would consider the impact of the discharge of untreated stormwater from excavation.

TABLE 3-6

STATE ACTION-SPECIFIC ARARs
SITE 32 EE/CA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 2 OF 2

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken
Florida Groundwater Permitting and Monitoring Requirements – April, 1994	FAC Chapter 62-522	Potentially Applicable	Establishes permitting and monitoring requirements for installations discharging to groundwater.	The substantive requirements of this rule would be met when discharge to groundwater is a possible remedial action. If these requirements are met under another permit, a separate discharge permit may not be required.
Florida Water Well Permitting and Construction Requirements – March, 1992	FAC Chapter 62-532	Applicable	Establishes minimum standards for the location, construction, repair, and abandonment of water wells. Permitting requirements and procedures are established.	The substantive requirements for permitting would be met if remedial actions involve the construction, repair, or abandonment of monitoring, extraction, or injection wells.
Florida Rules on Hazardous Waste Warning Signs – July, 1991	FAC Chapter 62-736	Applicable	Requires warning signs at NPL and FDEP identified hazardous waste sites to inform the public of the presence of potentially harmful conditions.	This requirement will be met.
Florida Rules on Permits – November,1994	FAC Chapter 62-4	Potentially Applicable	Establishes procedures for obtaining permits for sources of pollution. This rule also establishes a "mixing zone" rule for facilities that discharge wastewater into the surface waters of the state.	These substantive requirements would be met during remediation. Through dilution, applying the "mixing zone" rule allows wastewater with higher concentrations of pollutants to be discharged into surface water, while still maintaining the Florida water quality standards.

TABLE 3-7

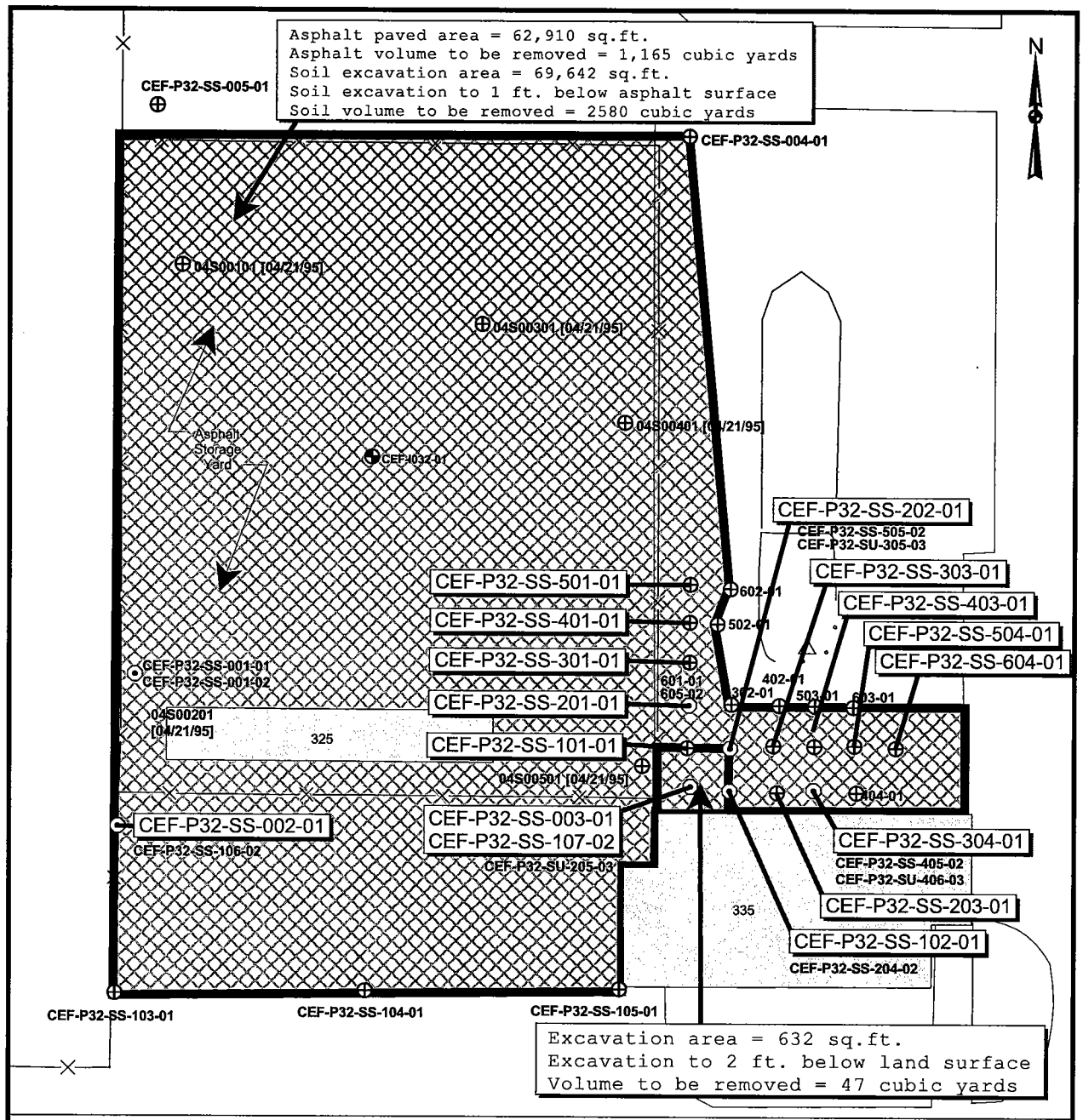
ATTAINMENT OF RESIDENTIAL SCTLs
SITE 32, DRMO ASPHALT STORAGE AREA
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	PRE-EXCAVATION		POST-EXCAVATION	
NSAMPLE	BaP	BaPEq	BaP	BaPEq
MIN	3.6000	5.5000	3.6000	5.5000
MAX	4,640.00	4,980.00	200.00	298.00
MEAN	468.03	575.57	30.78	97.08
t 0.95, n-1	0.237540922	0.235078079	0.247856559	0.298511965
STANDARD DEVIATION	980.94	1,103.14	38.84	60.80
COEFFICIENT OF VARIATION	2.10	1.92	1.26	0.63
n	38	38	38	38
UCL $_{0.95}$	506	618	32	100
Goal remediation level	**100.00**	**100.00**	**100.00**	**100.00**
SS-202-01	**4640**	**4640**	**19**	**124**
SS-304-01	**3880**	**4980**	**19**	**124**
SS-203-01	**1520**	**1812**	**19**	**124**
SS-201-01	**1350**	**1631**	**19**	**124**
SS-504-01	**939**	**1121**	**19**	**124**
SS-301-01	**728**	**859**	**19**	**124**
SS-604-01	**640**	**877**	**19**	**124**
SS-303-01	**601**	**676**	**19**	**124**
SS-401-01	**467**	**631**	**19**	**124**
SS-102-01	**444**	**615**	**19**	**124**
SS-101-01	**420**	**580**	**19**	**124**
SS-501-01	**304**	**355**	**19**	**124**
SS-403-01	**292**	**432**	**19**	**124**
SS-002-01	**280**	**390**	**19**	**124**
SS-003-01	**230**	**500**	**19**	**124**
SS-107-02	**204**	**272**	**19**	**124**
SS-602-01	200	298	200	298
SS-302-01	139	165	139	165
SU-406-03	111	193	111	193
SS-404-01	61.6	95.2	61.6	95.2
SS-004-01	45	61.7	45	61.7
SS-204-02	42.7	132	42.7	132
SS-103-01	38.65	108	38.65	108
SS-503-01	35.3	54.1	35.3	54.1
SS-601-01	32.1	93.6	32.1	93.6
SS-104-01	27	27	27	27
SS-603-01	24.9	69.7	24.9	69.7
SS-605-02	23.8	64.7	23.8	64.7
SS-502-01	13	13	13	13
SS-505-02	**13**	**30.1**	**19**	**124**
SS-105-01	5.5	5.5	5.5	5.5
SS-106-02	5.5	5.5	5.5	5.5
SS-405-02	**5.5**	**13.6**	**19**	**124**
SS-205-03	5	5.5	5	5.5
SU-305-03	5	24.9	5	24.9
SS-402-01	5	14.9	5	14.9
SS-001-02	3.8	11.92	3.8	11.92
SS-005-01	3.6	13.8	3.6	13.8

Bold indicates samples are proposed to be removed.

3.7.1 Estimated Volume of Contaminated Soil

Based on the analytical results, it was established that the paved area has soil contamination in excess of PRGs, covering an area approximately 1.45 acres or 62,915 square feet. Additional soil removal to achieve residential unrestricted use would also be required in the area north of Building 335 for a total area, including paved and unpaved areas, of 70,274 square feet. The removal area is as shown on Figure 3-1. Soil contamination is estimated to extend 1 foot below the asphalt cover, 1 foot bgs outside the paved area, and 2 feet bgs in a small area north of Building 335. The total volume of asphalt to be removed is approximately 1,165 cubic yards, and approximately 2,627 cubic yards of contaminated soil are estimated to require removal.



Notes:
1. Contaminant of concern is BaP.
2. 62,915 sq ft of the 1 ft bls is paved.

Legend
- Monitoring Well
- Surface Soil Sample
- Surface and Subsurface Soil Sample
- Subsurface Soil Sample
- CEF-P32-SS-102-01 ← Sample to be excavated
- CEF-P32-SS-204-02 ← Sample not requied to be excavated
- Buildings
- Excavation Area

60 0 60 Feet

DRAWN BY MJJ	DATE 08May00	LIMITS OF SOIL EXCAVATION TO ACHIEVE UNRESTRICTED USE SITE 32, DRMO ASPHALT STORAGE YARD EE/CA NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NUMBER 0039
CHECKED BY	DATE 8/8/02		APPROVED BY MPD DATE 8/8/02
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 3-1 REV 0

P:\GIS\NAS_CecilField\psc32_techmemo.apr 07Aug02 MJJ 6_Excavation Area Layout

4.0 IDENTIFICATION AND ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The following alternatives for soil remediation have been developed for Site 32:

1. No Action
2. Institutional Controls and Monitoring
3. Excavation and Off-Base Treatment and Disposal

A description and detailed analysis of these alternatives are provided in the following sections.

4.1 ALTERNATIVE 1: NO ACTION

This alternative is a "walk-away" alternative that is required under CERCLA to establish a basis for comparison with other alternatives. Under this alternative, the property would be released for unrestricted use. This alternative cannot be selected if waste remains on site.

4.1.1 Effectiveness

Overall Protection of Human Health and the Environment

Alternative 1 would not provide protection of human health and the environment. The potential for direct human and ecological exposure to contaminated soil under a future residential land use scenario would remain, leading to unacceptable risks. The potential would also continue to exist for the undetected migration of soil COCs to groundwater.

Compliance with ARARs and TBCs

Alternative 1 would not comply with chemical-specific ARARs and TBCs because no action would be taken to reduce concentrations of COCs. Alternative 1 would also not comply with location-specific ARARs. Action-Specific ARARs are not applicable.

Long-Term Effectiveness and Permanence

Alternative 1 would have no long-term effectiveness and permanence because contaminated soil would remain on site. Because there would be no institutional controls to prevent residential development, the potential would exist for future unacceptable risk to human receptors. Residential development of Site 32 could also result in unacceptable risk to a correspondingly increased population of ecological receptors from exposure to contaminated soil. Because there would be no monitoring, the possible migration of soil

COCs to groundwater would not be detected. Although COCs concentrations might eventually decrease to acceptable levels through natural attenuation, no monitoring would be conducted to verify this.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 would not reduce the toxicity, mobility, or volume of COCs through treatment because no treatment would occur. Some reduction of toxicity or volume might occur through natural dispersion, dilution, or other attenuation process, but no monitoring would be performed to verify this.

Short-Term Effectiveness

Because no action would occur, implementation of Alternative 1 would not pose any risks to on-site workers or result in adverse impacts to the local community and the environment.

Alternative 1 would not achieve the RAOs and, although the soil PRGs might eventually be achieved through natural attenuation, it would not be known when.

4.1.2 Implementability

Alternative 1 would be readily implementable because there would be nothing to implement. The technical feasibility criteria, including constructability, operability, and reliability, are not applicable. The implementability of administrative measures is not applicable because no such measures would be taken.

4.1.3 Cost

There would be no costs associated with Alternative 1.

4.2 ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND MONITORING

Alternative 2 is illustrated on Figure 4-1 and would consist of two major components: institutional controls and monitoring.

Component 1: Institutional Controls

Institutional controls would consist of limiting land use to industrial purposes. LUCs would be prepared and implemented to ensure that, prior to any development at Site 32, adequate measures would be taken to minimize adverse human health and environmental effects. In particular, these LUCs would prevent residential development of Site 32, and provide that maintenance of the asphalt cap or pavement would be required by the property owner.

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INSTITUTIONAL CONTROLS AND MONITORING

INSTITUTIONAL CONTROLS
- PREPARE AND IMPLEMENT A LUCs TO MAINTAIN THE EXISTING ASPHALT CAP AND PREVENT RESIDENTIAL DEVELOPMENT.
- PERFORM ANNUAL SITE INSPECTIONS TO VERIFY CONTINUED IMPLEMENTATION OF THE LUCs.

→

- COLLECT 4 SOIL SAMPLES IN SOURCE AREA EVERY FIVE YEARS AND ANALYZE FOR VOCs, SVOCs, AND INORGANICS.
- COLLECT TWO GROUNDWATER SAMPLES FROM SOURCE AND DOWNGRADIENT MONITORING WELLS EVERY FIVE YEARS AND ANALYZE FOR VOCs, SVOCs, AND INORGANICS.

→

PERFORM 5-YEAR SITE REVIEWS.

NOTE:

1. LUCs – LAND USE CONTROLS

DRAWN BY DM DATE 10/9/02	BLOCK FLOW DIAGRAM SOIL ALTERNATIVE 2 SITE 32 EE/CA NAS CECIL FIELD JACKSONVILLE, FLORIDA	CONTRACT NO. 0039	
CHECKED BY DATE		APPROVED BY DATE	
COST/SCHED-AREA		APPROVED BY DATE	
SCALE NOT TO SCALE		DRAWING NO. FIGURE 4-1	REV. 0

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Annual physical inspections of the property to ensure that all LUCs are being complied with, would be conducted by Navy personnel, or other party designated by the Navy, and reported to both U.S. EPA and FDEP.

Component 2: Monitoring

Monitoring would consist of checking COCs concentrations by advancing soil borings in the contaminated area and in the area of known organic contamination and field testing the samples collected at various depths for organic vapor analysis (OVA). For each boring, the sample with the highest OVA reading or highest inorganic concentration, based on previously collected data, would also be analyzed for location-specific COCs by a fixed-base laboratory. Monitoring would also consist of collecting groundwater samples from existing and proposed wells within and downgradient to the contaminated soil area and analyzing these samples for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and inorganics.

Monitoring would be conducted for 30 years, and the data would be evaluated to determine the need for additional remedial action at the site. Sampling frequency would be on a 5-year basis. Each sampling round would consist of advancing and sampling four soil borings and sampling two monitoring wells. Every 5 years, site reviews, including evaluation of sampling data, would be conducted to evaluate the continued adequacy of the remedial alternative. These site reviews would be required because this alternative would allow contaminants to remain in soil at levels that exceed PRGs.

If the 5-year site reviews indicate that COCs beneath the asphalt pavement are migrating beyond the DRMO Storage Yard, the site will be reevaluated at that time to determine whether excavation and disposal of all or part of the impacted soil beneath the asphalt pavement would be necessary, or whether a groundwater treatment system would have to be installed. Likewise, if the annual inspection of the asphalt cap indicates that it is not being properly maintained causing COCs to migrate in the groundwater beyond the site, the site will also be reevaluated to determine if additional groundwater treatment or excavation of contaminated soils are required.

As part of the change of Site 32 from military to private ownership, provisions would be incorporated into the property transfer documents to ensure continuation of the above-described monitoring.

4.2.1 Effectiveness

Overall Protection of Human Health and the Environment

Alternative 2 would be protective of human health and the environment. Maintenance of the pavement would prevent exposure to contaminated soil.

Institutional controls restricting Site 32 to industrial use would be protective of human health by preventing unacceptable risks to future residents from direct exposure to contaminated soil.

Monitoring would be protective of the environment by detecting the potential migration of soil COCs to groundwater.

Compliance with ARARs and TBCs

Alternative 2 would not comply with chemical-specific ARARs and TBCs because COC concentrations would not actively be reduced. However, chemical-specific ARARs might eventually be achieved through natural attenuation. Alternative 2 would comply with all location- and action-specific ARARs and TBCs.

Long-Term Effectiveness and Permanence

Alternative 2 would provide long-term effectiveness and permanence. Although soil COC concentrations would not be actively reduced, risks to human health and the environment would be minimized through land use restrictions and monitoring.

Restricting Site 32 to industrial use and maintaining the integrity of the paved area would effectively and permanently prevent its development as a residential area, thereby preventing unacceptable risk from direct exposure of future residents and of an increased ecological population to contaminated soil.

Long-term monitoring would effectively detect potential migration of soil COCs to the groundwater.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 2 would not reduce the toxicity, mobility, or volume of contaminants through treatment because no treatment would occur. Some reduction in toxicity and volume might occur through natural attenuation, and this would be verified through monitoring.

Short-Term Effectiveness

Alternative 2 would have minimal short-term effectiveness concerns. Any exposure of workers to contaminated soil during the collection of soil samples and the maintenance and sampling of existing and proposed monitoring wells would be minimized by appropriate personal protection equipment (PPE) and compliance with site-specific health and safety procedures. Implementation of institutional controls and monitoring would not adversely impact the surrounding community or the environment.

The RAOs would be achieved immediately upon implementation of institutional controls and monitoring. Eventual attainment of PRGs through natural attenuation would be determined through monitoring.

4.2.2 Implementability

Alternative 2 would be readily implementable.

Maintenance of monitoring wells and paved areas, sampling and analysis of soil and groundwater, and performance of regular site inspections and 5-year reviews could readily be accomplished. The resources, equipment, and materials required for all these activities are readily available.

The administrative aspects of Alternative 2 would be relatively simple to implement. No construction permit would be required for this alternative. As part of the change of the site from military to private ownership, appropriate provisions will be incorporated into the property transfer documents to ensure continued implementation of land use restrictions and monitoring.

4.2.3 Cost

The estimated costs for Alternative 2 are as follows. These costs have been rounded to the nearest $1,000 to reflect the preliminary nature of the estimates:

- Capital Cost: $11,000
- Year by O&M Cost: $1,000/year and $13,000 every 5 years
- 30-Year Net Present Worth: $50,000

A detailed cost estimate for this alternative is provided in Appendix C.

4.3 ALTERNATIVE 3: EXCAVATION AND OFF-BASE TREATMENT AND DISPOSAL

Alternative 3 is illustrated on Figure 4-2 and would consist of two major components: excavation and off-base transportation and treatment and disposal.

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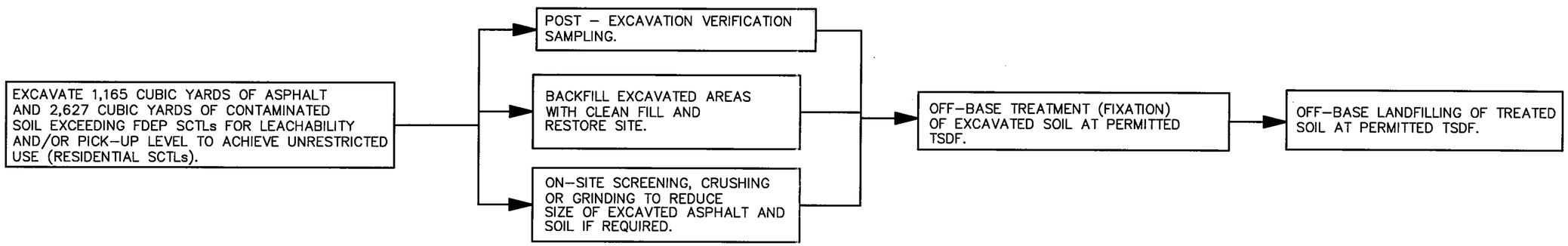
EXCAVATION AND OFF-BASE TREATMENT & DISPOSAL



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY HJP DATE 6/6/01
CHECKED BY DATE
COST/SCHED-AREA
SCALE AS NOTED

BLOCK FLOW DIAGRAM
SOIL ALTERNATIVE 3
SITE 32 EE/CA
NAS CECIL FIELD
JACKSONVILLE, FLORIDA

CONTRACT NO. 0039
APPROVED BY DATE 8/02/02
APPROVED BY MPS DATE 8/02/02
DRAWING NO. FIGURE 4-2 REV. 1

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

Component 1: Excavation

Soil contaminated with concentrations of COCs in excess of the cleanup value required to achieve the 95 percent UCL in order to obtain the FDEP SCTLs for direct residential exposure or FDEP leachability SCTLs will be excavated. Pre-excavation sampling would be conducted in order to verify the exact extent of the contamination.

The asphalt area measures 62,915 square feet and is 6 inches thick, resulting in a volume of 1,165 cubic yards. The next 1 foot of soil below the asphalt is assumed to be impacted, resulting in a volume of 2,330 cubic yards. An area outside the paved area, not previously excavated, is approximately 7,359 square feet in size, as shown on Figure 3-1. Of this area, 6,727 square feet would be excavated to a depth of 1 foot and 672 square feet would be excavated to depth of 2 feet bgs. This corresponds to a volume of approximately 296 cubic yards of excavated material. After completion of excavation, the sidewalls and the bottom of the excavated areas would be sampled and analyzed to confirm that the PRGs have been met. Following excavation, the excavated areas would be backfilled with clean fill and graded, and the site would be restored to pre-excavation conditions. Because a large portion of the excavated area consists of paved parking lots, it is assumed that on-site screening, crushing, and grinding would be required to reduce the particle size of at least part of the excavated material to less than 3 inches, as typically required by treatment, storage, and disposal facilities (TSDFs).

Component 2: Off-Base Transportation and Treatment and Disposal

The excavated soil would be transported to an off-base permitted TSDF for possible treatment and disposal. The exact nature and extent of treatment would be determined by the TSDF, based upon actual analysis of the contaminated soil and the requirements of the TSDF permit. Soil with high concentrations of inorganics may have to be chemically fixated and solidified. The TSDF may require bench-scale treatability tests to be performed to determine optimum treatment.

The treated soil would then be disposed. It is assumed that the treated soil would be nonhazardous and would be disposed in a Resource Conservation and Recovery Act (RCRA) Subtitle D type landfill. Samples of the treated soil would be collected and analyzed to ensure that the soil complies with the TSDF landfill permit.

4.3.1 Effectiveness

Overall Protection of Human Health and the Environment

Alternative 3 would be protective of human health and the environment.

Excavation of soil with concentrations of COCs in excess of FDEP SCTLs for direct residential exposure would eliminate the potential for unacceptable human health risk in case of residential development of the site. Excavation of contaminated soil would also minimize the potential for soil COCs to migrate to the groundwater.

Off-base treatment and disposal of the excavated soil at a permitted TSDF would protect human health and the environment.

Some short-term risks could be incurred by workers from exposure to contaminated soil and thermal desorption during on-site remedial activities. However, the potential for exposure would be minimized by the implementation of engineering controls (e.g., dust suppression, offgas treatment), the wearing of appropriate PPE, and compliance with Occupational Safety and Health Administration (OSHA) regulations and site-specific health and safety procedures. Any potential negative short-term impacts to the surrounding community and environment from fugitive emissions and/or spillage of contaminated soil could be minimized through the implementation of appropriate engineering controls (e.g., offgas treatment, perimeter air monitoring, spill prevention procedures, etc.).

Compliance with ARARs and TBCs

Alternative 3 would comply with all chemical-, location-, and action-specific ARARs and TBCs.

Long-Term Effectiveness and Permanence

Alternative 3 would provide long-term effectiveness and permanence.

Excavation of soil with concentrations of COCs in excess of FDEP SCTLs for direct residential exposure would effectively eliminate the potential for unacceptable human health risk in case of residential development of the site. Excavation would also effectively minimize the potential for COCs to migrate from soil to groundwater. Off-base treatment and disposal would effectively minimize any adverse impact from contaminated soil on human health and the environment.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 3 would reduce toxicity, mobility, and volume of contaminants through treatment. Approximately 3,792 cubic yards of material, including 2,627 cubic yards of soil and 1,165 cubic yards of asphalt, would be removed from Site 32 by this alternative. Mobility of COCs would be reduced in that portion of the excavated soil that may be treated by chemical fixation/solidification.

Short-Term Effectiveness

Implementation of the excavation and off-base treatment and disposal components of Alternative 3 could expose construction workers to contaminated soil. This potential for exposure would be minimized by the implementation of engineering controls such as dust suppression and air-quality monitoring. The potential for worker exposure would be further reduced by the wearing of appropriate PPE and compliance with applicable OSHA regulations and proper site-specific health and safety procedures.

Implementation of the excavation, treatment, and off-site disposal components is not expected to adversely impact either the surrounding community or the environment. However, measures such as spill prevention and containment, erosion and sedimentation control, perimeter air monitoring, and traffic control would be taken to ensure that the impact remains acceptable.

Alternative 3 could be completed in approximately 2 months and would achieve the RAOs and attain the soil PRGs at completion.

4.3.2 Implementability

Alternative 3 would be easily implementable.

The excavation component of this alternative could be performed with normal construction equipment, resources, equipment, and materials that would be readily available for this purpose. Because the excavation would be limited to 2 feet bgs, the need for shoring and dewatering would be minimal, although care would have to be taken not to undermine the foundations of existing buildings. Other existing site structures such as parking lots and utility lines would need to be removed or moved and restored or replaced after excavation.

Permitted TSDFs with soil treatment and nonhazardous landfilling capabilities are available, which would make implementation of this alternative relatively easy.

The administrative aspects of Alternative 3 would be relatively simple to implement. A construction permit would have to be obtained and the off-site transportation and disposal of the excavated soil would require the completion of relatively numerous administrative procedures that, while constituting a significant effort, could readily be accomplished.

4.3.3 Cost

The estimated costs for Alternative 3 are as follows. These costs have been rounded to the nearest $1,000 to reflect the preliminary nature of the estimate:

- Capital Cost: $676,000
- Yearly O&M Cost: $0
- NPW: $676,000

A detailed cost estimate for this alternative is provided in Appendix C.

5.0 COMPARATIVE ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

This section compares the analyses that were presented for each of the remedial alternatives in Section 4.0 of this EE/CA. The criteria for comparison are identical to those used for the detailed analysis of individual alternatives.

5.1 COMPARISON OF SOIL REMEDIAL ALTERNATIVES BY CRITERIA

The following remedial alternatives for soil are being compared in this section:

- Alternative 1: No Action
- Alternative 2: Institutional Controls and Monitoring
- Alternative 3: Excavation and Off-Base Treatment and Disposal

5.1.1 Overall Protection of Health and Environment

Alternative 1 would not provide protection of human health and the environment because the potential would remain for residential development that would result in an unacceptable risk due to direct exposure of human and ecological receptors to contaminated soil. However, under the current use, this alternative would provide adequate protection of human health and the environment. The major threat from soil contamination at Site 32 would be the migration of soil COCs to the groundwater and, because no monitoring would be performed, this migration would remain unknown.

Alternative 2 would be protective of human health and the environment. Institutional controls would provide protection by preventing residential development. Monitoring would provide protection by detecting potential migration of soil COCs to the groundwater.

Alternative 3 would be more protective than Alternative 2. Soil contaminated above PRGs would be excavated and taken to an off-base permitted TSDF for treatment and disposal.

5.1.2 Compliance with ARARs and TBCs

Alternative 1 would not comply with chemical-specific ARARs. No action-specific ARARs or TBCs apply to this alternative.

Alternative 2 would not comply with chemical-specific ARARs. This alternative would comply with all location- and action-specific ARARs and TBCs.

Alternative 3 would comply with all State and Federal chemical-, location-, and action-specific ARARs and TBCs.

5.1.3 Long-Term Effectiveness and Permanence

Alternative 1 would have very limited long-term effectiveness and permanence because contaminated soil would remain on site. Because there would be no institutional controls to prevent residential development, the potential would continue to exist for unacceptable risk to possible future residents. Residential development at Site 32 could also result in unacceptable risk to a correspondingly increased population of ecological receptors from exposure to contaminated soil. Because there would be no monitoring, potential migration of soil COCs to groundwater would go undetected.

Alternative 2 would have long-term effectiveness and permanence. Institutional controls, including prevention of residential development, would effectively and permanently reduce the risk from direct exposure of human and ecological receptors to contaminated soil. Long-term monitoring would be effective for the detection of potential migration of soil COCs to the groundwater.

Alternative 3 would offer the best long-term effectiveness and permanence. Soil contaminated above the PRGs would be excavated and taken to a permitted off-base TSDF. These remedial actions would effectively and permanently eliminate the risk from direct exposure to contaminated soil and the potential for soil COCs to migrate to the groundwater.

5.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives 1 and 2 would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment. Both alternatives might achieve some reduction of contaminant toxicity and volume through natural processes.

Alternative 3 would best reduce contaminant toxicity, mobility, and volume through treatment. Alternative 3 would remove approximately 2,627 cubic yards of contaminated soil and 1,165 cubic yards of asphalt. The excavation of contaminated soil at Site 32 would permanently reduce the volume of COCs. Off-base treatment and disposal would irreversibly reduce toxicity and mobility.

5.1.5 Short-Term Effectiveness

Implementation of Alternative 1 would not result in risks to site workers or adversely impact the surrounding community or environment because no remedial activities would be performed. Alternative 1

would not achieve the RAOs, although the soil PRGs might eventually be achieved over time through natural processes (this would not be verified through monitoring).

Implementation of Alternative 2 would result in a slight possibility of exposing site workers to contaminated soil during the sampling of soil and groundwater. However, the risk of exposure would be effectively controlled by wearing appropriate PPE and complying with proper site-specific health and safety procedures. Implementation of Alternative 2 would not adversely impact the surrounding community or environment. Alternative 2 would immediately achieve the RAOs, and the eventual attainment of the PRGs through natural attenuation would be determined through monitoring.

Implementation of Alternative 3 would result in a significant possibility of exposing construction workers to contaminated soil during the excavation and off-base transportation, treatment, and disposal activities. However, these risks of exposure would be effectively controlled by the implementation of engineering controls (e.g., dust suppression, offgas treatment), by the wearing of appropriate PPE, and by compliance with applicable OSHA regulations and proper site-specific health and safety procedures.

With the implementation of Alternative 3, there would be a slight risk to the surrounding community during the transportation of the contaminated soil to the off-base TSDF. This risk would be controlled through adherence to Department of Transportation (DOT) regulations and implementation of traffic control and spill prevention measures. Alternative 3 would achieve the RAOs and PRGs within approximately 2 months.

5.1.6 Implementability

Alternative 1 would be very simple to implement because no action would occur.

Alternative 2 would be relatively easy to implement. Preparation and implementation of LUCs to restrict Site 32 to industrial use could be readily accomplished. Installation of new monitoring wells, maintenance and sampling of new and existing wells, and performance of 5-year reviews as part of the monitoring component could also be readily accomplished. Resources, equipment, and materials are available for all these tasks. The administrative implementability of institutional controls and monitoring would also be relatively easy. As part of change of the site from military to private ownership, appropriate provisions will be incorporated into the property transfer documents to ensure the continuation of these controls and monitoring.

Alternative 3 would be slightly more difficult to implement than Alternative 2. This alternative would consist of excavation and off-base treatment and disposal of contaminated soil. Off-base permitted TSDFs are available, which makes the implementation of this alternative relatively easy. Alternative 3

would not require long-term monitoring. The ease of administrative implementation of Alternative 3 would be similar to that of Alternative 2, because the alternative would also require a construction permit. Although it would not require institutional controls, it would require manifesting of the excavated soil.

5.1.7 Cost

The capital and O&M costs and NPW of the soil alternatives are as follows. Costs have been rounded to the nearest $1,000 to reflect the preliminary nature of the estimates. Detailed cost estimates are provided in Appendix C.

Alternative	Capital ($)	Yearly of O&M ($)	NPW ($)
1	$0	$0	$0
2	$11,000	$3,000	$50,000
3	$676,000	$0	$676,000

5.2 SUMMARY OF COMPARATIVE ANALYSIS OF SOIL REMEDIAL ALTERNATIVES

Table 5-1 summarizes the comparative analysis of the three soil remedial alternatives.

TABLE 5-1

SUMMARY OF COMPARATIVE ANALYSIS OF SOIL REMEDIAL ACTION ALTERNATIVES
SITE 32 EE/CA
NAS CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 1 OF 2

Evaluation Criteria	Alternative 1: No Action	Alternative 2: Institutional Controls and Monitoring	Alternative 3: Excavation and Off-Base Treatment and Disposal
Overall Protection of Human Health and Environment	Would not be protective because residential development could occur that would result in unacceptable risks to human and ecological receptors. The threat of soil COCs migrating to the groundwater would remain.	Would be protective of the environment by preventing residential development and detecting the migration of soil COCs.	Would be most protective by eliminating the risk of exposure to soil contaminated above SCTLs for direct residential exposure and minimizing the potential for migration of COCs to groundwater.
Compliance with ARARs and TBCs: Chemical-Specific Location-Specific Action-Specific	 Would not comply Would not comply Not applicable	 Would not comply Would comply Would comply	 Would comply Would comply Would comply
Long-Term Effectiveness and Permanence	Would have very limited long-term effectiveness and permanence since all contaminants would remain on-site. Any long-term effectiveness would not be known since monitoring would not occur.	Would be long-term effective and permanent. The prevention of residential development through deed restrictions and the monitoring of contaminants to evaluate their migration would provide long-term effectiveness and permanence.	Would provide the most long-term effectiveness and permanence. Risks from exposure to soil contaminated above the SCTLs for direct residential exposure and from the potential migration of contaminants would be effectively and permanently eliminated through excavation, treatment, and disposal.
Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment	Would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment but may achieve some reduction through natural processes.	Would not achieve reduction of toxicity, mobility, or volume of contaminants through treatment but may achieve some reduction through natural processes.	Would remove 2,672 cubic yards of contaminated soil and 1,165 cubic yards of ashpalt. Treatment would reduce mobility and toxicity.

TABLE 5-1

SUMMARY OF COMPARATIVE ANALYSIS OF SOIL REMEDIAL ACTION ALTERNATIVES
SITE 32 EE/CA
NAS CECIL FIELD
JACKSONVILLE, FLORIDA
PAGE 2 OF 2

Evaluation Criteria	Alternative 1: No Action	Alternative 2: Institutional Controls and Monitoring	Alternative 3: Excavation and Off-Base Treatment and Disposal
Short-Term Effectiveness	Would not result in short-term risks to site workers or adversely impact the surrounding community but would also not achieve RAOs through treatment.	Would result in slight risk to site workers during sampling of the soil and groundwater. This risk would be reduced through the wearing of appropriate PPE and the compliance with site-specific health and safety procedures. RAOs would be achieved immediately upon implementation. Eventual compliance with PRGs would be determined through monitoring.	Would result in a significant risk of exposure to site workers to contaminated soil during the excavation, treatment, and disposal activities. This risk would be reduced through wearing of appropriate PPE and compliance with site-specific health and safety procedures. The RAOs would be achieved immediately upon implementation. PRGs would be attained within 2 months.
Implementability	Would be simple to implement since no action would occur.	Would be easy to implement since the resources, materials, and equipment are readily available. Provisions were incorporated into the property transfer documents to ensure the continuation of the institutional controls and monitoring when ownership of the site was transferred to the private sector.	Would be more difficult to implement since contaminated soil would have to be excavated and transported off-base for treatment and disposal. No institutional controls or monitoring would be required. A construction permit and manifesting would also be required.
Costs:			
Capital	$0	$10,500	$676,000
Average Yearly O&M	$0	$3,500	$0
NPW	$0	$50,000	$676,000

6.0 RECOMMENDED REMEDIAL ACTION ALTERNATIVE

This section provides a recommendation for selection of an alternative to address soil contamination identified at Site 32. As presented in the previous sections, the evaluated alternatives include:

- Alternative 1: No Action
- Alternative 2: Institutional Controls and Monitoring
- Alternative 3: Excavation and Off-Base Treatment and Disposal

It is not acceptable to select the No Action alternative, and this alternative is used only for comparison. Both Alternatives 2 and 3 are effective in achieving their designed objectives, are technically feasible, comply with regulatory requirements, and are relatively easy to implement. Alternative 2 is less expensive, but Alternative 3 will permit unrestricted use of the site.

Site 32 has been identified in the reuse plan as an industrial area, and it is anticipated that the asphalt pavement area will continue to be used in the manner for which it was constructed. It is therefore recommended that the lower cost Alternative 2 be selected and that a LUCs be prepared and implemented rather than additional costly excavation in order to have unrestricted use of this site with no LUCs.

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APPENDIX A

ANALYTICAL LABORATORY RESULTS

PHASE I ANALYTICAL RESULTS

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-07-9-083

TO:	**M. SPERANZA**	**DATE:**	**JULY 13, 1999**
FROM:	**GRETCHEN PHIPPS**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PAH**
CTO 078 - NAS CECIL FIELD, FLORIDA
SDG – F4254

SAMPLES: 7/Soils/

CEF-P32-SS-001-01	CEF-P32-SS-001-02
CEF-P32-SS-002-01	CEF-P32-SS-003-01
CEF-P32-SS-004-01	CEF-P32-SS-005-01
CEF-P32-SS-DU01	

Overview

The sample set for CTO 078, NAS Cecil Field, SDG F4254, consists of seven (7) soil environmental samples. One (1) field duplicate pair (CEF-P32-SS-001-02/ CEF-P32-SS-DU01) was included within this SDG.

All samples were analyzed for polynuclear aromatic hydrocarbons (PAHs). The samples were collected by Tetra Tech NUS on June 3 and 4, 1999 and analyzed by Accutest Laboratory. PAH analyses were conducted using SW 846 method 8310.

The data was evaluated based on the following parameters:

- * Data Completeness
- * Calibration Verifications
- * Holding Times
- * Laboratory Blank Analyses
- Field Duplicate Analyses
- * Surrogate Recoveries
- * Detection Limits

* - All quality control criteria were met for this parameter.

Field Duplicate Results

Field duplicate imprecision (>50%) was noted for chrysene in field duplicate pair CEF-P32-SS-001-02/ CEF-P32-SS-DU01. The positive and nondetected results reported for chrysene in the affected duplicate pair were qualified as estimated, "J" and "UJ", respectively.

Notes

A comparison of field duplicate pair (CEF-P32-SS-001-02/ CEF-P32-SS-DU01) is included in Appendix C.

The surrogate recoveries were not reported on the Form 1s. However, a surrogate summary table is included in Appendix C.

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: Field duplicate imprecision was noted for chrysene in field duplicate pair CEF-P32-SS-001-02/ CEF-P32-SS-DU01.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Review", February 1994 and the NFESC document entitles "Navy Installation Restoration Laboratory Quality Assurance Guide." (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps

Tetra Tech NUS
Joseph A. Samchuck
Quality Control Officer

Attachments:

1. Appendix A - Qualified Analytical Data
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F4254

SAMPLE NUMBER:	CEF-P32-SS-001-01			CEF-P32-SS-001-02			CEF-P32-SS-002-01			CEF-P32-SS-003-01		
SAMPLE DATE:	06/04/99			06/04/99			06/03/99			06/03/99		
LABORATORY ID:	F4254-1			F4254-2			F4254-3			F4254-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	89.8 %			89.1 %			94.9 %			99.0 %		
UNITS:	UG/KG			UG/KG			UG/KG			UG/KG		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	50	U		50	U		53	U		55	U	
2-METHYLNAPHTHALENE	50	U		50	U		1400			580		
ACENAPHTHENE	50	U		50	U		1400			710		
ACENAPHTHYLENE	100	U		100	U		110	U		110	U	
ANTHRACENE	7.7	U		7.6	U		8.1	U		8.4	U	
BENZO(A)ANTHRACENE	7.7	U		7.6	U		300			8.4	U	
BENZO(A)PYRENE	7.7	U		7.6	U		280			230		
BENZO(B)FLUORANTHENE	7.7	U		7.6	U		490			270		
BENZO(G,H,I)PERYLENE	10	U		10	U		340			290		
BENZO(K)FLUORANTHENE	7.7	U		7.6	U		160			140		
CHRYSENE	7.7	U		7.6	UJ	G	420			200		
DIBENZO(A,H)ANTHRACENE	13	U		12	U		13	U		220		
FLUORANTHENE	10	U		10	U		15000			650		
FLUORENE	10	U		10	U		11	U		11	U	
INDENO(1,2,3-CD)PYRENE	6.5	U		7.6	U		220			210		
NAPHTHALENE	50	U		50	U		53	U		55	U	
PHENANTHRENE	7.7	U		7.6	U		780			330		
PYRENE	10	U		10	U		980			530		

Report of Analysis

Client Sample ID:	CEF-P32-SS-001-01		
Lab Sample ID:	F4254-1	**Date Sampled:**	06/04/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
Method:	EPA 8310	**Percent Solids:**	89.8
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]		1	07/04/99	SUB	n/a	n/a	R6898
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	50	ug/kg	
208-96-8	Acenaphthylene	ND	100	ug/kg	
120-12-7	Anthracene	ND	7.7	ug/kg	
56-55-3	Benzo(a)anthracene	ND	7.7	ug/kg	
50-32-8	Benzo(a)pyrene	ND	7.7	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	7.7	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	7.7	ug/kg	
218-01-9	Chrysene	ND	7.7	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	13	ug/kg	
206-44-0	Fluoranthene	ND	10	ug/kg	
86-73-7	Fluorene	ND	10	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	6.5	ug/kg	
91-20-3	Naphthalene	ND	50	ug/kg	
90-12-0	1-Methylnaphthalene	ND	50	ug/kg	
91-57-6	2-Methylnaphthalene	ND	50	ug/kg	
85-01-8	Phenanthrene	ND	7.7	ug/kg	
129-00-0	Pyrene	ND	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1718-51-0	p-Terphenyl-d14	%		-%

(a) Analyzed By Accutest Southeast Subcontract Lab.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F4254

SAMPLE NUMBER:	CEF-P32-SS-004-01	CEF-P32-SS-005-01	CEF-P32-SS-DU01	
SAMPLE DATE:	06/03/99	06/04/99	06/04/99	/ /
LABORATORY ID:	F4254-5	F4254-6	F4254-7	
QC_TYPE:	NORMAL	NORMAL	NORMAL	
% SOLIDS:	76.0 %	84.8 %	93.9 %	100.0 %
UNITS:	UG/KG	UG/KG	UG/KG	
FIELD DUPLICATE OF:			CEF-P32-SS-001-02	

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	42	U		48	U		52	U				
2-METHYLNAPHTHALENE	42	U		48	U		52	U				
ACENAPHTHENE	42	U		48	U		52	U				
ACENAPHTHYLENE	87	U		97	U		110	U				
ANTHRACENE	6.5	U		7.2	U		8	U				
BENZO(A)ANTHRACENE	6.5	U		7.2	U		8	U				
BENZO(A)PYRENE	45			7.2	U		8	U				
BENZO(B)FLUORANTHENE	58			7.2	U		8	U				
BENZO(G,H,I)PERYLENE	49			9.7	U		11	U				
BENZO(K)FLUORANTHENE	6.5	U		7.2	U		8	U				
CHRYSENE	6.5	U		3100			200	J	G			
DIBENZO(A,H)ANTHRACENE	11	U		12	U		13	U				
FLUORANTHENE	8.7	U		9.7	U		11	U				
FLUORENE	8.7	U		9.7	U		11	U				
INDENO(1,2,3-CD)PYRENE	50			7.2	U		7.7	U				
NAPHTHALENE	42	U		48	U		52	U				
PHENANTHRENE	6.5	U		7.2	U		8	U				
PYRENE	8.7	U		9.7	U		11	U				

Report of Analysis

Client Sample ID:	CEF-P32-SS-001-02		
Lab Sample ID:	F4254-2	**Date Sampled:**	06/04/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
Method:	EPA 8310	**Percent Solids:**	89.1
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]		1	07/04/99	SUB	n/a	n/a	R6898
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	50	ug/kg	
208-96-8	Acenaphthylene	ND	100	ug/kg	
120-12-7	Anthracene	ND	7.6	ug/kg	
56-55-3	Benzo(a)anthracene	ND	7.6	ug/kg	
50-32-8	Benzo(a)pyrene	ND	7.6	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	7.6	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	10	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	7.6	ug/kg	
218-01-9	Chrysene	ND	7.6	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	12	ug/kg	
206-44-0	Fluoranthene	ND	10	ug/kg	
86-73-7	Fluorene	ND	10	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	7.6	ug/kg	
91-20-3	Naphthalene	ND	50	ug/kg	
90-12-0	1-Methylnaphthalene	ND	50	ug/kg	
91-57-6	2-Methylnaphthalene	ND	50	ug/kg	
85-01-8	Phenanthrene	ND	7.6	ug/kg	
129-00-0	Pyrene	ND	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1718-51-0	p-Terphenyl-d14	%		-%

(a) Analyzed By Accutest Southeast Subcontract Lab.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-P32-SS-002-01		
Lab Sample ID:	F4254-3	**Date Sampled:**	06/03/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
Method:	EPA 8310	**Percent Solids:**	94.9
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]		1	07/04/99	SUB	n/a	n/a	R6898
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	1400	53	ug/kg	
208-96-8	Acenaphthylene	ND	110	ug/kg	
120-12-7	Anthracene	ND	8.1	ug/kg	
56-55-3	Benzo(a)anthracene	300	8.1	ug/kg	
50-32-8	Benzo(a)pyrene	280	8.1	ug/kg	
205-99-2	Benzo(b)fluoranthene	490	8.1	ug/kg	
191-24-2	Benzo(g,h,i)perylene	340	11	ug/kg	
207-08-9	Benzo(k)fluoranthene	160	8.1	ug/kg	
218-01-9	Chrysene	420	8.1	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	13	ug/kg	
206-44-0	Fluoranthene	15000	11	ug/kg	
86-73-7	Fluorene	ND	11	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	220	8.1	ug/kg	
91-20-3	Naphthalene	ND	53	ug/kg	
90-12-0	1-Methylnaphthalene	ND	53	ug/kg	
91-57-6	2-Methylnaphthalene	1400	53	ug/kg	
85-01-8	Phenanthrene	780	8.1	ug/kg	
129-00-0	Pyrene	980	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1718-51-0	p-Terphenyl-d14	%		-%

(a) Analyzed By Accutest Southeast Subcontract Lab.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-P32-SS-003-01		
Lab Sample ID:	F4254-4	**Date Sampled:**	06/03/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
Method:	EPA 8310	**Percent Solids:**	99.0
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]		1	07/04/99	SUB	n/a	n/a	R6898
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	710	55	ug/kg	
208-96-8	Acenaphthylene	ND	110	ug/kg	
120-12-7	Anthracene	ND	8.4	ug/kg	
56-55-3	Benzo(a)anthracene	ND	8.4	ug/kg	
50-32-8	Benzo(a)pyrene	230	8.4	ug/kg	
205-99-2	Benzo(b)fluoranthene	270	8.4	ug/kg	
191-24-2	Benzo(g,h,i)perylene	290	11	ug/kg	
207-08-9	Benzo(k)fluoranthene	140	8.4	ug/kg	
218-01-9	Chrysene	200	8.4	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	220	14	ug/kg	
206-44-0	Fluoranthene	650	11	ug/kg	
86-73-7	Fluorene	ND	11	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	210	8.4	ug/kg	
91-20-3	Naphthalene	ND	55	ug/kg	
90-12-0	1-Methylnaphthalene	ND	55	ug/kg	
91-57-6	2-Methylnaphthalene	580	55	ug/kg	
85-01-8	Phenanthrene	330	8.4	ug/kg	
129-00-0	Pyrene	530	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1718-51-0	p-Terphenyl-d14	%		-%

(a) Analyzed By Accutest Southeast Subcontract Lab.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-P32-SS-004-01		
Lab Sample ID:	F4254-5	**Date Sampled:**	06/03/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
Method:	EPA 8310	**Percent Solids:**	76.0
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]		1	07/04/99	SUB	n/a	n/a	R6898
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	42	ug/kg	
208-96-8	Acenaphthylene	ND	87	ug/kg	
120-12-7	Anthracene	ND	6.5	ug/kg	
56-55-3	Benzo(a)anthracene	ND	6.5	ug/kg	
50-32-8	Benzo(a)pyrene	45	6.5	ug/kg	
205-99-2	Benzo(b)fluoranthene	58	6.5	ug/kg	
191-24-2	Benzo(g,h,i)perylene	49	8.7	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	6.5	ug/kg	
218-01-9	Chrysene	ND	6.5	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	ND	8.7	ug/kg	
86-73-7	Fluorene	ND	8.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	50	6.5	ug/kg	
91-20-3	Naphthalene	ND	42	ug/kg	
90-12-0	1-Methylnaphthalene	ND	42	ug/kg	
91-57-6	2-Methylnaphthalene	ND	42	ug/kg	
85-01-8	Phenanthrene	ND	6.5	ug/kg	
129-00-0	Pyrene	ND	8.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1718-51-0	p-Terphenyl-d14	%		-%

(a) Analyzed By Accutest Southeast Subcontract Lab.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-P32-SS-005-01		
Lab Sample ID:	F4254-6	**Date Sampled:**	06/04/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
Method:	EPA 8310	**Percent Solids:**	84.8
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]		1	07/04/99	SUB	n/a	n/a	R6898
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	48	ug/kg	
208-96-8	Acenaphthylene	ND	97	ug/kg	
120-12-7	Anthracene	ND	7.2	ug/kg	
56-55-3	Benzo(a)anthracene	ND	7.2	ug/kg	
50-32-8	Benzo(a)pyrene	ND	7.2	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	7.2	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	9.7	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	7.2	ug/kg	
218-01-9	Chrysene	3100	7.2	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	12	ug/kg	
206-44-0	Fluoranthene	ND	9.7	ug/kg	
86-73-7	Fluorene	ND	9.7	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	7.2	ug/kg	
91-20-3	Naphthalene	ND	48	ug/kg	
90-12-0	1-Methylnaphthalene	ND	48	ug/kg	
91-57-6	2-Methylnaphthalene	ND	48	ug/kg	
85-01-8	Phenanthrene	ND	7.2	ug/kg	
129-00-0	Pyrene	ND	9.7	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1718-51-0	p-Terphenyl-d14	%		-%

(a) Analyzed By Accutest Southeast Subcontract Lab.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	CEF-P32-SS-DU01		
Lab Sample ID:	F4254-7	**Date Sampled:**	06/04/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
Method:	EPA 8310	**Percent Solids:**	93.9
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]		1	07/04/99	SUB	n/a	n/a	R6898
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	52	ug/kg	
208-96-8	Acenaphthylene	ND	110	ug/kg	
120-12-7	Anthracene	ND	8.0	ug/kg	
56-55-3	Benzo(a)anthracene	ND	8.0	ug/kg	
50-32-8	Benzo(a)pyrene	ND	8.0	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	8.0	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	11	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	8.0	ug/kg	
218-01-9	Chrysene	200	8.0	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	13	ug/kg	
206-44-0	Fluoranthene	ND	11	ug/kg	
86-73-7	Fluorene	ND	11	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	7.7	ug/kg	
91-20-3	Naphthalene	ND	52	ug/kg	
90-12-0	1-Methylnaphthalene	ND	52	ug/kg	
91-57-6	2-Methylnaphthalene	ND	52	ug/kg	
85-01-8	Phenanthrene	ND	8.0	ug/kg	
129-00-0	Pyrene	ND	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
1718-51-0	p-Terphenyl-d14	%		-%

(a) Analyzed By Accutest Southeast Subcontract Lab.

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-07-9-094

TO:	M. SPERANZA	DATE:	JULY 14, 1999
FROM:	GRETCHEN PHIPPS	COPIES:	DV FILE

SUBJECT: **INORGANIC DATA VALIDATION – TAL METALS**
CTO 078 - NAS CECIL FIELD, FLORIDA
SDG – F4254

SAMPLES: 1/TCLP Leachate/

CEF-P32-SS-001-01

7/Soils/

CEF-P32-SS-001-01	CEF-P32-SS-001-02
CEF-P32-SS-002-01	CEF-P32-SS-003-01
CEF-P32-SS-004-01	CEF-P32-SS-005-01
CEF-P32-SS-DU01	

Overview

The sample set for CTO 078, Cecil Field, SDG F4254, consists of one (1) TCLP leachate and seven (7) soil environmental samples. One (1) field duplicate pair (CEF-P32-SS-001-02 / CEF-P32-SS-DU01) was included within this SDG.

The soil samples were analyzed for target analyte list (TAL) metals. The TCLP leachate samples was analyzed for toxicity characteristic leaching procedure (TCLP) arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver. The samples were collected by Tetra Tech NUS on June 4, 1999 and analyzed by Accutest Laboratory under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA / QC) criteria. Metals analyses, with the exception of mercury, were conducted using SW 846 method 6010B. Mercury analyses were conducted using SW 846 method 7470A.

The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
• Calibration Verifications
• Laboratory Blank Analyses
• Field Duplicate Imprecision
* • Detection Limits

* - All quality control criteria were met for this parameter.

Attachments:

1. Appendix A - Qualified Analytical Data
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F4254

SAMPLE NUMBER:	CEF-P32-SS-001-01			CEF-P32-SS-001-02			CEF-P32-SS-002-01			CEF-P32-SS-003-01		
SAMPLE DATE:	06/04/99			06/04/99			06/03/99			06/03/99		
LABORATORY ID:	F4254-1			F4254-2			F4254-3			F4254-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	89.8 %			89.1 %			94.9 %			99.0 %		
UNITS:	MG/KG			MG/KG			MG/KG			MG/KG		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ALUMINUM	1490	J	G	1910	J	G	5560	J	G	1570	J	G
ANTIMONY	0.27	U		0.27	U		5.8			0.24	U	
ARSENIC	0.38	U		0.39	U		3.8			0.35	U	
BARIUM	2.3			3.7			62.8			7.4		
BERYLLIUM	0.28	U	A	0.18	U	A	1.2	U	A	0.30	U	A
CADMIUM	0.04	U		0.04	U		30.2			0.37		
CALCIUM	435			844			42600			11500		
CHROMIUM	6.7			1.7			72.5			4.9		
COBALT	0.19			0.12			3.8			0.23		
COPPER	0.44			0.65			48.5			4.6		
IRON	382			383			6970			666		
LEAD	1.7			3.0			370			21.6		
MAGNESIUM	76.3			75.4			1820			358		
MANGANESE	3.5			2.4			303			19.2		
MERCURY	0.05	U		0.05	U		0.04	U		0.04	U	
NICKEL	3.7			0.73	U	A	16.4			1.3		
POTASSIUM	27.9	U	A	32.1	U	A	438			72.3		
SELENIUM	0.23	U		0.24	U	A	0.52	U	A	0.21	U	
SILVER	0.19	U	A	0.25	U	A	0.55	U	A	0.37	U	A
SODIUM	17.0	U		17.2	U		76.1	U	A	31.3	U	A
THALLIUM	0.30	U		0.30	U		0.28	U		0.27	U	
VANADIUM	1.8			1.6			24.3			2.3		
ZINC	4.4			3.6			557			34.1		

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F4254

SAMPLE NUMBER:	CEF-P32-SS-004-01	CEF-P32-SS-005-01	CEF-P32-SS-DU01	
SAMPLE DATE:	06/03/99	06/04/99	06/04/99	/ /
LABORATORY ID:	F4254-5	F4254-6	F4254-7	
QC_TYPE:	NORMAL	NORMAL	NORMAL	
% SOLIDS:	76.0 %	84.8 %	93.9 %	100.0 %
UNITS:	MG/KG	MG/KG	MG/KG	
FIELD DUPLICATE OF:			CEF-P32-SS-001-02	

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ALUMINUM	2400	J	G	142	J	G	737	J	G			
ANTIMONY	0.31	U		0.28	U		0.25	U				
ARSENIC	0.45	U		0.41	U		0.37	U				
BARIUM	5.1			3.5			2.2					
BERYLLIUM	0.31	U	A	0.24	U	A	0.24	U	A			
CADMIUM	0.11	U	A	0.04	U		0.04	U				
CALCIUM	1190			1240			461					
CHROMIUM	3.1			0.35	U	A	0.80	U	A			
COBALT	0.20			0.12			0.12					
COPPER	1.2			0.72			1.1					
IRON	766			115			239					
LEAD	6.6			2.4			2.7					
MAGNESIUM	125			66.1			54.9					
MANGANESE	5.3			3.2			2.1					
MERCURY	0.05	U		0.05	U		0.04	U				
NICKEL	1.2	U	A	0.34	U	A	0.39	U	A			
POTASSIUM	51.3	U	A	23.0	U	A	20.2	U	A			
SELENIUM	0.27	U		0.24	U		0.22	U				
SILVER	0.26	U	A	0.15	U	A	0.13	U	A			
SODIUM	20.1	U		29.1	U	A	16.3	U				
THALLIUM	0.35	U		0.32	U		0.29	U				
VANADIUM	2.9			0.26	U	A	0.78					
ZINC	6.9			4.8			3.6					

CTO078 - NAS CECIL FIELD
LEACHATE DATA
Accutest, NJ
SDG: F4254

SAMPLE NUMBER:	CEF-P32-SS-001-01			/ /			/ /			/ /		
SAMPLE DATE:	06/04/99											
LABORATORY ID:	F4254-1A											
QC_TYPE:	NORMAL											
% SOLIDS:	0.0 %			100.0 %			100.0 %			100.0 %		
UNITS:	UG/L											
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ARSENIC	5.0	U										
BARIUM	200	U										
CADMIUM	4.0	U										
CHROMIUM	10.0	U										
LEAD	3.0	U										
MERCURY	2.0	U										
SELENIUM	14.0	U	A									
SILVER	10.0	U										

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Report of Analysis

Client Sample ID:	CEF-P32-SS-001-01		
Lab Sample ID:	F4254-1	**Date Sampled:**	06/04/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
		Percent Solids:	89.8
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	1490	22.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Antimony	0.27 U	6.7	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Arsenic	0.38 U	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Barium	2.3 B	22.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Beryllium	0.28 B	0.56	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cadmium	0.04 U	0.45	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Calcium	435 B	557	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Chromium	6.7	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cobalt	0.19 B	5.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Copper	0.44 B	2.8	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Iron	382	11.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Lead	1.7 B	11.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Magnesium	76.3 B	557	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Manganese	3.5	1.7	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Mercury	0.05 U	0.19	mg/kg	1	06/09/99	06/09/99	JK	SW846 7471A
Nickel	3.7 B	4.5	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Potassium	27.9 B	557	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Selenium	0.23 U	11.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Silver	0.19 B	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Sodium	17.0 U	557	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Thallium	0.30 U	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Vanadium	1.8 B	5.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Zinc	4.4	2.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-001-02		
Lab Sample ID:	F4254-2	**Date Sampled:**	06/04/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
		Percent Solids:	89.1
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	1910	22.4	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Antimony	0.27 U	6.7	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Arsenic	0.39 U	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Barium	3.7 B	22.4	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Beryllium	0.18 B	0.56	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cadmium	0.04 U	0.45	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Calcium	844	561	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Chromium	1.7	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cobalt	0.12 B	5.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Copper	0.65 B	2.8	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Iron	383	11.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Lead	3.0 B	11.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Magnesium	75.4 B	561	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Manganese	2.4	1.7	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Mercury	0.05 U	0.19	mg/kg	1	06/09/99	06/09/99	JK	SW846 7471A
Nickel	0.73 B	4.5	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Potassium	32.1 B	561	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Selenium	0.24 B	11.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Silver	0.25 B	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Sodium	17.2 U	561	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Thallium	0.30 U	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Vanadium	1.6 B	5.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Zinc	3.6	2.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-002-01		
Lab Sample ID:	F4254-3	**Date Sampled:**	06/03/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
		Percent Solids:	94.9
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	5560	21.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Antimony	5.8 B	6.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Arsenic	3.8	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Barium	62.8	21.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Beryllium	1.2	0.53	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cadmium	30.2	0.42	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Calcium	42600	527	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Chromium	72.5	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cobalt	3.8 B	5.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Copper	48.5	2.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Iron	6970	10.5	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Lead	370	10.5	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Magnesium	1820	527	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Manganese	303	1.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Mercury	0.04 U	0.18	mg/kg	1	06/09/99	06/09/99	JK	SW846 7471A
Nickel	16.4	4.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Potassium	438 B	527	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Selenium	0.52 B	10.5	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Silver	0.55 B	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Sodium	76.1 B	527	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Thallium	0.28 U	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Vanadium	24.3	5.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Zinc	557	2.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-003-01		
Lab Sample ID:	F4254-4	**Date Sampled:**	06/03/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
		Percent Solids:	99.0
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	1570	20.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Antimony	0.24 U	6.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Arsenic	0.35 U	1.0	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Barium	7.4 B	20.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Beryllium	0.30 B	0.51	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cadmium	0.37 B	0.40	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Calcium	11500	505	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Chromium	4.9	1.0	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cobalt	0.23 B	5.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Copper	4.6	2.5	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Iron	666	10.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Lead	21.6	10.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Magnesium	358 B	505	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Manganese	19.2	1.5	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Mercury	0.04 U	0.17	mg/kg	1	06/09/99	06/09/99	JK	SW846 7471A
Nickel	1.3 B	4.0	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Potassium	72.3 B	505	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Selenium	0.21 U	10.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Silver	0.37 B	1.0	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Sodium	31.3 B	505	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Thallium	0.27 U	1.0	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Vanadium	2.3 B	5.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Zinc	34.1	2.0	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-004-01		
Lab Sample ID:	F4254-5	**Date Sampled:**	06/03/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
		Percent Solids:	76.0
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	2400	26.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Antimony	0.31 U	7.9	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Arsenic	0.45 U	1.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Barium	5.1 B	26.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Beryllium	0.31 B	0.66	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cadmium	0.11 B	0.53	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Calcium	1190	658	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Chromium	3.1	1.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cobalt	0.20 B	6.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Copper	1.2 B	3.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Iron	766	13.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Lead	6.6 B	13.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Magnesium	125 B	658	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Manganese	5.3	2.0	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Mercury	0.05 U	0.22	mg/kg	1	06/09/99	06/09/99	JK	SW846 7471A
Nickel	1.2 B	5.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Potassium	51.3 B	658	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Selenium	0.27 U	13.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Silver	0.26 B	1.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Sodium	20.1 U	658	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Thallium	0.35 U	1.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Vanadium	2.9 B	6.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Zinc	6.9	2.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-005-01		
Lab Sample ID:	F4254-6	**Date Sampled:**	06/04/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
		Percent Solids:	84.8
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	142	23.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Antimony	0.28 U	7.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Arsenic	0.41 U	1.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Barium	3.5 B	23.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Beryllium	0.24 B	0.59	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cadmium	0.04 U	0.47	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Calcium	1240	590	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Chromium	0.35 B	1.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cobalt	0.12 B	5.9	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Copper	0.72 B	2.9	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Iron	115	11.8	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Lead	2.4 B	11.8	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Magnesium	66.1 B	590	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Manganese	3.2	1.8	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Mercury	0.05 U	0.20	mg/kg	1	06/09/99	06/09/99	JK	SW846 7471A
Nickel	0.34 B	4.7	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Potassium	23.0 B	590	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Selenium	0.24 U	11.8	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Silver	0.15 B	1.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Sodium	29.1 B	590	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Thallium	0.32 U	1.2	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Vanadium	0.26 B	5.9	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Zinc	4.8	2.4	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-DU01		
Lab Sample ID:	F4254-7	**Date Sampled:**	06/04/99
Matrix:	SO - Soil	**Date Received:**	06/05/99
		Percent Solids:	93.9
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	737	21.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Antimony	0.25 U	6.4	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Arsenic	0.37 U	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Barium	2.2 B	21.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Beryllium	0.24 B	0.53	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cadmium	0.04 U	0.43	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Calcium	461 B	532	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Chromium	0.80 B	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Cobalt	0.12 B	5.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Copper	1.1 B	2.7	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Iron	239	10.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Lead	2.7 B	10.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Magnesium	54.9 B	532	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Manganese	2.1	1.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Mercury	0.04 U	0.18	mg/kg	1	06/09/99	06/09/99	JK	SW846 7471A
Nickel	0.39 B	4.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Potassium	20.2 B	532	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Selenium	0.22 U	10.6	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Silver	0.13 B	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Sodium	16.3 U	532	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Thallium	0.29 U	1.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Vanadium	0.78 B	5.3	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A
Zinc	3.6	2.1	mg/kg	1	06/11/99	06/14/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID: CEF-P32-SS-001-01
Lab Sample ID: F4254-1A
Matrix: ~~SO - Soil~~ TCLP Leachate
Project: NAS Cecil Field

Date Sampled: 06/04/99
Date Received: 06/05/99
Percent Solids: ~~89.8~~ 0

GAP 7-14-99

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Arsenic	<0.0050	0.0050	mg/l	1	06/21/99	06/21/99	JK	SW846 6010A
Barium	<0.20	0.20	mg/l	1	06/21/99	06/21/99	JK	SW846 6010A
Cadmium	<0.0040	0.0040	mg/l	1	06/21/99	06/21/99	JK	SW846 6010A
Chromium	<0.010	0.010	mg/l	1	06/21/99	06/21/99	JK	SW846 6010A
Lead	<0.0030	0.0030	mg/l	1	06/21/99	06/21/99	JK	SW846 6010A
Mercury	<0.0020	0.0020	mg/l	1	06/18/99	06/21/99	JK	SW846 7470A
Selenium	0.014	0.0050	mg/l	1	06/21/99	06/21/99	JK	SW846 6010A
Silver	<0.010	0.010	mg/l	1	06/21/99	06/21/99	JK	SW846 6010A

RDL = Reported Detection Limit

PHASE II ANALYTICAL RESULTS

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-09-9-061

TO: MR. M. SPERANZA

DATE: SEPTEMBER 8, 1999

FROM: JUSTIN ORBICH

CC: DV FILE

SUBJECT: ORGANIC DATA VALIDATION – PAH
CTO 078 – NAS CECIL FIELD
SDG F4725

SAMPLES: 8/Solid

CEF-P32-SS-101-01	CEF-P32-SS-102-01
CEF-P32-SS-103-01	CEF-P32-SS-104-01
CEF-P32-SS-105-01	CEF-P32-SS-106-02
CEF-P32-SS-107-02	CEF-P32-SS-DU02

OVERVIEW

The sample set for CTO 078, SDG F4725 Naval Air Station (NAS) Cecil Field; Florida consists of eight (8) solid environmental samples. The samples were analyzed for Polynuclear Aromatic Hydrocarbon (PAH) organic compounds. One (1) field duplicate pair (CEF-32-SS-103-01/CEF-P32-SS-DU02) was included within this SDG.

The samples were collected by Tetra Tech, NUS on August 16th, 1999 and analyzed by Accutest Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW 846 Method 8310 analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * Data Completeness
- * Holding Times
- Initial/continuing calibrations
- * Laboratory method/field quality control blank results
- * Detection Limits
- Field Duplicate Precision

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified analytical results are presented in Appendix A.

PAH FRACTION

The field duplicate precision Percent Difference exceeded the 50% quality control limits for several compounds in the field duplicate pair (CEF-32-SS-103-01/CEF-P32-SS-DU02). The positive and nondetected results were qualified as estimated (J) and (UJ).

The continuing calibration %Ds exceeded the quality control limits for several compounds on 8/23/99 at 2265 and 1122 on column one. No action was warranted since only nondetected result were reported and the %Ds were within the quality control limits on column two.

EXECUTIVE SUMMARY

Laboratory performance: the continuing calibration %Ds exceeded the quality control limits for several compounds on column one.

Other Factors Affecting Data Quality: Several compounds in the field duplicate pair exceeded the 50% quality control limits.

MEMO TO: MR. M. SPERANZA
DATE: SEPTEMBER 8, 1999 – PAGE 3

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1994), and the NFESC guidelines "Navy Installation Restoration Program Laboratory Quality Assurance Guide" (February, 1996). The text of this report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Justin Orbich

Chemist/Data Validator
Tetra Tech, NUS

Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech, NUS

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

DATA QUALIFIER DEFINITIONS:

U	-	Value is a nondetected result as reported by the laboratory and should not be considered present.
J	-	Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.
UJ	-	Nondetected result is considered to be estimated as a result of technical noncompliances.

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F4725

SAMPLE NUMBER:	CEF-P32-SS-101-01			CEF-P32-SS-102-01			CEF-P32-SS-103-01			CEF-P32-SS-104-01		
SAMPLE DATE:	08/16/99			08/16/99			08/16/99			08/16/99		
LABORATORY ID:	F4725-1			F4725-2			F4725-3			F4725-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	94.1 %			95.4 %			91.1 %			92.3 %		
UNITS:	UG/KG			UG/KG			UG/KG			UG/KG		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	71	U		70	U		73	U		360	U	
2-METHYLNAPHTHALENE	224			126			79.6	J	G	360	U	
ACENAPHTHENE	365			171			111	J	G	360	U	
ACENAPHTHYLENE	71	U		70	U		73	U		360	U	
ANTHRACENE	71	U		70	U		73	U		360	U	
BENZO(A)ANTHRACENE	312			187			80.1	J	G	54	U	
BENZO(A)PYRENE	420			444			77.3	J	G	54	U	
BENZO(B)FLUORANTHENE	643			460			103	J	G	54	U	
BENZO(G,H,I)PERYLENE	454			840			55.2	J	G	54	U	
BENZO(K)FLUORANTHENE	279			212			58.8	J	G	54	U	
CHRYSENE	351			205			99.5	J	G	54	U	
DIBENZO(A,H)ANTHRACENE	19.3			97.6			11	U		54	U	
FLUORANTHENE	423			296			206	J	G	54	U	
FLUORENE	130			77.6			73	U		360	U	
INDENO(1,2,3-CD)PYRENE	417			60.8			65.6	J	G	54	U	
NAPHTHALENE	76.7			72.5			73	U		360	U	
PHENANTHRENE	135			136			125	J	G	360	U	
PYRENE	421			261			162	J	G	54	U	

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F4725

SAMPLE NUMBER:	CEF-P32-SS-105-01			CEF-P32-SS-106-02			CEF-P32-SS-107-02			CEF-P32-SS-DU02		
SAMPLE DATE:	08/16/99			08/16/99			08/16/99			08/16/99		
LABORATORY ID:	F4725-5			F4725-6			F4725-7			F4725-8		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	88.6 %			93.2 %			95.1 %			90.5 %		
UNITS:	UG/KG			UG/KG			UG/KG			UG/KG		
FIELD DUPLICATE OF:										CEF-P32-SS-103-01		
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	74	U		71	U		69	U		72	U	
2-METHYLNAPHTHALENE	74	U		71	U		131			72	UJ	G
ACENAPHTHENE	74	U		71	U		195			72	UJ	G
ACENAPHTHYLENE	74	U		71	U		69	U		72	U	
ANTHRACENE	74	U		71	U		69	U		72	U	
BENZO(A)ANTHRACENE	11	U		11	U		155			11	UJ	G
BENZO(A)PYRENE	11	U		11	U		204			11	UJ	G
BENZO(B)FLUORANTHENE	11	U		11	U		266			11	UJ	G
BENZO(G,H,I)PERYLENE	11	U		11	U		186			11	UJ	G
BENZO(K)FLUORANTHENE	11	U		11	U		109			11	UJ	G
CHRYSENE	11	U		11	U		199			11	UJ	G
DIBENZO(A,H)ANTHRACENE	11	U		11	U		10	U		11	U	
FLUORANTHENE	11	U		11	U		313			11	UJ	G
FLUORENE	74	U		71	U		69	U		72	U	
INDENO(1,2,3-CD)PYRENE	11	U		11	U		192			11	UJ	G
NAPHTHALENE	74	U		71	U		69	U		72	U	
PHENANTHRENE	74	U		71	U		123			72	UJ	G
PYRENE	11	U		11	U		280			11	UJ	G

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-101-01		
Lab Sample ID:	F4725-1	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
Method:	SW846 8310	**Percent Solids:**	94.1
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC5461.D	1	08/23/99	AMA	08/19/99	M:OP1397	M:GLC22
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	365	71	ug/kg	
208-96-8	Acenaphthylene	ND	71	ug/kg	
120-12-7	Anthracene	ND	71	ug/kg	
56-55-3	Benzo (a) anthracene	312	11	ug/kg	
50-32-8	Benzo (a) pyrene	420	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	643	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	454	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	279	11	ug/kg	
218-01-9	Chrysene	351	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	19.3	11	ug/kg	
206-44-0	Fluoranthene	423	11	ug/kg	
86-73-7	Fluorene	130	71	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	417	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	71	ug/kg	
91-57-6	2-Methylnaphthalene	224	71	ug/kg	
91-20-3	Naphthalene	76.7	71	ug/kg	
85-01-8	Phenanthrene	135	71	ug/kg	
129-00-0	Pyrene	421	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	51%		20-130%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000003

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-102-01		
Lab Sample ID:	F4725-2	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
Method:	SW846 8310	**Percent Solids:**	95.4
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC5462.D	1	08/23/99	AMA	08/19/99	M:OP1397	M:GLC22
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	171	70	ug/kg	
208-96-8	Acenaphthylene	ND	70	ug/kg	
120-12-7	Anthracene	ND	70	ug/kg	
56-55-3	Benzo (a) anthracene	187	10	ug/kg	
50-32-8	Benzo (a) pyrene	444	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	460	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	840	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	212	10	ug/kg	
218-01-9	Chrysene	205	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	97.6	10	ug/kg	
206-44-0	Fluoranthene	296	10	ug/kg	
86-73-7	Fluorene	77.6	70	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	60.8	10	ug/kg	
90-12-0	1-Methylnaphthalene	ND	70	ug/kg	
91-57-6	2-Methylnaphthalene	126	70	ug/kg	
91-20-3	Naphthalene	72.5	70	ug/kg	
85-01-8	Phenanthrene	136	70	ug/kg	
129-00-0	Pyrene	261	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	52%		20-130%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000004

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-103-01		
Lab Sample ID:	F4725-3	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
Method:	SW846 8310	**Percent Solids:**	91.1
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC5463.D	1	08/23/99	AMA	08/19/99	M:OP1397	M:GLC22
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	111	73	ug/kg	
208-96-8	Acenaphthylene	ND	73	ug/kg	
120-12-7	Anthracene	ND	73	ug/kg	
56-55-3	Benzo (a) anthracene	80.1	11	ug/kg	
50-32-8	Benzo (a) pyrene	77.3	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	103	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	55.2	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	58.8	11	ug/kg	
218-01-9	Chrysene	99.5	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	206	11	ug/kg	
86-73-7	Fluorene	ND	73	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	65.6	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	73	ug/kg	
91-57-6	2-Methylnaphthalene	79.6	73	ug/kg	
91-20-3	Naphthalene	ND	73	ug/kg	
85-01-8	Phenanthrene	125	73	ug/kg	
129-00-0	Pyrene	162	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	22%		20-130%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000005

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-104-01		
Lab Sample ID:	F4725-4	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
Method:	SW846 8310	**Percent Solids:**	92.3
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC5464.D	5	08/23/99	AMA	08/19/99	M:OP1397	M:GLC22
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	360	ug/kg	
208-96-8	Acenaphthylene	ND	360	ug/kg	
120-12-7	Anthracene	ND	360	ug/kg	
56-55-3	Benzo (a) anthracene	ND	54	ug/kg	
50-32-8	Benzo (a) pyrene	ND	54	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	54	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	54	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	54	ug/kg	
218-01-9	Chrysene	ND	54	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	54	ug/kg	
206-44-0	Fluoranthene	ND	54	ug/kg	
86-73-7	Fluorene	ND	360	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	54	ug/kg	
90-12-0	1-Methylnaphthalene	ND	360	ug/kg	
91-57-6	2-Methylnaphthalene	ND	360	ug/kg	
91-20-3	Naphthalene	ND	360	ug/kg	
85-01-8	Phenanthrene	ND	360	ug/kg	
129-00-0	Pyrene	ND	54	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	120%		20-130%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000007

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-105-01		
Lab Sample ID:	F4725-5	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
Method:	SW846 8310	**Percent Solids:**	88.6
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC5465.D	1	08/23/99	AMA	08/19/99	M:OP1397	M:GLC22
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	74	ug/kg	
208-96-8	Acenaphthylene	ND	74	ug/kg	
120-12-7	Anthracene	ND	74	ug/kg	
56-55-3	Benzo (a) anthracene	ND	11	ug/kg	
50-32-8	Benzo (a) pyrene	ND	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	11	ug/kg	
218-01-9	Chrysene	ND	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	ND	11	ug/kg	
86-73-7	Fluorene	ND	74	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	74	ug/kg	
91-57-6	2-Methylnaphthalene	ND	74	ug/kg	
91-20-3	Naphthalene	ND	74	ug/kg	
85-01-8	Phenanthrene	ND	74	ug/kg	
129-00-0	Pyrene	ND	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	71%		20-130%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000009

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-106-02		
Lab Sample ID:	F4725-6	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
Method:	SW846 8310	**Percent Solids:**	93.2
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC5466.D	1	08/23/99	AMA	08/19/99	M:OP1397	M:GLC22
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	71	ug/kg	
208-96-8	Acenaphthylene	ND	71	ug/kg	
120-12-7	Anthracene	ND	71	ug/kg	
56-55-3	Benzo (a) anthracene	ND	11	ug/kg	
50-32-8	Benzo (a) pyrene	ND	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	11	ug/kg	
218-01-9	Chrysene	ND	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	ND	11	ug/kg	
86-73-7	Fluorene	ND	71	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	71	ug/kg	
91-57-6	2-Methylnaphthalene	ND	71	ug/kg	
91-20-3	Naphthalene	ND	71	ug/kg	
85-01-8	Phenanthrene	ND	71	ug/kg	
129-00-0	Pyrene	ND	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	77%		20-130%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	CEF-P32-SS-107-02		
Lab Sample ID:	F4725-7	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
Method:	SW846 8310	**Percent Solids:**	95.1
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC5467.D	1	08/23/99	AMA	08/19/99	M:OP1397	M:GLC22
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	195	69	ug/kg	
208-96-8	Acenaphthylene	ND	69	ug/kg	
120-12-7	Anthracene	ND	69	ug/kg	
56-55-3	Benzo (a) anthracene	155	10	ug/kg	
50-32-8	Benzo (a) pyrene	204	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	266	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	186	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	109	10	ug/kg	
218-01-9	Chrysene	199	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	313	10	ug/kg	
86-73-7	Fluorene	ND	69	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	192	10	ug/kg	
90-12-0	1-Methylnaphthalene	ND	69	ug/kg	
91-57-6	2-Methylnaphthalene	131	69	ug/kg	
91-20-3	Naphthalene	ND	69	ug/kg	
85-01-8	Phenanthrene	123	69	ug/kg	
129-00-0	Pyrene	280	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	62%		20-130%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000013

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Report of Analysis

Client Sample ID:	CEF-P32-SS-DU02		
Lab Sample ID:	F4725-8	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
Method:	SW846 8310	**Percent Solids:**	90.5
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC5468.D	1	08/23/99	AMA	08/19/99	M:OP1397	M:GLC22
Run #2							

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	72	ug/kg	
208-96-8	Acenaphthylene	ND	72	ug/kg	
120-12-7	Anthracene	ND	72	ug/kg	
56-55-3	Benzo (a) anthracene	ND	11	ug/kg	
50-32-8	Benzo (a) pyrene	ND	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	11	ug/kg	
218-01-9	Chrysene	ND	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	ND	11	ug/kg	
86-73-7	Fluorene	ND	72	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	72	ug/kg	
91-57-6	2-Methylnaphthalene	ND	72	ug/kg	
91-20-3	Naphthalene	ND	72	ug/kg	
85-01-8	Phenanthrene	ND	72	ug/kg	
129-00-0	Pyrene	ND	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	49%		20-130%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000015

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-09-9-046

TO:	**M. SPERANZA**	**DATE:**	**SEPTEMBER 3, 1999**
FROM:	**GRETCHEN PHIPPS**	**COPIES:**	**DV FILE**

SUBJECT: **INORGANIC DATA VALIDATION – TAL METALS**
CTO 078 - CECIL FIELD
SDG – F4725

SAMPLES: 6/Soils/

CEF-P32-SS-103-01	CEF-P32-SS-104-01
CEF-P32-SS-105-01	CEF-P32-SS-106-02
CEF-P32-SS-107-02	CEF-P32-SS-DU02

Overview

The sample set for CTO 078, Cecil Field, SDG F4725 consists of six (6) soil environmental samples. One (1) field duplicate pair (CEF-P32-SS-103-01/ CEF-P32-SS-DU02) was included within this SDG.

The samples were analyzed for target analyte list (TAL) metals. The samples were collected by Tetra Tech NUS on August 16, 1999 and analyzed by Accutest Laboratory under Naval Facilities Engineering Service Center (NFESC) Quality Assurance / Quality Control (QA / QC) criteria. Metals analyses, with the exception of mercury, were analyzed using SW 846 method 6010B. Mercury analyses were conducted using SW 846 method 7471A.

The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Verifications
• Laboratory Blank Analyses
• Field Duplicate Imprecision
* • Detection Limits

* - All quality control criteria were met for this parameter.

Laboratory Blank Analyses

The following contaminants were present in a laboratory method / preparation blanks at the following maximum concentration:

Affected samples: All

Analyte	Maximum Concentration	Action Level(soil)
Aluminum	54.4µg/L	27.2 mg/kg
Antimony	4.3µg/L	2.15 mg/kg
Arsenic	5.2µg/L	2.6 mg/kg
Barium(1)	0.43 mg/kg	2.15 mg/kg
Beryllium	2.4µg/L	1.2 mg/kg
Cadmium	0.88µg/L	0.44 mg/kg
Calcium(1)	6.2 mg/kg	31.0 mg/kg
Chromium	2.2µg/L	1.1 mg/kg
Cobalt	0.99µg/L	0.495 mg/kg
Lead	1.6µg/L	0.8 mg/kg
Magnesium	21.7µg/L	10.85 mg/kg
Manganese(1)	0.12 mg/kg	0.60 mg/kg
Nickel	2.4µg/L	1.2 mg/kg
Potassium(1)	3.0 mg/kg	15.0 mg/kg
Selenium	3.1µg/L	1.55 mg/kg
Silver	1.0µg/L	0.5 mg/kg
Sodium(1)	19.3 mg/kg	96.5 mg/kg
Thallium	9.4µg/L	4.7 mg/kg
Vanadium	0.78µg/L	0.39 mg/kg
Zinc(1)	0.24 mg/kg	1.2 mg/kg

(1) Maximum concentration present in a soil preparation blank.

An action level of 5X the maximum concentration has been used to evaluate the sample data for blank contamination: Sample aliquot, percent solids and dilution factors were taken into consideration when determining blank contamination. Positive results less than the blank action level for antimony, arsenic, beryllium, cadmium, chromium, cobalt, manganese, nickel, potassium and selenium were qualified, "U", as a result of blank contamination. No action was taken for the remaining analytes as either the results were greater than the blank action level or were nondetected.

Field Duplicate Imprecision

Field duplicate imprecision (>50%) was noted for iron, lead and zinc. The positive results reported for iron, lead and zinc were qualified as estimated, "J".

Executive Summary

Laboratory Performance: Several analytes were present in the laboratory method / preparation blanks.

Other Factors Affecting Data Quality: Field duplicate imprecision was noted for iron, lead and zinc.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Inorganic Review", February 1994 and the NFESC document entitles "Navy Installation Restoration Laboratory Quality Assurance Guide." (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps

Tetra Tech NUS
Joseph A. Samchuck
Quality Control Officer

Attachments:

1. Appendix A - Qualified Analytical Data
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F4725

SAMPLE NUMBER:	CEF-P32-SS-103-01			CEF-P32-SS-104-01			CEF-P32-SS-105-01			CEF-P32-SS-106-02		
SAMPLE DATE:	08/16/99			08/16/99			08/16/99			08/16/99		
LABORATORY ID:	F4725-3			F4725-4			F4725-5			F4725-6		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	91.1 %			92.3 %			88.6 %			93.2 %		
UNITS:	MG/KG			MG/KG			MG/KG			MG/KG		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ALUMINUM	1320			1180			962			1050		
ANTIMONY	0.26	U		0.64	U	A	0.42	U	A	0.33	U	A
ARSENIC	1.5	U	A	0.57	U	A	0.52	U	A	0.36	U	A
BARIUM	16.1			17.6			6.6			5.4		
BERYLLIUM	0.39	U	A	0.18	U	A	0.20	U	A	0.19	U	A
CADMIUM	2.7			0.04	U		0.04	U		0.03	U	
CALCIUM	170000			660			2180			702		
CHROMIUM	12.7			7.2			1.5			1.1	U	A
COBALT	0.61	U	A	0.11	U	A	0.09	U		0.09	U	A
COPPER	14.5			0.51			0.29			0.34		
IRON	1320	J	G	174	J	G	401	J	G	161	J	G
LEAD	47.9	J	G	31.5	J	G	2.0	J	G	1.1	J	G
MAGNESIUM	1940			41.6			29.1			36.9		
MANGANESE	66.5			10.8			0.69	U	A	1.1		
MERCURY	0.02			0.01			0.01			0.01		
NICKEL	2.5			1.1	U	A	0.43	U	A	0.57	U	A
POTASSIUM	74.6			18.7			8.8	U	A	16.2		
SELENIUM	1.4	U	A	0.35	U	A	0.38	U	A	0.32	U	A
SILVER	0.10	U		0.10	U		0.11	U		0.10	U	
SODIUM	391			242			326			235		
THALLIUM	0.29	U		0.29	U		0.29	U		0.28	U	
VANADIUM	6.4			0.86			1.2			1.2		
ZINC	125	J	G	24.2	J	G	2.8	J	G	3.0	J	G

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F4725

SAMPLE NUMBER:	CEF-P32-SS-107-02	CEF-P32-SS-DU02	/ /	/ /
SAMPLE DATE:	08/16/99	08/16/99		
LABORATORY ID:	F4725-7	F4725-8		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	95.1 %	90.5 %	100.0 %	100.0 %
UNITS:	MG/KG	MG/KG		
FIELD DUPLICATE OF:		CEF-P32-SS-103-01		

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
INORGANICS												
ALUMINUM	1770			1770								
ANTIMONY	0.25	U		0.26	U							
ARSENIC	0.57	U	A	1.0	U	A						
BARIUM	6.8			15.4								
BERYLLIUM	0.21	U	A	0.44	U	A						
CADMIUM	0.07	U	A	1.3								
CALCIUM	9050			156000								
CHROMIUM	2.2			9.3								
COBALT	0.13	U	A	0.53	U	A						
COPPER	2.5			7.7								
IRON	308	J	G	730	J	G						
LEAD	3.7	J	G	19.4	J	G						
MAGNESIUM	151			1790								
MANGANESE	6.3			52.7								
MERCURY	0.01			0.01	U							
NICKEL	0.90	U	A	2.0								
POTASSIUM	30.9			133								
SELENIUM	0.40	U	A	1.5	U	A						
SILVER	0.10	U		0.10	U							
SODIUM	259			363								
THALLIUM	0.28	U		0.29	U							
VANADIUM	1.7			6.5								
ZINC	10.0	J	G	49.7	J	G						

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-103-01		
Lab Sample ID:	F4725-3	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
		Percent Solids:	91.1
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	1320	21.7	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Antimony	0.26 U	6.5	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Arsenic	1.5	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Barium	16.1 B	21.7	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Beryllium	0.39 B	0.54	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cadmium	2.7	0.43	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Calcium	170000	543	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Chromium	12.7	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cobalt	0.61 B	5.4	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Copper	14.5	2.7	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Iron	1320	10.9	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Lead	47.9	10.9	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Magnesium	1940	543	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Manganese	66.5	1.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Mercury	0.02 B	0.18	mg/kg	1	08/19/99	08/20/99	JK	SW846 7471A
Nickel	2.5 B	4.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Potassium	74.6 B	543	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Selenium	1.4 B	10.9	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Silver	0.10 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Sodium	391 B	543	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Thallium	0.29 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Vanadium	6.4	5.4	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Zinc	125	2.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A

RDL = Reported Detection Limit

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ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-104-01		
Lab Sample ID:	F4725-4	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
		Percent Solids:	92.3
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	1180	21.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Antimony	0.64 B	6.4	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Arsenic	0.57 B	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Barium	17.6 B	21.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Beryllium	0.18 B	0.53	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cadmium	0.04 U	0.42	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Calcium	660	531	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Chromium	7.2	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cobalt	0.11 B	5.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Copper	0.51 B	2.7	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Iron	174	10.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Lead	31.5	10.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Magnesium	41.6 B	531	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Manganese	10.8	1.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Mercury	0.01 B	0.18	mg/kg	1	08/19/99	08/20/99	JK	SW846 7471A
Nickel	1.1 B	4.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Potassium	18.7 B	531	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Selenium	0.35 B	10.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Silver	0.10 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Sodium	242 B	531	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Thallium	0.29 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Vanadium	0.86 B	5.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Zinc	24.2	2.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-105-01		
Lab Sample ID:	F4725-5	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
		Percent Solids:	88.6
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	962	21.9	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Antimony	0.42 B	6.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Arsenic	0.52 B	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Barium	6.6 B	21.9	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Beryllium	0.20 B	0.55	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cadmium	0.04 U	0.44	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Calcium	2180	548	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Chromium	1.5	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cobalt	0.09 U	5.5	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Copper	0.29 B	2.7	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Iron	401	11.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Lead	2.0 B	11.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Magnesium	29.1 B	548	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Manganese	0.69 B	1.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Mercury	0.01 B	0.19	mg/kg	1	08/19/99	08/20/99	JK	SW846 7471A
Nickel	0.43 B	4.4	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Potassium	8.8 B	548	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Selenium	0.38 B	11.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Silver	0.11 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Sodium	326 B	548	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Thallium	0.29 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Vanadium	1.2 B	5.5	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Zinc	2.8	2.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-106-02		
Lab Sample ID:	F4725-6	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
		Percent Solids:	93.2
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	1050	20.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Antimony	0.33 B	6.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Arsenic	0.36 B	1.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Barium	5.4 B	20.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Beryllium	0.19 B	0.52	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cadmium	0.03 U	0.41	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Calcium	702	516	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Chromium	1.1	1.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cobalt	0.09 B	5.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Copper	0.34 B	2.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Iron	161	10.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Lead	1.1 B	10.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Magnesium	36.9 B	516	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Manganese	1.1 B	1.5	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Mercury	0.01 B	0.17	mg/kg	1	08/19/99	08/20/99	JK	SW846 7471A
Nickel	0.57 B	4.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Potassium	16.2 B	516	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Selenium	0.32 B	10.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Silver	0.1 U	1.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Sodium	235 B	516	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Thallium	0.28 U	1.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Vanadium	1.2 B	5.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Zinc	3.0	2.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-107-02		
Lab Sample ID:	F4725-7	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
		Percent Solids:	95.1
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	1770	21.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Antimony	0.25 U	6.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Arsenic	0.57 B	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Barium	6.8 B	21.0	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Beryllium	0.21 B	0.53	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cadmium	0.07 B	0.42	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Calcium	9050	526	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Chromium	2.2	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cobalt	0.13 B	5.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Copper	2.5 B	2.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Iron	308	10.5	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Lead	3.7 B	10.5	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Magnesium	151 B	526	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Manganese	6.3	1.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Mercury	0.01 B	0.18	mg/kg	1	08/19/99	08/20/99	JK	SW846 7471A
Nickel	0.90 B	4.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Potassium	30.9 B	526	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Selenium	0.40 B	10.5	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Silver	0.10 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Sodium	259 B	526	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Thallium	0.28 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Vanadium	1.7 B	5.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Zinc	10	2.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A

RDL = Reported Detection Limit

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Report of Analysis

Client Sample ID:	CEF-P32-SS-DU02		
Lab Sample ID:	F4725-8	**Date Sampled:**	08/16/99
Matrix:	SO - Soil	**Date Received:**	08/18/99
		Percent Solids:	90.5
Project:	NAS Cecil Field		

Metals Analysis

Analyte	Result	RDL	Units	DF	Prep	Analyzed	By	Method
Aluminum	1770	21.7	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Antimony	0.26 U	6.5	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Arsenic	1.0 B	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Barium	15.4 B	21.7	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Beryllium	0.44 B	0.54	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cadmium	1.3	0.43	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Calcium	156000	542	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Chromium	9.3	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Cobalt	0.53 B	5.4	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Copper	7.7	2.7	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Iron	730	10.8	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Lead	19.4	10.8	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Magnesium	1790	542	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Manganese	52.7	1.6	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Mercury	0.01 U	0.18	mg/kg	1	08/19/99	08/20/99	JK	SW846 7471A
Nickel	2.0 B	4.3	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Potassium	133 B	542	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Selenium	1.5 B	10.8	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Silver	0.10 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Sodium	363 B	542	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Thallium	0.29 U	1.1	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Vanadium	6.5	5.4	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A
Zinc	49.7	2.2	mg/kg	1	08/19/99	08/20/99	JK	SW846 6010A

RDL = Reported Detection Limit

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PHASE III ANALYTICAL RESULTS

Tetra Tech NUS

INTERNAL CORRESPONDENCE

PITT-11-9-018

TO: MR. M. SPERANZA

DATE: DECEMBER 14, 1999

FROM: JUSTIN ORBICH

CC: DV FILE

SUBJECT: ORGANIC DATA VALIDATION –PAH
CTO 078 – NAS CECIL FIELD
SDG F5055

SAMPLES: 6/Soil

CEF-P32-SS-201-01	CEF-P32-SS-202-01
CEF-P32-SS-203-01	CEF-P32-SS-204-01
CEF-P32-SU-205-03	CEF-P32-SU-DU03

OVERVIEW

The sample set for CTO 078, SDG F5055 Naval Air Station (NAS) Cecil Field; Florida consists of six (6) soil environmental samples. The samples were analyzed for Polynuclear Aromatic Hydrocarbon (PAH) organic compounds. One (1) field duplicate pair (CEF-P32-SU-205-03/CEF-P32-SU-DU03) was included within this SDG.

The samples were collected by Tetra Tech, NUS on and October 11th, 1999 and analyzed by Accutest Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW 846 Method 8310 analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * Data Completeness
- * Holding Times
- * Initial/continuing calibrations
- * Laboratory method/field quality control blank results
- * Detection Limits
- Field Duplicate Precision

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified analytical results are presented in Appendix A.

PAH FRACTION

The field duplicate pair, CEF-P32-SU-205-03/CEF-P32-SU-DU03, Relative Percent Difference (RPD) exceeded the 50% quality control limit for fluoranthene. The positive and nondetected results were qualified as estimated (J) and (UJ), respectively, in the aforementioned pair.

ADDITIONAL COMMENTS

Positive results reported below the CRQL are qualified as estimated (J).

MEMO TO: **MR. M. SPERANZA**
DATE: **DECEMBER 14, 1999 – PAGE 2**

EXECUTIVE SUMMARY

Laboratory performance: None.

Other Factors Affecting Data Quality: The duplicate pair RPD exceeded the 50% quality control limit for fluoranthene.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1994), and the NFESC "Navy Installation Restoration Program Laboratory Quality Assurance Guide" (February, 1996). The text of this report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Justin Orbich

Chemist/Data Validator
Tetra Tech, NUS

Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech, NUS

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's r < 0.995
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning r < 0.995 (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

DATA QUALIFIER DEFINITIONS:

U - Value is a nondetected result as reported by the laboratory and should not be considered present.

J - Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.

CTO078 - NAS CEICL FIELD
SOIL DATA
Accutest, NJ
SDG: F5055

SAMPLE NUMBER:	CEF-P32-SS-201-01			CEF-P32-SS-202-01			CEF-P32-SS-203-01			CEF-P32-SS-204-02		
SAMPLE DATE:	10/11/99			10/11/99			10/11/99			10/11/99		
LABORATORY ID:	F5055-1			F5055-2			F5055-3			F5055-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	93.2 %			93.4 %			93.0 %			90.3 %		
UNITS:	UG/KG			UG/KG			UG/KG			UG/KG		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	638			1860			68	U		73	U	
2-METHYLNAPHTHALENE	257			490			68	U		73	U	
ACENAPHTHENE	1150			2430			404			73	U	
ACENAPHTHYLENE	98.9			504			68	U		73	U	
ANTHRACENE	168			239			82.5			73	U	
BENZO(A)ANTHRACENE	739			2290			354			18.9		
BENZO(A)PYRENE	1350			4640			1520			42.7		
BENZO(B)FLUORANTHENE	1130			3790			1320			37.8		
BENZO(G,H,I)PERYLENE	768			2280			886			11	U	
BENZO(K)FLUORANTHENE	462			1540			538			17.9		
CHRYSENE	812			2340			434			21.9		
DIBENZO(A,H)ANTHRACENE	10	U		35.2			10	U		81.4		
FLUORANTHENE	2280			4980			865			90.1		
FLUORENE	93.5			908			185			73	U	
INDENO(1,2,3-CD)PYRENE	834			3000			1140			22.6		
NAPHTHALENE	69	U		232			90.4			73	U	
PHENANTHRENE	884			338			129			73	U	
PYRENE	1580			3560			1950			29.4		

CTO078 - NAS CEICL FIELD
SOIL DATA
Accutest, NJ
SDG: F5055

SAMPLE NUMBER:	CEF-P32-SU-205-03			CEF-P32-SU-DU03								
SAMPLE DATE:	10/11/99			10/11/99			/ /			/ /		
LABORATORY ID:	F5055-5			F5055-6								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	91.2 %			92.7 %			100.0 %			100.0 %		
UNITS:	UG/KG			UG/KG								
FIELD DUPLICATE OF:				CEF-P32-SU-205-03								
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	70	U		71	U							
2-METHYLNAPHTHALENE	70	U		71	U							
ACENAPHTHENE	70	U		71	U							
ACENAPHTHYLENE	70	U		71	U							
ANTHRACENE	70	U		71	U							
BENZO(A)ANTHRACENE	10	U		11	U							
BENZO(A)PYRENE	10	U		11	U							
BENZO(B)FLUORANTHENE	10	U		11	U							
BENZO(G,H,I)PERYLENE	10	U		11	U							
BENZO(K)FLUORANTHENE	10	U		11	U							
CHRYSENE	10	U		11	U							
DIBENZO(A,H)ANTHRACENE	10	U		11	U							
FLUORANTHENE	10	UJ	G	35.6	J	G						
FLUORENE	70	U		71	U							
INDENO(1,2,3-CD)PYRENE	10	U		11	U							
NAPHTHALENE	70	U		71	U							
PHENANTHRENE	70	U		71	U							
PYRENE	10	U		11	U							

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-201-01		
Lab Sample ID:	F5055-1	**Date Sampled:**	10/11/99
Matrix:	SO - Soil	**Date Received:**	10/12/99
Method:	SW846 8310	**Percent Solids:**	93.2
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC6556.D	1	10/27/99	AMA	10/23/99	M:OP1506	M:GLC44
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	1150	69	ug/kg	
208-96-8	Acenaphthylene	98.9	69	ug/kg	
120-12-7	Anthracene	168	69	ug/kg	
56-55-3	Benzo (a) anthracene	739	10	ug/kg	
50-32-8	Benzo (a) pyrene	1350	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	1130	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	768	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	462	10	ug/kg	
218-01-9	Chrysene	812	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	2280	10	ug/kg	
86-73-7	Fluorene	93.5	69	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	834	10	ug/kg	
90-12-0	1-Methylnaphthalene	638	69	ug/kg	
91-57-6	2-Methylnaphthalene	257	69	ug/kg	
91-20-3	Naphthalene	ND	69	ug/kg	
85-01-8	Phenanthrene	884	69	ug/kg	
129-00-0	Pyrene	1580	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	39%		20-130%

000013

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-202-01		
Lab Sample ID:	F5055-2	**Date Sampled:**	10/11/99
Matrix:	SO - Soil	**Date Received:**	10/12/99
Method:	SW846 8310	**Percent Solids:**	93.4
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC6557.D	1	10/27/99	AMA	10/23/99	M:OP1506	M:GLC44
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	2430	70	ug/kg	
208-96-8	Acenaphthylene	504	70	ug/kg	
120-12-7	Anthracene	239	70	ug/kg	
56-55-3	Benzo (a) anthracene	2290	10	ug/kg	
50-32-8	Benzo (a) pyrene	4640	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	3790	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	2280	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	1540	10	ug/kg	
218-01-9	Chrysene	2340	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	35.2	10	ug/kg	
206-44-0	Fluoranthene	4980	10	ug/kg	
86-73-7	Fluorene	908	70	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	3000	10	ug/kg	
90-12-0	1-Methylnaphthalene	1860	70	ug/kg	
91-57-6	2-Methylnaphthalene	490	70	ug/kg	
91-20-3	Naphthalene	232	70	ug/kg	
85-01-8	Phenanthrene	338	70	ug/kg	
129-00-0	Pyrene	3560	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	82%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-203-01		
Lab Sample ID:	F5055-3	**Date Sampled:**	10/11/99
Matrix:	SO - Soil	**Date Received:**	10/12/99
Method:	SW846 8310	**Percent Solids:**	93.0
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC6558.D	1	10/27/99	AMA	10/23/99	M:OP1506	M:GLC44
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	404	68	ug/kg	
208-96-8	Acenaphthylene	ND	68	ug/kg	
120-12-7	Anthracene	82.5	68	ug/kg	
56-55-3	Benzo (a) anthracene	354	10	ug/kg	
50-32-8	Benzo (a) pyrene	1520	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	1320	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	886	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	538	10	ug/kg	
218-01-9	Chrysene	434	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	865	10	ug/kg	
86-73-7	Fluorene	185	68	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	1140	10	ug/kg	
90-12-0	1-Methylnaphthalene	ND	68	ug/kg	
91-57-6	2-Methylnaphthalene	ND	68	ug/kg	
91-20-3	Naphthalene	90.4	68	ug/kg	
85-01-8	Phenanthrene	129	68	ug/kg	
129-00-0	Pyrene	1950	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	93%		20-130%

000005

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-204-02		
Lab Sample ID:	F5055-4	**Date Sampled:**	10/11/99
Matrix:	SO - Soil	**Date Received:**	10/12/99
Method:	SW846 8310	**Percent Solids:**	90.3
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC6559.D	1	10/27/99	AMA	10/23/99	M:OP1506	M:GLC44
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	73	ug/kg	
208-96-8	Acenaphthylene	ND	73	ug/kg	
120-12-7	Anthracene	ND	73	ug/kg	
56-55-3	Benzo (a) anthracene	18.9	11	ug/kg	
50-32-8	Benzo (a) pyrene	42.7	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	37.8	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	17.9	11	ug/kg	
218-01-9	Chrysene	21.9	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	81.4	11	ug/kg	
206-44-0	Fluoranthene	90.1	11	ug/kg	
86-73-7	Fluorene	ND	73	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	22.6	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	73	ug/kg	
91-57-6	2-Methylnaphthalene	ND	73	ug/kg	
91-20-3	Naphthalene	ND	73	ug/kg	
85-01-8	Phenanthrene	ND	73	ug/kg	
129-00-0	Pyrene	29.4	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	72%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SU-205-03		
Lab Sample ID:	F5055-5	**Date Sampled:**	10/11/99
Matrix:	SO - Soil	**Date Received:**	10/12/99
Method:	SW846 8310	**Percent Solids:**	91.2
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC6560.D	1	10/27/99	AMA	10/23/99	M:OP1506	M:GLC44
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	70	ug/kg	
208-96-8	Acenaphthylene	ND	70	ug/kg	
120-12-7	Anthracene	ND	70	ug/kg	
56-55-3	Benzo (a) anthracene	ND	10	ug/kg	
50-32-8	Benzo (a) pyrene	ND	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	10	ug/kg	
218-01-9	Chrysene	ND	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	ND	10	ug/kg	
86-73-7	Fluorene	ND	70	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	10	ug/kg	
90-12-0	1-Methylnaphthalene	ND	70	ug/kg	
91-57-6	2-Methylnaphthalene	ND	70	ug/kg	
91-20-3	Naphthalene	ND	70	ug/kg	
85-01-8	Phenanthrene	ND	70	ug/kg	
129-00-0	Pyrene	ND	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	55%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SU-DU03		
Lab Sample ID:	F5055-6	**Date Sampled:**	10/11/99
Matrix:	SO - Soil	**Date Received:**	10/12/99
Method:	SW846 8310	**Percent Solids:**	92.7
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC6561.D	1	10/27/99	AMA	10/23/99	M:OP1506	M:GLC44
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	71	ug/kg	
208-96-8	Acenaphthylene	ND	71	ug/kg	
120-12-7	Anthracene	ND	71	ug/kg	
56-55-3	Benzo (a) anthracene	ND	11	ug/kg	
50-32-8	Benzo (a) pyrene	ND	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	11	ug/kg	
218-01-9	Chrysene	ND	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	35.6	11	ug/kg	
86-73-7	Fluorene	ND	71	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	71	ug/kg	
91-57-6	2-Methylnaphthalene	ND	71	ug/kg	
91-20-3	Naphthalene	ND	71	ug/kg	
85-01-8	Phenanthrene	ND	71	ug/kg	
129-00-0	Pyrene	ND	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	58%		20-130%

00308

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

PHASE IV ANALYTICAL RESULTS

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-11-9-210

TO: **MR. M. SPERANZA** **DATE: JANUARY 28, 2000**

FROM: **JUSTIN ORBICH** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION –PAH**
CTO 078 – NAS CECIL FIELD
SDG F5260 AND F5262

SAMPLES: F5260

6/Soil

CEF-P32-DU04	CEF-P32-SS-301-01
CEF-P32-SS-302-01	CEF-P32-SS-303-01
CEF-P32-SS-304-01	CEF-P32-SU-305-01

F5262

2/Soil

CEF-P49-SS-401-01	CEF-P49-SS-DU10

OVERVIEW

The sample set for CTO 078, SDG F5260 and F5262 Naval Air Station (NAS) Cecil Field, Florida consists of eight (8) soil environmental samples. The samples were analyzed for Polynuclear Aromatic Hydrocarbon (PAH) organic compounds. Two (2) field duplicate pairs (CEF-P32-SS-305-01/CEF-P32-DU04 and CEF-P49-SS-401-01/CEF-P49-SS-DU10) were included within this SDG.

The samples were collected by Tetra Tech, NUS on and November 11th, 1999 and analyzed by Accutest Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW 846 Method 8310 analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
* • Initial/continuing calibrations
* • Laboratory method/field quality control blank results
• Surrogate Percent Recoveries
* • Detection Limits
• Field Duplicate Precision

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified analytical results are presented in Appendix A.

PAH FRACTION

The surrogate Percent Recovery (%R) was below the ten percent quality control limit for o-Terphenyl in sample CEF-P32-SS-304-01. The positive and nondetected results were qualified as estimated (J) and rejected (UR).

The Relative Percent Difference (RPD) exceeded the 50% quality control limits for benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene. The positive and nondetected results were qualified as estimated (J) and (UJ), respectively, in the field duplicate pair (CEF-P32-SU-305-03/CEF-P32-DU04.

The Relative Percent Difference (RPD) exceeded the 50% quality control limits for several compounds. The positive and nondetected results were qualified as estimated (J) and (UJ), respectively, in the field duplicate pair (CEF-P49-SS-401-01/CEF-P49-SS-DU10.

ADDITIONAL COMMENTS

Positive results reported below the reporting limit are qualified as estimated (J).

EXECUTIVE SUMMARY

Laboratory performance: The surrogate %Rs were <10% percent in sample CEF-P32-SS-304-01.

Other Factors Affecting Data Quality: The RPD exceeded the 50% quality control limits for several field duplicate pairs in both SDGs.

MEMO TO: MR. M. SPERANZA
DATE: JANUARY 28, 2000 – PAGE 3

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (February, 1994), and the NFESC "Navy Installation Restoration Program Laboratory Quality Assurance Guide" (February, 1996). The text of this report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Justin Orbich

Chemist/Data Validator
Tetra Tech, NUS

Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech, NUS

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

DATA QUALIFIER DEFINITIONS:

U	-	Value is a nondetected result as reported by the laboratory and should not be considered present.
J	-	Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.
UJ	-	Nondetected result is considered to be estimated as a result of technical noncompliances.

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

SOIL DATA
Accutest, NJ
SDG: F5262

SAMPLE NUMBER:	CEF-P49-SS-401-01	CEF-P49-SS-DU10		
SAMPLE DATE:	11/11/99	11/11/99	/ /	/ /
LABORATORY ID:	F5262-1	F5262-2		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	89.6 %	77.5 %	100.0 %	100.0 %
UNITS:	UG/KG	UG/KG		
FIELD DUPLICATE OF:		CEF-P49-SS-401-01		

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
1-METHYLNAPHTHALENE	107	J	G	84	UJ	G						
2-METHYLNAPHTHALENE	72	U		84	U							
ACENAPHTHENE	131	J	G	84	UJ	G						
ACENAPHTHYLENE	72	U		84	U							
ANTHRACENE	72	U		84	U							
BENZO(A)ANTHRACENE	37.2			55.2								
BENZO(A)PYRENE	122			186								
BENZO(B)FLUORANTHENE	34.8			47.2								
BENZO(G,H,I)PERYLENE	71.5	J	G	140	J	G						
BENZO(K)FLUORANTHENE	22.6			29.9								
CHRYSENE	52.5			79.8								
DIBENZO(A,H)ANTHRACENE	11	U		13	U							
FLUORANTHENE	119	J	G	549	J	G						
FLUORENE	72	U		84	U							
INDENO(1,2,3-CD)PYRENE	11	U		13	U							
NAPHTHALENE	72	U		84	U							
PHENANTHRENE	72	UJ	G	84.9	J	G						
PYRENE	59.4			84								

CTO078-NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F5260

SAMPLE NUMBER:	CEF-P32-DU04			CEF-P32-SS-301-01			CEF-P32-SS-302-01			CEF-P32-SS-303-01		
SAMPLE DATE:	11/11/99			11/11/99			11/11/99			11/11/99		
LABORATORY ID:	F5260-6			F5260-1			F5260-2			F5260-3		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	93.9 %			94.1 %			94.8 %			92.1 %		
UNITS:	UG/KG			UG/KG			UG/KG			UG/KG		
FIELD DUPLICATE OF:	CEF-P32-SU-305-03											
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
1-METHYLNAPHTHALENE	71	U		158			72.2			188		
2-METHYLNAPHTHALENE	71	U		344			70	U		72	U	
ACENAPHTHENE	71	U		70	U		158			708		
ACENAPHTHYLENE	71	U		70	U		70	U		72	U	
ANTHRACENE	71	U		70	U		70	U		72	U	
BENZO(A)ANTHRACENE	10	U		384			120			317		
BENZO(A)PYRENE	10	U		728			139			601		
BENZO(B)FLUORANTHENE	10	U		522			78.4			359		
BENZO(G,H,I)PERYLENE	10	UJ	G	504			110			497		
BENZO(K)FLUORANTHENE	10	U		131			31.3			104		
CHRYSENE	10	U		412			10	U		309		
DIBENZO(A,H)ANTHRACENE	10	U		10	U		10	U		11	U	
FLUORANTHENE	10	U		686			284			522		
FLUORENE	71	U		70	U		70	U		72	U	
INDENO(1,2,3-CD)PYRENE	10	UJ	G	337			10	U		11	U	
NAPHTHALENE	71	U		70	U		70	U		72	U	
PHENANTHRENE	71	U		70	U		138			72	U	
PYRENE	10	U		370			188			460		

CTO078-NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F5260

SAMPLE NUMBER:	CEF-P32-SS-304-01			CEF-P32-SU-305-03								
SAMPLE DATE:	11/11/99			11/11/99			/ /			/ /		
LABORATORY ID:	F5260-4			F5260-5								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	92.3 %			94.6 %			100.0 %			100.0 %		
UNITS:	UG/KG			UG/KG								
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
SEMIVOLATILES												
1-METHYLNAPHTHALENE	3360	J	R	70	U							
2-METHYLNAPHTHALENE	72	UR	R	70	U							
ACENAPHTHENE	12200	J	R	70	U							
ACENAPHTHYLENE	72	UR	R	70	U							
ANTHRACENE	2090	J	R	70	U							
BENZO(A)ANTHRACENE	4200	J	R	10	U							
BENZO(A)PYRENE	3880	J	R	10	U							
BENZO(B)FLUORANTHENE	2960	J	R	10	U							
BENZO(G,H,I)PERYLENE	2350	J	R	270	J	G						
BENZO(K)FLUORANTHENE	744	J	R	10	U							
CHRYSENE	3270	J	R	10	U							
DIBENZO(A,H)ANTHRACENE	226	J	R	10	U							
FLUORANTHENE	12200	J	R	10	U							
FLUORENE	862	J	R	70	U							
INDENO(1,2,3-CD)PYRENE	1470	J	R	138	J	G						
NAPHTHALENE	623	J	R	70	U							
PHENANTHRENE	6570	J	R	70	U							
PYRENE	8010	J	R	10	U							

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-DU04		
Lab Sample ID:	F5260-6	**Date Sampled:**	11/11/99
Matrix:	SO - Soil	**Date Received:**	11/12/99
Method:	SW846 8310	**Percent Solids:**	93.9
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC7208.D	1	12/03/99	AMA	11/23/99	M:OP1565	M:GLC67
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	71	ug/kg	
208-96-8	Acenaphthylene	ND	71	ug/kg	
120-12-7	Anthracene	ND	71	ug/kg	
56-55-3	Benzo (a) anthracene	ND	10	ug/kg	
50-32-8	Benzo (a) pyrene	ND	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	10	ug/kg	
218-01-9	Chrysene	ND	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	ND	10	ug/kg	
86-73-7	Fluorene	ND	71	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	10	ug/kg	
90-12-0	1-Methylnaphthalene	ND	71	ug/kg	
91-57-6	2-Methylnaphthalene	ND	71	ug/kg	
91-20-3	Naphthalene	ND	71	ug/kg	
85-01-8	Phenanthrene	ND	71	ug/kg	
129-00-0	Pyrene	ND	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	101%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-301-01		
Lab Sample ID:	F5260-1	**Date Sampled:**	11/11/99
Matrix:	SO - Soil	**Date Received:**	11/12/99
Method:	SW846 8310	**Percent Solids:**	94.1
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC7203.D	1	12/02/99	AMA	11/23/99	M:OP1565	M:GLC67
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	70	ug/kg	
208-96-8	Acenaphthylene	ND	70	ug/kg	
120-12-7	Anthracene	ND	70	ug/kg	
56-55-3	Benzo (a) anthracene	384	10	ug/kg	
50-32-8	Benzo (a) pyrene	728	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	522	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	504	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	131	10	ug/kg	
218-01-9	Chrysene	412	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	686	10	ug/kg	
86-73-7	Fluorene	ND	70	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	337	10	ug/kg	
90-12-0	1-Methylnaphthalene	158	70	ug/kg	
91-57-6	2-Methylnaphthalene	344	70	ug/kg	
91-20-3	Naphthalene	ND	70	ug/kg	
85-01-8	Phenanthrene	ND	70	ug/kg	
129-00-0	Pyrene	370	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	61%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-302-01		
Lab Sample ID:	F5260-2	**Date Sampled:**	11/11/99
Matrix:	SO - Soil	**Date Received:**	11/12/99
Method:	SW846 8310	**Percent Solids:**	94.8
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC7204.D	1	12/02/99	AMA	11/23/99	M:OP1565	M:GLC67
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	158	70	ug/kg	
208-96-8	Acenaphthylene	ND	70	ug/kg	
120-12-7	Anthracene	ND	70	ug/kg	
56-55-3	Benzo (a) anthracene	120	10	ug/kg	
50-32-8	Benzo (a) pyrene	139	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	78.4	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	110	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	31.3	10	ug/kg	
218-01-9	Chrysene	ND	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	284	10	ug/kg	
86-73-7	Fluorene	ND	70	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	10	ug/kg	
90-12-0	1-Methylnaphthalene	72.2	70	ug/kg	
91-57-6	2-Methylnaphthalene	ND	70	ug/kg	
91-20-3	Naphthalene	ND	70	ug/kg	
85-01-8	Phenanthrene	138	70	ug/kg	
129-00-0	Pyrene	188	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	50%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-303-01		
Lab Sample ID:	F5260-3	Date Sampled:	11/11/99
Matrix:	SO - Soil	Date Received:	11/12/99
Method:	SW846 8310	Percent Solids:	92.1
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC7205.D	1	12/02/99	AMA	11/23/99	M:OP1565	M:GLC67
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	708	72	ug/kg	
208-96-8	Acenaphthylene	ND	72	ug/kg	
120-12-7	Anthracene	ND	72	ug/kg	
56-55-3	Benzo (a) anthracene	317	11	ug/kg	
50-32-8	Benzo (a) pyrene	601	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	359	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	497	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	104	11	ug/kg	
218-01-9	Chrysene	309	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	522	11	ug/kg	
86-73-7	Fluorene	ND	72	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	11	ug/kg	
90-12-0	1-Methylnaphthalene	188	72	ug/kg	
91-57-6	2-Methylnaphthalene	ND	72	ug/kg	
91-20-3	Naphthalene	ND	72	ug/kg	
85-01-8	Phenanthrene	ND	72	ug/kg	
129-00-0	Pyrene	460	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	57%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-304-01		
Lab Sample ID:	F5260-4	Date Sampled:	11/11/99
Matrix:	SO - Soil	Date Received:	11/12/99
Method:	SW846 8310	Percent Solids:	92.3
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC7206.D	1	12/02/99	AMA	11/23/99	M:OP1565	M:GLC67
Run #2	LC7278E.D	5	12/06/99	AMA	11/23/99	M:OP1565	M:GLC70

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	12200 [a]	360	ug/kg	
208-96-8	Acenaphthylene	ND	72	ug/kg	
120-12-7	Anthracene	2090	72	ug/kg	
56-55-3	Benzo (a) anthracene	4200	11	ug/kg	
50-32-8	Benzo (a) pyrene	3880	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	2960	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	2350	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	744	11	ug/kg	
218-01-9	Chrysene	3270	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	226	11	ug/kg	
206-44-0	Fluoranthene	12200 [a]	54	ug/kg	
86-73-7	Fluorene	862	72	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	1470	11	ug/kg	
90-12-0	1-Methylnaphthalene	3360	72	ug/kg	
91-57-6	2-Methylnaphthalene	ND	72	ug/kg	
91-20-3	Naphthalene	623	72	ug/kg	
85-01-8	Phenanthrene	6570	72	ug/kg	
129-00-0	Pyrene	8010 [a]	54	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	9% [b]	8% [b]	20-130%

(a) Result is from Run# 2
(b) Confirmed by reanalysis.

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SU-305-03		
Lab Sample ID:	F5260-5	Date Sampled:	11/11/99
Matrix:	SO - Soil	Date Received:	11/12/99
Method:	SW846 8310	Percent Solids:	94.6
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC7207.D	1	12/03/99	AMA	11/23/99	M:OP1565	M:GLC67
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	70	ug/kg	
208-96-8	Acenaphthylene	ND	70	ug/kg	
120-12-7	Anthracene	ND	70	ug/kg	
56-55-3	Benzo (a) anthracene	ND	10	ug/kg	
50-32-8	Benzo (a) pyrene	ND	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	270	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	10	ug/kg	
218-01-9	Chrysene	ND	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	ND	10	ug/kg	
86-73-7	Fluorene	ND	70	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	138	10	ug/kg	
90-12-0	1-Methylnaphthalene	ND	70	ug/kg	
91-57-6	2-Methylnaphthalene	ND	70	ug/kg	
91-20-3	Naphthalene	ND	70	ug/kg	
85-01-8	Phenanthrene	ND	70	ug/kg	
129-00-0	Pyrene	ND	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	112%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P49-SS-401-01		
Lab Sample ID:	F5262-1	**Date Sampled:**	11/11/99
Matrix:	SO - Soil	**Date Received:**	11/12/99
Method:	SW846 8310	**Percent Solids:**	89.6
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC7213.D	1	12/03/99	AMA	11/23/99	M:OP1565	M:GLC67
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	131	72	ug/kg	
208-96-8	Acenaphthylene	ND	72	ug/kg	
120-12-7	Anthracene	ND	72	ug/kg	
56-55-3	Benzo (a) anthracene	37.2	11	ug/kg	
50-32-8	Benzo (a) pyrene	122	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	34.8	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	71.5	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	22.6	11	ug/kg	
218-01-9	Chrysene	52.5	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	119	11	ug/kg	
86-73-7	Fluorene	ND	72	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	11	ug/kg	
90-12-0	1-Methylnaphthalene	107	72	ug/kg	
91-57-6	2-Methylnaphthalene	ND	72	ug/kg	
91-20-3	Naphthalene	ND	72	ug/kg	
85-01-8	Phenanthrene	ND	72	ug/kg	
129-00-0	Pyrene	59.4	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	64%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P49-SS-DU10		
Lab Sample ID:	F5262-2	**Date Sampled:**	11/11/99
Matrix:	SO - Soil	**Date Received:**	11/12/99
Method:	SW846 8310	**Percent Solids:**	77.5
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC7214.D	1	12/03/99	AMA	11/23/99	M:OP1565	M:GLC67
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	84	ug/kg	
208-96-8	Acenaphthylene	ND	84	ug/kg	
120-12-7	Anthracene	ND	84	ug/kg	
56-55-3	Benzo (a) anthracene	55.2	13	ug/kg	
50-32-8	Benzo (a) pyrene	186	13	ug/kg	
205-99-2	Benzo (b) fluoranthene	47.2	13	ug/kg	
191-24-2	Benzo (g,h,i) perylene	140	13	ug/kg	
207-08-9	Benzo (k) fluoranthene	29.9	13	ug/kg	
218-01-9	Chrysene	79.8	13	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	13	ug/kg	
206-44-0	Fluoranthene	549	13	ug/kg	
86-73-7	Fluorene	ND	84	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	13	ug/kg	
90-12-0	1-Methylnaphthalene	ND	84	ug/kg	
91-57-6	2-Methylnaphthalene	ND	84	ug/kg	
91-20-3	Naphthalene	ND	84	ug/kg	
85-01-8	Phenanthrene	84.9	84	ug/kg	
129-00-0	Pyrene	84.0	13	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	78%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

APPENDIX C

Support Documentation

PHASE V ANALYTICAL RESULTS

Tetra Tech NUS

INTERNAL CORRESPONDENCE

TO:	**M. SPERANZA**	**DATE:**	**MARCH 1, 2000**
FROM:	**GRETCHEN PHIPPS**	**COPIES:**	**DV FILE**
SUBJECT:	**ORGANIC DATA VALIDATION – PAHs** **CTO 078 - NAS, CECIL FIELD** **SDG – F5710**		
SAMPLES:	7/Soils/		

CEF-P32-SS-401-01	CEF-P32-SS-402-01
CEF-P32-SS-403-01	CEF-P32-SS-404-01
CEF-P32-SS-405-02	CEF-P32-SU-406-03
CEF-P32-SU-DU05	

Overview

The sample set for CTO 078, NAS Cecil Field, SDG F5710, consists of seven (7) soil environmental samples. One (1) field duplicate pair (CEF-P32-SU-406-03 / CEF-P32-SU-DU05) was included within this SDG.

All samples were analyzed for polynuclear aromatic hydrocarbons (PAHs). The samples were collected by Tetra Tech NUS on January 21, 2000 and analyzed by Accutest Laboratory. PAH analyses were conducted using SW 846 method 8310.

The data was evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Calibration Verifications
* • Laboratory Blank Analyses
• Field Duplicate Analyses
* • Detection Limits

* - All quality control criteria were met for this parameter.

Field Duplicate Analyses

Field duplicate imprecision (RPD >50%) was noted for the all compounds except 1-methylnaphthalene, anthracene and fluorene in field duplicate pair CEF-P32-SU-406-03 / CEF-P32-SU-DU05. The positive and nondetected results reported for all compounds except those listed above in field duplicate pair CEF-P32-SU-406-03 / CEF-P32-SU-DU05 were qualified as estimated, "J" and "UJ", respectively.

Executive Summary

Laboratory Performance: None.

Other Factors Affecting Data Quality: Field duplicate imprecision was noted for several compounds.

The data for these analyses were reviewed with reference to the "National Functional Guidelines for Organic Review", February 1994 and the NFESC document entitles "Navy Installation Restoration Laboratory Quality Assurance Guide." (NFESC 2/96).

The text of this report has been formulated to address only those problem areas affecting data quality.

"I attest that the data referenced herein were validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Gretchen A. Phipps

Tetra Tech NUS
Gretchen A. Phipps

Tetra Tech NUS
Joseph A. Samchuck
Quality Control Officer

Attachments:

1. Appendix A - Qualified Analytical Data
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCD% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop

NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F5710

SAMPLE NUMBER:	CEF-P32-SS-401-01			CEF-P32-SS-402-01			CEF-P32-SS-403-01			CEF-P32-SS-404-01		
SAMPLE DATE:	01/21/00			01/21/00			01/21/00			01/21/00		
LABORATORY ID:	F5710-1			F5710-3			F5710-2			F5710-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	92.7 %			94.1 %			91.2 %			92.9 %		
UNITS:	UG/KG			UG/KG			UG/KG			UG/KG		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	71	U		70	U		72	U		71	U	
2-METHYLNAPHTHALENE	76.4			70	U		105			71	U	
ACENAPHTHENE	147			70	U		181			71	U	
ACENAPHTHYLENE	71	U		70	U		219			107		
ANTHRACENE	71	U		70	U		72	U		71	U	
BENZO(A)ANTHRACENE	410			16.5			336			85.1		
BENZO(A)PYRENE	467			10	U		292			61.6		
BENZO(B)FLUORANTHENE	740			25.8			488			114		
BENZO(G,H,I)PERYLENE	388			25.9			336			78		
BENZO(K)FLUORANTHENE	382			12.6			275			54.7		
CHRYSENE	541			21			398			105		
DIBENZO(A,H)ANTHRACENE	11	U		10	U		21.2			11	U	
FLUORANTHENE	586			32.3			656			237		
FLUORENE	71	U		70	U		72	U		71	U	
INDENO(1,2,3-CD)PYRENE	392			10	U		330			75.3		
NAPHTHALENE	76.4			70	U		72	U		88.8		
PHENANTHRENE	71	U		70	U		141			130		
PYRENE	602			29.8			552			211		

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F5710

SAMPLE NUMBER:	CEF-P32-SS-405-02	CEF-P32-SU-406-03	CEF-P32-SU-DU05	/ /
SAMPLE DATE:	01/21/00	01/21/00	01/21/00	
LABORATORY ID:	F5710-5	F5710-6	F5710-7	
QC_TYPE:	NORMAL	NORMAL	NORMAL	
% SOLIDS:	87.7 %	94.0 %	94.5 %	100.0 %
UNITS:	UG/KG	UG/KG	UG/KG	
FIELD DUPLICATE OF:			CEF-P32-SU-406-03	

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	76	U		71	U		70	U				
2-METHYLNAPHTHALENE	76	U		96.5	J	G	70	UJ	G			
ACENAPHTHENE	76	U		80.1	J	G	70	UJ	G			
ACENAPHTHYLENE	76	U		156	J	G	70	UJ	G			
ANTHRACENE	76	U		71	U		70	U				
BENZO(A)ANTHRACENE	14			182	J	G	10	UJ	G			
BENZO(A)PYRENE	11	U		111	J	G	10	UJ	G			
BENZO(B)FLUORANTHENE	11	U		165	J	G	10	UJ	G			
BENZO(G,H,I)PERYLENE	11	U		118	J	G	10	UJ	G			
BENZO(K)FLUORANTHENE	11	U		97.4	J	G	10	UJ	G			
CHRYSENE	13.1			184	J	G	10	UJ	G			
DIBENZO(A,H)ANTHRACENE	11	U		34.1	J	G	10	UJ	G			
FLUORANTHENE	92.6			517	J	G	10	UJ	G			
FLUORENE	76	U		71	U		70	U				
INDENO(1,2,3-CD)PYRENE	11	U		117	J	G	10	UJ	G			
NAPHTHALENE	76	U		89.6	J	G	70	UJ	G			
PHENANTHRENE	76	U		217	J	G	70	UJ	G			
PYRENE	18.3			360	J	G	10	UJ	G			

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-401-01		
Lab Sample ID:	F5710-1	**Date Sampled:**	01/21/00
Matrix:	SO - Soil	**Date Received:**	01/24/00
Method:	SW846 8310	**Percent Solids:**	92.7
Project:	NAS Cecil Field PO#N0039-P98655A-01		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC8529.D	1	02/10/00	AMA	02/04/00	M:OP1716	M:GLC102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	147	71	ug/kg	
208-96-8	Acenaphthylene	ND	71	ug/kg	
120-12-7	Anthracene	ND	71	ug/kg	
56-55-3	Benzo (a) anthracene	410	11	ug/kg	
50-32-8	Benzo (a) pyrene	467	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	740	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	388	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	382	11	ug/kg	
218-01-9	Chrysene	541	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	586	11	ug/kg	
86-73-7	Fluorene	ND	71	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	392	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	71	ug/kg	
91-57-6	2-Methylnaphthalene	76.4	71	ug/kg	
91-20-3	Naphthalene	76.4	71	ug/kg	
85-01-8	Phenanthrene	ND	71	ug/kg	
129-00-0	Pyrene	602	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	77%		20-130%

00 001

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-402-01		
Lab Sample ID:	F5710-3	Date Sampled:	01/21/00
Matrix:	SO - Soil	Date Received:	01/24/00
Method:	SW846 8310	Percent Solids:	94.1
Project:	NAS Cecil Field PO#N0039-P98655A-01		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC8531.D	1	02/10/00	AMA	02/04/00	M:OP1716	M:GLC102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	70	ug/kg	
208-96-8	Acenaphthylene	ND	70	ug/kg	
120-12-7	Anthracene	ND	70	ug/kg	
56-55-3	Benzo (a) anthracene	16.5	10	ug/kg	
50-32-8	Benzo (a) pyrene	ND	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	25.8	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	25.9	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	12.6	10	ug/kg	
218-01-9	Chrysene	21.0	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	32.3	10	ug/kg	
86-73-7	Fluorene	ND	70	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	10	ug/kg	
90-12-0	1-Methylnaphthalene	ND	70	ug/kg	
91-57-6	2-Methylnaphthalene	ND	70	ug/kg	
91-20-3	Naphthalene	ND	70	ug/kg	
85-01-8	Phenanthrene	ND	70	ug/kg	
129-00-0	Pyrene	29.8	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	54%		20-130%

CC 003

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-403-01		
Lab Sample ID:	F5710-2	**Date Sampled:**	01/21/00
Matrix:	SO - Soil	**Date Received:**	01/24/00
Method:	SW846 8310	**Percent Solids:**	91.2
Project:	NAS Cecil Field PO#N0039-P98655A-01		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC8530.D	1	02/10/00	AMA	02/04/00	M:OP1716	M:GLC102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	181	72	ug/kg	
208-96-8	Acenaphthylene	219	72	ug/kg	
120-12-7	Anthracene	ND	72	ug/kg	
56-55-3	Benzo (a) anthracene	336	11	ug/kg	
50-32-8	Benzo (a) pyrene	292	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	488	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	336	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	275	11	ug/kg	
218-01-9	Chrysene	398	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	21.2	11	ug/kg	
206-44-0	Fluoranthene	656	11	ug/kg	
86-73-7	Fluorene	ND	72	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	330	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	72	ug/kg	
91-57-6	2-Methylnaphthalene	105	72	ug/kg	
91-20-3	Naphthalene	ND	72	ug/kg	
85-01-8	Phenanthrene	141	72	ug/kg	
129-00-0	Pyrene	552	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	48%		20-130%

CC 002

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-404-01		
Lab Sample ID:	F5710-4	**Date Sampled:**	01/21/00
Matrix:	SO - Soil	**Date Received:**	01/24/00
Method:	SW846 8310	**Percent Solids:**	92.9
Project:	NAS Cecil Field PO#N0039-P98655A-01		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC8534.D	1	02/10/00	AMA	02/04/00	M:OP1716	M:GLC102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	71	ug/kg	
208-96-8	Acenaphthylene	107	71	ug/kg	
120-12-7	Anthracene	ND	71	ug/kg	
56-55-3	Benzo (a) anthracene	85.1	11	ug/kg	
50-32-8	Benzo (a) pyrene	61.6	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	114	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	78.0	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	54.7	11	ug/kg	
218-01-9	Chrysene	105	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	237	11	ug/kg	
86-73-7	Fluorene	ND	71	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	75.3	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	71	ug/kg	
91-57-6	2-Methylnaphthalene	ND	71	ug/kg	
91-20-3	Naphthalene	88.8	71	ug/kg	
85-01-8	Phenanthrene	130	71	ug/kg	
129-00-0	Pyrene	211	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	82%		20-130%

CC 004

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-405-02		
Lab Sample ID:	F5710-5	**Date Sampled:**	01/21/00
Matrix:	SO - Soil	**Date Received:**	01/24/00
Method:	SW846 8310	**Percent Solids:**	87.7
Project:	NAS Cecil Field PO#N0039-P98655A-01		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC8535.D	1	02/10/00	AMA	02/04/00	M:OP1716	M:GLC102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	76	ug/kg	
208-96-8	Acenaphthylene	ND	76	ug/kg	
120-12-7	Anthracene	ND	76	ug/kg	
56-55-3	Benzo (a) anthracene	14.0	11	ug/kg	
50-32-8	Benzo (a) pyrene	ND	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	11	ug/kg	
218-01-9	Chrysene	13.1	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	11	ug/kg	
206-44-0	Fluoranthene	92.6	11	ug/kg	
86-73-7	Fluorene	ND	76	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	76	ug/kg	
91-57-6	2-Methylnaphthalene	ND	76	ug/kg	
91-20-3	Naphthalene	ND	76	ug/kg	
85-01-8	Phenanthrene	ND	76	ug/kg	
129-00-0	Pyrene	18.3	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	68%		20-130%

00 005

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SU-406-03		
Lab Sample ID:	F5710-6	**Date Sampled:**	01/21/00
Matrix:	SO - Soil	**Date Received:**	01/24/00
Method:	SW846 8310	**Percent Solids:**	94.0
Project:	NAS Cecil Field PO#N0039-P98655A-01		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC8536.D	1	02/10/00	AMA	02/04/00	M:OP1716	M:GLC102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	80.1	71	ug/kg	
208-96-8	Acenaphthylene	156	71	ug/kg	
120-12-7	Anthracene	ND	71	ug/kg	
56-55-3	Benzo (a) anthracene	182	11	ug/kg	
50-32-8	Benzo (a) pyrene	111	11	ug/kg	
205-99-2	Benzo (b) fluoranthene	165	11	ug/kg	
191-24-2	Benzo (g,h,i) perylene	118	11	ug/kg	
207-08-9	Benzo (k) fluoranthene	97.4	11	ug/kg	
218-01-9	Chrysene	184	11	ug/kg	
53-70-3	Dibenz(a,h)anthracene	34.1	11	ug/kg	
206-44-0	Fluoranthene	517	11	ug/kg	
86-73-7	Fluorene	ND	71	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	117	11	ug/kg	
90-12-0	1-Methylnaphthalene	ND	71	ug/kg	
91-57-6	2-Methylnaphthalene	96.5	71	ug/kg	
91-20-3	Naphthalene	89.6	71	ug/kg	
85-01-8	Phenanthrene	217	71	ug/kg	
129-00-0	Pyrene	360	11	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	72%		20-130%

00 006

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SU-DU05		
Lab Sample ID:	F5710-7	**Date Sampled:**	01/21/00
Matrix:	SO - Soil	**Date Received:**	01/24/00
Method:	SW846 8310	**Percent Solids:**	94.5
Project:	NAS Cecil Field PO#N0039-P98655A-01		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC8537.D	1	02/10/00	AMA	02/04/00	M:OP1716	M:GLC102
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	70	ug/kg	
208-96-8	Acenaphthylene	ND	70	ug/kg	
120-12-7	Anthracene	ND	70	ug/kg	
56-55-3	Benzo (a) anthracene	ND	10	ug/kg	
50-32-8	Benzo (a) pyrene	ND	10	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	10	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	10	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	10	ug/kg	
218-01-9	Chrysene	ND	10	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	10	ug/kg	
206-44-0	Fluoranthene	ND	10	ug/kg	
86-73-7	Fluorene	ND	70	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	10	ug/kg	
90-12-0	1-Methylnaphthalene	ND	70	ug/kg	
91-57-6	2-Methylnaphthalene	ND	70	ug/kg	
91-20-3	Naphthalene	ND	70	ug/kg	
85-01-8	Phenanthrene	ND	70	ug/kg	
129-00-0	Pyrene	ND	10	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	64%		20-130%

00 007

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

PHASE VI ANALYTICAL RESULTS

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-04-0-050

TO: **MARK SPERANZA** **DATE: MAY 15, 2000**

FROM: **JUSTIN ORBICH** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PAH**
CTO 078 – NAS CECIL FIELD
SDG F6027

SAMPLES: 6/Surface Soil

CEF-P32-SS-501-01	CEF-P32-SS-502-01
CEF-P32-SS-503-01	CEF-P32-SS-504-01
CEF-P32-SS-505-01	CEF-P32-SS-DU06

OVERVIEW

The sample set for CTO 078, SDG F6027 Naval Air Station (NAS) Cecil Field; Florida consists of six (6) surface soil environmental samples. The sample was analyzed for Target Compound List (TCL) Polynuclear Aromatic Hydrocarbon (PAH) plus 1-methylnaphthalene and 2-methylnaphthalene organic compounds. One (1) field duplicate pair (CEF-P32-SS-501-01/CEF-P32-SS-DU06) was included within this SDG.

The samples were collected by Tetra Tech, NUS on March 9th, 2000 and analyzed by Accutest Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW 846 Method 8310 analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

- * Data Completeness
- * Holding Times
- * Initial/continuing calibrations
- * Laboratory method/field quality control blank results
- Field Duplicate Results
- * Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified analytical results are presented in Appendix A.

PAH FRACTION

It should be noted that all the samples were analyzed at a 5X dilution thus causing elevated reporting limits.

The field duplicate pair (CEF-P32-SS-501-01/CEF-P32-SS-DU06) Relative Percent Differences (RPDs) exceeded the 50% quality control limits for indeno(1,2,3-cd)pyrene. The positive and nondetected results were qualified as estimated (J) and (UJ).

EXECUTIVE SUMMARY

Laboratory performance: None.

Other Factors Affecting Data Quality: All samples were analyzed at a 5X dilution. The field duplicate pair RPDs exceeded the quality control limits for indeno(1,2,3-cd)pyrene.

MEMO TO: MARK SPERANZA
DATE: MAY 15, 2000 – PAGE 3

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (October, 1999), and the NFESC guidelines "Navy Installation Restoration Program Laboratory Quality Assurance Guide" (February, 1996). The text of this report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Justin Orbich

Chemist/Data Validator
Tetra Tech, NUS

Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech, NUS

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

DATA QUALIFIER DEFINITIONS:

U	-	Value is a nondetected result as reported by the laboratory and should not be considered present.
J	-	Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.
UJ	-	Nondetected result is considered to be estimated as a result of technical noncompliances.

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F6027

SAMPLE NUMBER:	CEF-P32-SS-501-01			CEF-P32-SS-502-01			CEF-P32-SS-503-01			CEF-P32-SS-504-01		
SAMPLE DATE:	03/09/00			03/09/00			03/09/00			03/09/00		
LABORATORY ID:	F6027-1			F6027-2			F6027-3			F6027-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	96.1 %			97.5 %			96.8 %			95.2 %		
UNITS:	UG/KG			UG/KG			UG/KG			UG/KG		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	170	U		170	U		170	U		180	U	
2-METHYLNAPHTHALENE	170	U		170	U		170	U		316		
ACENAPHTHENE	170	U		170	U		170	U		245		
ACENAPHTHYLENE	170	U		170	U		170	U		180	U	
ANTHRACENE	170	U		170	U		170	U		180	U	
BENZO(A)ANTHRACENE	78.5			26	U		26	U		304		
BENZO(A)PYRENE	296			26	U		35.3			939		
BENZO(B)FLUORANTHENE	236			26	U		26	U		604		
BENZO(G,H,I)PERYLENE	179			26	U		26	U		511		
BENZO(K)FLUORANTHENE	91.3			26	U		26	U		235		
CHRYSENE	135			26	U		26	U		400		
DIBENZO(A,H)ANTHRACENE	26	U		26	U		26	U		31.6		
FLUORANTHENE	211			26	U		43.1			828		
FLUORENE	170	U		170	U		170	U		180	U	
INDENO(1,2,3-CD)PYRENE	169	J	G	26	U		30.6			534		
NAPHTHALENE	170	U		170	U		170	U		180	U	
PHENANTHRENE	170	U		170	U		170	U		180	U	
PYRENE	144			26	U		29			662		

CTO078 - NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F6027

SAMPLE NUMBER:	CEF-P32-SS-505-02			CEF-P32-SS-DU06								
SAMPLE DATE:	03/09/00			03/09/00			/ /			/ /		
LABORATORY ID:	F6027-5			F6027-6								
QC_TYPE:	NORMAL			NORMAL								
% SOLIDS:	89.9 %			95.3 %			100.0 %			100.0 %		
UNITS:	UG/KG			UG/KG								
FIELD DUPLICATE OF:				CEF-P32-SS-501-01								
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	180	U		180	U							
2-METHYLNAPHTHALENE	180	U		180	U							
ACENAPHTHENE	180	U		180	U							
ACENAPHTHYLENE	180	U		180	U							
ANTHRACENE	180	U		180	U							
BENZO(A)ANTHRACENE	26	U		92.6								
BENZO(A)PYRENE	26	U		301								
BENZO(B)FLUORANTHENE	26	U		255								
BENZO(G,H,I)PERYLENE	27.3			174								
BENZO(K)FLUORANTHENE	26	U		103								
CHRYSENE	52.3			145								
DIBENZO(A,H)ANTHRACENE	26	U		26	U							
FLUORANTHENE	91.9			249								
FLUORENE	180	U		180	U							
INDENO(1,2,3-CD)PYRENE	26	U		26	UJ	G						
NAPHTHALENE	180	U		180	U							
PHENANTHRENE	180	U		180	U							
PYRENE	26	U		171								

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-501-01		
Lab Sample ID:	F6027-1	**Date Sampled:**	03/09/00
Matrix:	SO - Soil	**Date Received:**	03/10/00
Method:	SW846 8310	**Percent Solids:**	96.1
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC9222.D	5	03/28/00	AMA	03/18/00	M:OP1817	M:GLC128
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	170	ug/kg	
208-96-8	Acenaphthylene	ND	170	ug/kg	
120-12-7	Anthracene	ND	170	ug/kg	
56-55-3	Benzo (a) anthracene	78.5	26	ug/kg	
50-32-8	Benzo (a) pyrene	296	26	ug/kg	
205-99-2	Benzo (b) fluoranthene	236	26	ug/kg	
191-24-2	Benzo (g,h,i) perylene	179	26	ug/kg	
207-08-9	Benzo (k) fluoranthene	91.3	26	ug/kg	
218-01-9	Chrysene	135	26	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	26	ug/kg	
206-44-0	Fluoranthene	211	26	ug/kg	
86-73-7	Fluorene	ND	170	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	169	26	ug/kg	
90-12-0	1-Methylnaphthalene	ND	170	ug/kg	
91-57-6	2-Methylnaphthalene	ND	170	ug/kg	
91-20-3	Naphthalene	ND	170	ug/kg	
85-01-8	Phenanthrene	ND	170	ug/kg	
129-00-0	Pyrene	144	26	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	81%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000003

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-502-01		
Lab Sample ID:	F6027-2	**Date Sampled:**	03/09/00
Matrix:	SO - Soil	**Date Received:**	03/10/00
Method:	SW846 8310	**Percent Solids:**	97.5
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC9223.D	5	03/28/00	AMA	03/18/00	M:OP1817	M:GLC128
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	170	ug/kg	
208-96-8	Acenaphthylene	ND	170	ug/kg	
120-12-7	Anthracene	ND	170	ug/kg	
56-55-3	Benzo (a) anthracene	ND	26	ug/kg	
50-32-8	Benzo (a) pyrene	ND	26	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	26	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	26	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	26	ug/kg	
218-01-9	Chrysene	ND	26	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	26	ug/kg	
206-44-0	Fluoranthene	ND	26	ug/kg	
86-73-7	Fluorene	ND	170	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	26	ug/kg	
90-12-0	1-Methylnaphthalene	ND	170	ug/kg	
91-57-6	2-Methylnaphthalene	ND	170	ug/kg	
91-20-3	Naphthalene	ND	170	ug/kg	
85-01-8	Phenanthrene	ND	170	ug/kg	
129-00-0	Pyrene	ND	26	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	93%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000004

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-503-01		
Lab Sample ID:	F6027-3	**Date Sampled:**	03/09/00
Matrix:	SO - Soil	**Date Received:**	03/10/00
Method:	SW846 8310	**Percent Solids:**	96.8
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC9224.D	5	03/28/00	AMA	03/18/00	M:OP1817	M:GLC128
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	170	ug/kg	
208-96-8	Acenaphthylene	ND	170	ug/kg	
120-12-7	Anthracene	ND	170	ug/kg	
56-55-3	Benzo (a) anthracene	ND	26	ug/kg	
50-32-8	Benzo (a) pyrene	35.3	26	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	26	ug/kg	
191-24-2	Benzo (g,h,i) perylene	ND	26	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	26	ug/kg	
218-01-9	Chrysene	ND	26	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	26	ug/kg	
206-44-0	Fluoranthene	43.1	26	ug/kg	
86-73-7	Fluorene	ND	170	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	30.6	26	ug/kg	
90-12-0	1-Methylnaphthalene	ND	170	ug/kg	
91-57-6	2-Methylnaphthalene	ND	170	ug/kg	
91-20-3	Naphthalene	ND	170	ug/kg	
85-01-8	Phenanthrene	ND	170	ug/kg	
129-00-0	Pyrene	29.0	26	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	69%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000095

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-504-01		
Lab Sample ID:	F6027-4	**Date Sampled:**	03/09/00
Matrix:	SO - Soil	**Date Received:**	03/10/00
Method:	SW846 8310	**Percent Solids:**	95.2
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC9225.D	5	03/28/00	AMA	03/18/00	M:OP1817	M:GLC128
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	245	180	ug/kg	
208-96-8	Acenaphthylene	ND	180	ug/kg	
120-12-7	Anthracene	ND	180	ug/kg	
56-55-3	Benzo (a) anthracene	304	26	ug/kg	
50-32-8	Benzo (a) pyrene	939	26	ug/kg	
205-99-2	Benzo (b) fluoranthene	604	26	ug/kg	
191-24-2	Benzo (g,h,i) perylene	511	26	ug/kg	
207-08-9	Benzo (k) fluoranthene	235	26	ug/kg	
218-01-9	Chrysene	400	26	ug/kg	
53-70-3	Dibenz(a,h)anthracene	31.6	26	ug/kg	
206-44-0	Fluoranthene	828	26	ug/kg	
86-73-7	Fluorene	ND	180	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	534	26	ug/kg	
90-12-0	1-Methylnaphthalene	ND	180	ug/kg	
91-57-6	2-Methylnaphthalene	316	180	ug/kg	
91-20-3	Naphthalene	ND	180	ug/kg	
85-01-8	Phenanthrene	ND	180	ug/kg	
129-00-0	Pyrene	662	26	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	95%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	CEF-P32-SS-505-02		
Lab Sample ID:	F6027-5	**Date Sampled:**	03/09/00
Matrix:	SO - Soil	**Date Received:**	03/10/00
Method:	SW846 8310	**Percent Solids:**	89.9
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC9226.D	5	03/28/00	AMA	03/18/00	M:OP1817	M:GLC128
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	180	ug/kg	
208-96-8	Acenaphthylene	ND	180	ug/kg	
120-12-7	Anthracene	ND	180	ug/kg	
56-55-3	Benzo (a) anthracene	ND	26	ug/kg	
50-32-8	Benzo (a) pyrene	ND	26	ug/kg	
205-99-2	Benzo (b) fluoranthene	ND	26	ug/kg	
191-24-2	Benzo (g,h,i) perylene	27.3	26	ug/kg	
207-08-9	Benzo (k) fluoranthene	ND	26	ug/kg	
218-01-9	Chrysene	52.3	26	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	26	ug/kg	
206-44-0	Fluoranthene	91.9	26	ug/kg	
86-73-7	Fluorene	ND	180	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	26	ug/kg	
90-12-0	1-Methylnaphthalene	ND	180	ug/kg	
91-57-6	2-Methylnaphthalene	ND	180	ug/kg	
91-20-3	Naphthalene	ND	180	ug/kg	
85-01-8	Phenanthrene	ND	180	ug/kg	
129-00-0	Pyrene	ND	26	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	70%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000097

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Report of Analysis

Client Sample ID:	CEF-P32-SS-DU06		
Lab Sample ID:	F6027-6	**Date Sampled:**	03/09/00
Matrix:	SO - Soil	**Date Received:**	03/10/00
Method:	SW846 8310	**Percent Solids:**	95.3
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	LC9227.D	5	03/28/00	AMA	03/18/00	M:OP1817	M:GLC128
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	180	ug/kg	
208-96-8	Acenaphthylene	ND	180	ug/kg	
120-12-7	Anthracene	ND	180	ug/kg	
56-55-3	Benzo (a) anthracene	92.6	26	ug/kg	
50-32-8	Benzo (a) pyrene	301	26	ug/kg	
205-99-2	Benzo (b) fluoranthene	255	26	ug/kg	
191-24-2	Benzo (g,h,i) perylene	174	26	ug/kg	
207-08-9	Benzo (k) fluoranthene	103	26	ug/kg	
218-01-9	Chrysene	145	26	ug/kg	
53-70-3	Dibenz(a,h)anthracene	ND	26	ug/kg	
206-44-0	Fluoranthene	249	26	ug/kg	
86-73-7	Fluorene	ND	180	ug/kg	
193-39-5	Indeno (1,2,3-cd) pyrene	ND	26	ug/kg	
90-12-0	1-Methylnaphthalene	ND	180	ug/kg	
91-57-6	2-Methylnaphthalene	ND	180	ug/kg	
91-20-3	Naphthalene	ND	180	ug/kg	
85-01-8	Phenanthrene	ND	180	ug/kg	
129-00-0	Pyrene	171	26	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	83%		20-130%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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PHASE VII ANALYTICAL RESULTS

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

PITT-04-0-058

TO: **MARK SPERANZA** **DATE: MAY 15, 2000**

FROM: **JUSTIN ORBICH** **CC: DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PAH**
CTO 078 – NAS CECIL FIELD
SDG F6273

SAMPLES: 6/Surface Soil

CEF-P32-SS-601-01	CEF-P32-SS-602-01
CEF-P32-SS-603-01	CEF-P32-SS-604-01
CEF-P32-SS-605-02	CEF-P32-SS-DU07

OVERVIEW

The sample set for CTO 078, SDG F6273 Naval Air Station (NAS) Cecil Field; Florida consists of six (6) surface soil environmental samples. The samples were analyzed for Target Compound List (TCL) Polynuclear Aromatic Hydrocarbon (PAH) organic compounds. One (1) field duplicate (CEF-P32-SS-605-02/CEF-P32-SS-DU07) was included within this SDG.

The samples were collected by Tetra Tech, NUS on April 5th, 2000 and analyzed by Accutest Laboratories. All analyses were performed in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria and analyzed according to SW 846 Method 8310 analytical and reporting protocols. The data in this SDG was validated with regard to the following parameters:

* • Data Completeness
* • Holding Times
* • Initial/continuing calibrations
* • Laboratory method/field quality control blank results
* • Field Duplicate Precision
* • Detection Limits

The symbol (*) indicates that all quality control criteria were met for this parameter. Problems affecting data quality are discussed below; documentation supporting these findings is presented in Appendix C. Qualified analytical results are presented in Appendix A.

PAH FRACTION

All quality control parameters were met for this fraction.

MEMO TO: MARK SPERANZA
DATE: MAY 15, 2000 – PAGE 2

EXECUTIVE SUMMARY

Laboratory performance: None.

Other Factors Affecting Data Quality: Several field duplicate RPDs exceeded the criteria.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (October, 1999), and the NFESC guidelines "Navy Installation Restoration Program Laboratory Quality Assurance Guide" (February, 1996). The text of this report has been formulated to address only those problems affecting data quality.

"I attest that the data referenced herein was validated according to the agreed upon validation criteria as specified in the NFESC Guidelines and the Quality Assurance Project Plan (QAPP)."

Justin Orbich

Chemist/Data Validator
Tetra Tech, NUS

Joseph A. Samchuck

Data Validation Quality Assurance Officer
Tetra Tech, NUS

Attachments:
1. Appendix A - Qualified Analytical Results
2. Appendix B - Results as reported by the Laboratory
3. Appendix C - Support Documentation

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration (i.e., % RSDs, %Ds, ICVs, CCVs, RPDs, RRFs, etc.) Noncompliance
D = MS/MSD Noncompliance
E = LCS/LCSD Noncompliance
F = Lab Duplicate Imprecision
G = Field Duplicate Imprecision
H = Holding Time Exceedance
I = ICP Serial Dilution Noncompliance
J = GFAA PDS - GFAA MSA's $r < 0.995$
K = ICP Interference - include ICSAB % R's
L = Instrument Calibration Range Exceedance
M = Sample Preservation
N = Internal Standard Noncompliance
O = Poor Instrument Performance (i.e., base-time drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = Pest/PCB D% between columns for positive results
V = Non-linear calibrations, tuning $r < 0.995$ (correlation coefficient)
W = EMPC result
X = Signal to noise response drop
Y = % Solid content is less than 30%

DATA QUALIFIER DEFINITIONS:

U - Value is a nondetected result as reported by the laboratory and should not be considered present.

J - Positive result is estimated as a result of a value below the CRQL or a technical noncompliance.

CTO078-NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F6273

SAMPLE NUMBER:	CEF-P32-SS-605-02	CEF-P32-SS-DU07		
SAMPLE DATE:	04/13/00	04/13/00	/ /	/ /
LABORATORY ID:	F6273-5	F6273-6		
QC_TYPE:	NORMAL	NORMAL		
% SOLIDS:	93.5 %	94.4 %	100.0 %	100.0 %
UNITS:	UG/KG	UG/KG		
FIELD DUPLICATE OF:		CEF-P32-SS-605-02		

	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	360	U		350	U							
2-METHYLNAPHTHALENE	360	U		350	U							
ACENAPHTHENE	360	U		350	U							
ACENAPHTHYLENE	710	U		700	U							
ANTHRACENE	360	U		350	U							
BENZO(A)ANTHRACENE	18.3	J	P	15.5	J	P						
BENZO(A)PYRENE	30	J	P	17.6	J	P						
BENZO(B)FLUORANTHENE	14.2	J	P	17	J	P						
BENZO(G,H,I)PERYLENE	42.6	J	P	20.5	J	P						
BENZO(K)FLUORANTHENE	13.4	J	P	11.6	J	P						
CHRYSENE	15.6	J	P	15.6	J	P						
DIBENZO(A,H)ANTHRACENE	71	U		70	U							
FLUORANTHENE	360	U		350	U							
FLUORENE	360	U		350	U							
INDENO(1,2,3-CD)PYRENE	20	J	P	20.4	J	P						
NAPHTHALENE	360	U		350	U							
PHENANTHRENE	360	U		350	U							
PYRENE	360	U		350	U							

CTO078-NAS CECIL FIELD
SOIL DATA
Accutest, NJ
SDG: F6273

SAMPLE NUMBER:	CEF-P32-SS-601-01			CEF-P32-SS-602-01			CEF-P32-SS-603-01			CEF-P32-SS-604-01		
SAMPLE DATE:	04/13/00			04/13/00			04/13/00			04/13/00		
LABORATORY ID:	F6273-1			F6273-2			F6273-3			F6273-4		
QC_TYPE:	NORMAL			NORMAL			NORMAL			NORMAL		
% SOLIDS:	98.5 %			98.7 %			95.3 %			90.5 %		
UNITS:	UG/KG			UG/KG			UG/KG			UG/KG		
FIELD DUPLICATE OF:												
	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE	RESULT	QUAL	CODE
POLYNUCLEAR AROMATIC HYDROCARBONS												
1-METHYLNAPHTHALENE	340	U		340	U		350	U		164	J	P
2-METHYLNAPHTHALENE	340	U		340	U		350	U		255	J	P
ACENAPHTHENE	340	U		340	U		350	U		349	J	P
ACENAPHTHYLENE	680	U		680	U		700	U		740	U	
ANTHRACENE	340	U		340	U		350	U		370	U	
BENZO(A)ANTHRACENE	32.1	J	P	252			70	U		530		
BENZO(A)PYRENE	62.9	J	P	200			24.9	J	P	640		
BENZO(B)FLUORANTHENE	52.9	J	P	196			70	U		534		
BENZO(G,H,I)PERYLENE	58.7	J	P	164			42.4	J	P	633		
BENZO(K)FLUORANTHENE	39.6	J	P	143			70	U		420		
CHRYSENE	37.3	J	P	211			70	U		556		
DIBENZO(A,H)ANTHRACENE	15.7	J	P	68	U		70	U		62.5	J	P
FLUORANTHENE	340	U		343			350	U		783		
FLUORENE	340	U		340	U		350	U		370	U	
INDENO(1,2,3-CD)PYRENE	60.9	J	P	176			24.3	J	P	638		
NAPHTHALENE	340	U		340	U		350	U		370	U	
PHENANTHRENE	340	U		103	J	P	350	U		186	J	P
PYRENE	340	U		302	J	P	350	U		600		

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-601-01		
Lab Sample ID:	F6273-1	**Date Sampled:**	04/13/00
Matrix:	SO - Soil	**Date Received:**	04/14/00
Method:	EPA 8310	**Percent Solids:**	98.5
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA000732.D	1	04/17/00	CCJ	04/15/00	OP1453	GAA37
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	340	ug/kg	
208-96-8	Acenaphthylene	ND	680	ug/kg	
120-12-7	Anthracene	ND	340	ug/kg	
56-55-3	Benzo(a)anthracene	32.1	68	ug/kg	J
50-32-8	Benzo(a)pyrene	62.9	68	ug/kg	J
205-99-2	Benzo(b)fluoranthene	52.9	68	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	58.7	68	ug/kg	J
207-08-9	Benzo(k)fluoranthene	39.6	68	ug/kg	J
218-01-9	Chrysene	37.3	68	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	15.7	68	ug/kg	J
206-44-0	Fluoranthene	ND	340	ug/kg	
86-73-7	Fluorene	ND	340	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	60.9	68	ug/kg	J
91-20-3	Naphthalene	ND	340	ug/kg	
90-12-0	1-Methylnaphthalene	ND	340	ug/kg	
91-57-6	2-Methylnaphthalene	ND	340	ug/kg	
85-01-8	Phenanthrene	ND	340	ug/kg	
129-00-0	Pyrene	ND	340	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	86%		35-135%
92-94-4	p-Terphenyl	91%		50-150%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

000053

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-602-01		
Lab Sample ID:	F6273-2	**Date Sampled:**	04/13/00
Matrix:	SO - Soil	**Date Received:**	04/14/00
Method:	EPA 8310	**Percent Solids:**	98.7
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA000733.D	1	04/17/00	CCJ	04/15/00	OP1453	GAA37
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	340	ug/kg	
208-96-8	Acenaphthylene	ND	680	ug/kg	
120-12-7	Anthracene	ND	340	ug/kg	
56-55-3	Benzo(a)anthracene	252	68	ug/kg	
50-32-8	Benzo(a)pyrene	200	68	ug/kg	
205-99-2	Benzo(b)fluoranthene	196	68	ug/kg	
191-24-2	Benzo(g,h,i)perylene	164	68	ug/kg	
207-08-9	Benzo(k)fluoranthene	143	68	ug/kg	
218-01-9	Chrysene	211	68	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	68	ug/kg	
206-44-0	Fluoranthene	343	340	ug/kg	
86-73-7	Fluorene	ND	340	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	176	68	ug/kg	
91-20-3	Naphthalene	ND	340	ug/kg	
90-12-0	1-Methylnaphthalene	ND	340	ug/kg	
91-57-6	2-Methylnaphthalene	ND	340	ug/kg	
85-01-8	Phenanthrene	103	340	ug/kg	J
129-00-0	Pyrene	302	340	ug/kg	J

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	92%		35-135%
92-94-4	p-Terphenyl	95%		50-150%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-603-01		
Lab Sample ID:	F6273-3	**Date Sampled:**	04/13/00
Matrix:	SO - Soil	**Date Received:**	04/14/00
Method:	EPA 8310	**Percent Solids:**	95.3
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA000734.D	1	04/17/00	CCJ	04/15/00	OP1453	GAA37
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	350	ug/kg	
208-96-8	Acenaphthylene	ND	700	ug/kg	
120-12-7	Anthracene	ND	350	ug/kg	
56-55-3	Benzo(a)anthracene	ND	70	ug/kg	
50-32-8	Benzo(a)pyrene	24.9	70	ug/kg	J
205-99-2	Benzo(b)fluoranthene	ND	70	ug/kg	
191-24-2	Benzo(g,h,i)perylene	42.4	70	ug/kg	J
207-08-9	Benzo(k)fluoranthene	ND	70	ug/kg	
218-01-9	Chrysene	ND	70	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	70	ug/kg	
206-44-0	Fluoranthene	ND	350	ug/kg	
86-73-7	Fluorene	ND	350	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	24.3	70	ug/kg	J
91-20-3	Naphthalene	ND	350	ug/kg	
90-12-0	1-Methylnaphthalene	ND	350	ug/kg	
91-57-6	2-Methylnaphthalene	ND	350	ug/kg	
85-01-8	Phenanthrene	ND	350	ug/kg	
129-00-0	Pyrene	ND	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	72%		35-135%
92-94-4	p-Terphenyl	78%		50-150%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-604-01		
Lab Sample ID:	F6273-4	**Date Sampled:**	04/13/00
Matrix:	SO - Soil	**Date Received:**	04/14/00
Method:	EPA 8310	**Percent Solids:**	90.5
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA000735.D	1	04/17/00	CCJ	04/15/00	OP1453	GAA37
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	349	370	ug/kg	J
208-96-8	Acenaphthylene	ND	740	ug/kg	
120-12-7	Anthracene	ND	370	ug/kg	
56-55-3	Benzo(a)anthracene	530	74	ug/kg	
50-32-8	Benzo(a)pyrene	640	74	ug/kg	
205-99-2	Benzo(b)fluoranthene	534	74	ug/kg	
191-24-2	Benzo(g,h,i)perylene	633	74	ug/kg	
207-08-9	Benzo(k)fluoranthene	420	74	ug/kg	
218-01-9	Chrysene	556	74	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	62.5	74	ug/kg	J
206-44-0	Fluoranthene	783	370	ug/kg	
86-73-7	Fluorene	ND	370	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	638	74	ug/kg	
91-20-3	Naphthalene	ND	370	ug/kg	
90-12-0	1-Methylnaphthalene	164	370	ug/kg	J
91-57-6	2-Methylnaphthalene	255	370	ug/kg	J
85-01-8	Phenanthrene	186	370	ug/kg	J
129-00-0	Pyrene	600	370	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	85%		35-135%
92-94-4	p-Terphenyl	88%		50-150%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-605-02		
Lab Sample ID:	F6273-5	**Date Sampled:**	04/13/00
Matrix:	SO - Soil	**Date Received:**	04/14/00
Method:	EPA 8310	**Percent Solids:**	93.5
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA000736.D	1	04/17/00	CCJ	04/15/00	OP1453	GAA37
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	360	ug/kg	
208-96-8	Acenaphthylene	ND	710	ug/kg	
120-12-7	Anthracene	ND	360	ug/kg	
56-55-3	Benzo(a)anthracene	18.3	71	ug/kg	J
50-32-8	Benzo(a)pyrene	30.0	71	ug/kg	J
205-99-2	Benzo(b)fluoranthene	14.2	71	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	42.6	71	ug/kg	J
207-08-9	Benzo(k)fluoranthene	13.4	71	ug/kg	J
218-01-9	Chrysene	15.6	71	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	71	ug/kg	
206-44-0	Fluoranthene	ND	360	ug/kg	
86-73-7	Fluorene	ND	360	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	20.0	71	ug/kg	J
91-20-3	Naphthalene	ND	360	ug/kg	
90-12-0	1-Methylnaphthalene	ND	360	ug/kg	
91-57-6	2-Methylnaphthalene	ND	360	ug/kg	
85-01-8	Phenanthrene	ND	360	ug/kg	
129-00-0	Pyrene	ND	360	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	83%		35-135%
92-94-4	p-Terphenyl	90%		50-150%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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ACCUTEST

Report of Analysis

Client Sample ID:	CEF-P32-SS-DU07		
Lab Sample ID:	F6273-6	**Date Sampled:**	04/13/00
Matrix:	SO - Soil	**Date Received:**	04/14/00
Method:	EPA 8310	**Percent Solids:**	94.4
Project:	NAS Cecil Field		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	AA000737.D	1	04/17/00	CCJ	04/15/00	OP1453	GAA37
Run #2							

CAS No.	Compound	Result	RL	Units	Q
83-32-9	Acenaphthene	ND	350	ug/kg	
208-96-8	Acenaphthylene	ND	700	ug/kg	
120-12-7	Anthracene	ND	350	ug/kg	
56-55-3	Benzo(a)anthracene	15.5	70	ug/kg	J
50-32-8	Benzo(a)pyrene	17.6	70	ug/kg	J
205-99-2	Benzo(b)fluoranthene	17.0	70	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	20.5	70	ug/kg	J
207-08-9	Benzo(k)fluoranthene	11.6	70	ug/kg	J
218-01-9	Chrysene	15.6	70	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	ND	70	ug/kg	
206-44-0	Fluoranthene	ND	350	ug/kg	
86-73-7	Fluorene	ND	350	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	20.4	70	ug/kg	J
91-20-3	Naphthalene	ND	350	ug/kg	
90-12-0	1-Methylnaphthalene	ND	350	ug/kg	
91-57-6	2-Methylnaphthalene	ND	350	ug/kg	
85-01-8	Phenanthrene	ND	350	ug/kg	
129-00-0	Pyrene	ND	350	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	82%		35-135%
92-94-4	p-Terphenyl	90%		50-150%

ND = Not detected
RL = Reporting Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

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APPENDIX B

CLEAN FILL DATA

(AS PRESENTED IN THE SOURCE REMOVAL REPORT;
CH_2MHILL JANUARY 2001, APPENDIX D)

VOLATILE ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

002-CP7-S-0815-00

Lab Name: PEL Laboratories, Inc. Contract: Cecil Field

Lab Code : PEL Case No. SAS No: SDG No.: 2007271

Matrix: SOIL Lab Sample ID 200727101 Lab File ID 27101R.D

Sample wt/vol: 5.04 Units: G Date Received: 8/16/00

Concentrated Extract Volume: Date Extracted:

Level:(low/med) LOW Date Analyzed: 8/16/00 Time: 3:50 PM

PercentSolids: 88.36 decanted : Dilution Factor: 1

Extraction: PURGETRAP Station ID Clean Pile #7 Method: 8260

GPC Cleanup : (Y/N) pH:

GC Column: DB-624 ID: 0.18 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	*ANALYTE*	*RESULT*	*Q*
74-87-3	Chloromethane	11	U
75-01-4	Vinyl chloride	11	U
74-83-9	Bromomethane	11	U
75-00-3	Chloroethane	11	U
75-35-4	1,1-Dichloroethene	11	U
75-15-0	Carbon disulfide	11	U
75-09-2	Methylene chloride	11	U
156-60-5	Trans-1,2-Dichloroethene	11	U
75-34-3	1,1-Dichloroethane	11	U
67-64-1	Acetone	11	U
156-59-2	Cis-1,2-Dichloroethene	11	U
78-93-3	2-Butanone (MEK)	11	U
67-66-3	Chloroform	11	U
71-55-6	1,1,1-Trichloroethane	11	U
56-23-5	Carbon tetrachloride	11	U
71-43-2	Benzene	11	U
107-06-2	1,2-Dichloroethane	0.3	JB
79-01-6	Trichloroethene	11	U
78-87-5	1,2-Dichloropropane	11	U
75-27-4	Bromodichloromethane	11	U
10061-01-5	Cis-1,3-Dichloropropene	11	U
108-10-1	4-Methyl-2-pentanone	11	U
108-88-3	Toluene	11	U
10061-02-6	Trans-1,3-Dichloropropene	11	U
79-00-5	1,1,2-Trichloroethane	11	U
127-18-4	Tetrachloroethylene	11	U
591-78-6	2-Hexanone	11	U

VOLATILE ORGANIC ANALYSIS DATA SHEET

EPA Sample No.
002-CP7-S-0815-00

Lab Name: PEL Laboratories, Inc. Contract: Cecil Field

Lab Code : PEL Case No. SAS No: SDG No.: 2007271

Matrix: SOIL Lab Sample ID 200727101 Lab File ID 27101R.D

Sample wt/vol: 5.04 Units: G Date Received: 8/16/00

Concentrated Extract Volume: Date Extracted:

Level:(low/med) LOW Date Analyzed: 8/16/00 Time: 3:50 PM

PercentSolids: 88.36 decanted : Dilution Factor: 1

Extraction: PURGETRAP Station ID Clean Pile #7 Method: 8260

GPC Cleanup : (Y/N) pH:

GC Column: DB-624 ID: 0.18 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	*ANALYTE*	*RESULT*	*Q*
124-48-1	Dibromochloromethane	11	U
108-90-7	Chlorobenzene	11	U
100-41-4	Ethylbenzene	11	U
511-39-00	M,P-Xylene	11	U
95-47-6	O-Xylene	11	U
100-42-5	Styrene	11	U
75-25-2	Bromoform	11	U
79-34-5	1,1,2,2-Tetrachloroethane	11	U
1330-20-7	Xylenes (total)	11	U

PAH ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

002-CP7-S-0815-00

Lab Name: PEL Laboratories, Inc.

Contract: Cecil Field

Lab Code : PEL

Case No.

SAS No:

SDG No.: 2007271

Matrix: SOIL

Lab Sample ID 200727101

Lab File ID 271-1.D

Sample wt/vol: 33.48 Units: G

Date Received: 8/16/00

Concentrated Extract Volume: 1

Date Extracted: 8/16/00

Level:(low/med) LOW

Date Analyzed: 8/17/00

Time: 3:17 AM

PercentSolids: 88.36

decanted :

Dilution Factor: 1

Extraction: SONC

Station ID Clean Pile #7

Method: 8310

GPC Cleanup : (Y/N) N

pH:

GC Column: Vydac 201TP54

ID: 4.6 (mm)

CONCENTRATION UNITS: ug/Kg

CAS NO.	*ANALYTE*	*RESULT*	*Q*
91-20-3	Naphthalene	1270	U
208-96-8	Acenaphthylene	10	U
90-12-0	1-Methylnaphthalene	10	U
91-57-6	2-Methylnaphthalene	10	U
83-32-9	Acenaphthene	10	U
86-73-7	Fluorene	10	U
85-01-8	Phenanthrene	8.9	J
120-12-7	Anthracene	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	7.6	J
56-55-3	Benzo(a)anthracene	13	J
218-01-9	Chrysene	27	J
205-99-2	Benzo(b)fluoranthene	9.2	J
207-08-9	Benzo(k)fluoranthene	38	U
50-32-8	Benzo(a)pyrene	38	U
53-70-3	Dibenz(a,h)anthracene	203	U
191-24-2	Benzo(g,h,i)perylene	7.1	J
193-39-5	Indeno(1,2,3-cd)pyrene	4.5	J

FL-PRO ORGANIC ANALYSIS DATA SHEET

EPA Sample No.

002-CP7-S-0815-00

Lab Name: PEL Laboratories, Inc. Contract: Cecil Field

Lab Code : PEL Case No. SAS No: SDG No.: 2007271

Matrix: SOIL Lab Sample ID 200727101 Lab File ID 271-1.D

Sample wt/vol: 25.26 Units: G Date Received: 8/16/00

Concentrated Extract Volume: 2 Date Extracted: 8/16/00

Level:(low/med) LOW Date Analyzed: 8/17/00 Time: 5:09 AM

PercentSolids: 88.36 decanted : Dilution Factor: 1

Extraction: SONC Station ID Clean Pile #7 Method: FL-PRO

GPC Cleanup : (Y/N) N pH:

GC Column: RTX-5 ID: 0.53 (mm)

CONCENTRATION UNITS: mg/Kg

CAS NO.	*ANALYTE*	*RESULT*	*Q*
5289290-40-0	Total Petroleum Hydrocarbons	66	

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115 Perimeter Pln 700
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CHAIN CUSTODY RECORD

JAM

149152 page 1 of 1

PROJECT NAME:	PROJECT NUMBER:	LAB NAME AND CONTACT:	FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 1 (Name and Company)	RECIPIENT 1 (Address, Tel No , and Fax No)
NAS Cecil Field	149152	PEL Laboratories, Inc. Darcy Welsman	Bill Canelos CCI/J.A. Jones	6219 Authority Avenue, Jacksonville, FL 32215 PH: 904-777-4812 Fax: 904-777-4262
PROJECT PHASE/SITE/TASK:	CTO OR DO NUMBER:	LAB PO NUMBER:	FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 2 (Name and Company)	RECIPIENT 2 (Address, Tel No , and Fax No)
NTFF Clean Soil Pile #7	CTO 002	2098	Elsa Schwan, CCI	115 Perimeter Center Place, N.E. Suite 700 Atlanta, GA 3034((770)604-9182 Ext.561 FAX:604-9282
PROJECT CONTACT	PROJECT TEL NO AND FAX NO:	PH (813) 247-2805 FAX (813)-248-1537	FAX AND MAIL REPORTS/EDD TO:: RECIPIENT 3 (Name and Company)	RECIPIENT 3 (Address, Tel No , and Fax No)
Bill Canelos	PH (904) 777-4812 FAX (904) 777-4262			

ANALYSES REQUIRED (Include Method Numbers)

ITEM	SAMPLE IDENTIFIER	SAMPLE DESCRIPTION/LOCATION	MATRIX (see codes on back)	DATE COLLECTED	TIME COLLECTED	DATA PKG LEVEL (see codes on back)	TAT (calendar days)	EPA 8260B (Grab)	EPA 8310 (composite)	FL PRO (Composite)					SAMPLE TYPE (see codes on back)	COMMENTS/ SCREENING READINGS	LAB ID
1	002-CP7-S-0815-00	Clean Pile #7	soil	08/15/00	17:00	III/C	3 Day	x	x	x						OVA = 0 ppm	
2																- Level III	
3																- Temp upon rec'd 2c	
4																- SD's received in encores	
5																- pick ms/msd	
6																- ~~SS~~	
7																	
8																	
9																	
10																	

SAMPLES TEMPERATURE AND CONDITION UPON RECEIPT

SAMPLER(S) AND COMPANY: (please print)
W. J. Canelos, CCI/JAJES

COURIER AND SHIPPING NUMBER:
FedEx Tracking No. 7911-2786-9008

RELINQUISHED BY	DATE	TIME	RECEIVED BY	DATE	TIME
Printed Name and Signature: W. J. Canelos, CCI/JAJES W J Canelos	8/15/00	18:00	Printed Name and Signature: FedEx Tracking No. 7911-2786-9008	8/15/00	18:30
Printed Name and Signature			Printed Name and Signature:		

Form CC1001, Rev 0/00

Distribution | | Original - Laboratory (To be returned with Analytical Report). | | Copy 1 - Project File. | | Copy 2 - PMO

APPENDIX C

COST ESTIMATE

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
SITE 32
ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND MONITORING

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING											
1.1 Prepare Monitoring Plan	20	hr			$35.00		$0	$0	$700	$0	$700
2 INSTITUTIONAL CONTROLS											
2.1 Prepare Deed Restrictions & LUCs	150	hr			$35.00		$0	$0	$5,250	$0	$5,250
Subtotal							$0	$0	$5,950	$0	$5,950
Local Area Adjustments							100.0%	120.5%	88.0%	88.0%	
							$0	$0	$5,236	$0	$5,236
Overhead on Labor Cost @ 30%									$1,571		$1,571
G & A on Labor Cost @ 10%									$524		$524
G & A on Material Cost @ 10%								$0			$0
G & A on Subcontract Cost @ 10%							$0				$0
Total Direct Cost							$0	$0	$7,330	$0	$7,330
Indirects on Total Direct Cost @ 35%											$2,566
Profit on Total Direct Cost @ 10%											$733
Subtotal											$10,629
Health & Safety Monitoring @ 0%											$0
Contingency on Subtotal Cost @ 0%											$0
Engineering on Subtotal Cost @ 0%											$0
TOTAL COST											**$10,629**

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
SITE 32
ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND MONITORING
Annual Cost

Item	Item Cost Annually	Item Cost Every 5 Years	Notes
Sampling		$3,270	Labor, Field Supplies
Analysis/Water		$500	Analyze samples from two (2) locations plus one (1) QA sample for TCL VOCs, TCL SVOCs, and TCL Metals/CN
Analysis/Soil		$540	Analyze samples from four (4) locations plus one (1) QA sample for TCL VOCs, TCL SVOCs, and TCL Metals/CN
Report		$1,200	Document sampling events and results
Site Inspection	$1,000		To verify continued implementation of the LUCIP.
Site Review		$7,000	
TOTALS	$1,000	$12,510	

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
SITE 32
ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND MONITORING
Present Worth Analysis

Year	Capital Cost	Annual Cost	Total Year Cost	Annual Discount Rate at 7%	Present Worth
0	$10,629		$10,629	1.000	$10,629
1		$1,000	$1,000	0.935	$935
2		$1,000	$1,000	0.873	$873
3		$1,000	$1,000	0.816	$816
4		$1,000	$1,000	0.763	$763
5		$13,510	$13,510	0.713	$9,633
6		$1,000	$1,000	0.666	$666
7		$1,000	$1,000	0.623	$623
8		$1,000	$1,000	0.582	$582
9		$1,000	$1,000	0.544	$544
10		$13,510	$13,510	0.508	$6,863
11		$1,000	$1,000	0.475	$475
12		$1,000	$1,000	0.444	$444
13		$1,000	$1,000	0.415	$415
14		$1,000	$1,000	0.388	$388
15		$13,510	$13,510	0.362	$4,891
16		$1,000	$1,000	0.339	$339
17		$1,000	$1,000	0.317	$317
18		$1,000	$1,000	0.296	$296
19		$1,000	$1,000	0.277	$277
20		$13,510	$13,510	0.258	$3,486
21		$1,000	$1,000	0.242	$242
22		$1,000	$1,000	0.226	$226
23		$1,000	$1,000	0.211	$211
24		$1,000	$1,000	0.197	$197
25		$13,510	$13,510	0.184	$2,486
26		$1,000	$1,000	0.172	$172
27		$1,000	$1,000	0.161	$161
28		$1,000	$1,000	0.150	$150
29		$1,000	$1,000	0.141	$141
30		$13,510	$13,510	0.131	$1,770
				TOTAL PRESENT WORTH	$50,010

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA
SITE 32
ALTERNATIVE 3: EXCAVATION AND OFF-BASE DISPOSAL

Item	Quantity	Unit	Unit Cost Subcontract	Unit Cost Material	Unit Cost Labor	Unit Cost Equipment	Extended Cost Subcontract	Extended Cost Material	Extended Cost Labor	Extended Cost Equipment	Subtotal
1 PROJECT PLANNING											
1.1 Prepare Remedial Action Plan	50	hr			$35.00		$0	$0	$1,750	$0	$1,750
2 MOBILIZATION/DEMOBILIZATION AND FIELD SUPPORT											
2.1 Equipment Mobilization/Demobilization	4	ea			$50.00	$176.00	$0	$0	$200	$704	$904
2.2 Mobilization/Demobilization of Asphalt Crushing	1	ls	$1,600.00				$1,600	$0	$0	$0	$1,600
3 DECONTAMINATION											
3.1 Equipment Decon Pad	1	ls		$5,800.00	$6,650.00	$700.00	$0	$5,800	$6,650	$700	$13,150
3.2 Decontamination Services	2	mo	$2,200.00				$4,400	$0	$0	$0	$4,400
3.3 Decon Water	2,000	gal	$0.20				$400	$0	$0	$0	$400
3.4 Decon Water Storage Tank, 6,000 gallon	2	mo	$600.00				$1,200	$0	$0	$0	$1,200
3.5 Clean Water Storage Tank, 4,000 gallon	2	mo	$540.00				$1,080	$0	$0	$0	$1,080
3.6 Disposal of Decon Waste (liquid & solid)	2	mo	$900.00				$1,800	$0	$0	$0	$1,800
3.7 PPE (5 p * 5 days * 8 weeks)	200	day		$31.67			$0	$6,334	$0	$0	$6,334
4 EXCAVATE CONTAMINATED SOIL											
4.1 Clear and grub, cut & chip light, trees to 6" diam,	0.2	ac	$2,900.00				$493	$0	$0	$0	$493
4.2 Pulverize asphalt	6,990	sy	$2.79				$19,502	$0	$0	$0	$19,502
4.3 Excavate Soil/Pavement	3,790	cy	$1.45				$5,496	$0	$0	$0	$5,496
4.4 Front End Loader, 150 ft haul	3,790	cy	$2.41				$9,134	$0	$0	$0	$9,134
4.5 Shoring around Building Foundations, 1000 ft	1.5	mbf	$1,825.00				$2,738	$0	$0	$0	$2,738
4.6 Post-excavation Soil Analysis: VOCs, SVOCs, inorganics	25	ea	$1,115.00				$27,875	$0	$0	$0	$27,875
5 DISPOSAL											
5.1 Waste Characterization Testing (TCLP),1 per 1000 cy	3	ea	$820.00				$2,460	$0	$0	$0	$2,460
5.2 Transportation and Off-Site Disposal with Manifest	3,790	cy	$40.00				$151,600	$0	$0	$0	$151,600
6 SITE RESTORATION											
6.1 Import clean backfill	2,490	cy	$8.75				$21,788	$0	$0	$0	$21,788
6.2 Furnish and place topsoil - 6" layer	7,808	sy	$3.71				$28,968	$0	$0	$0	$28,968
6.3 Fine Grading and seeding, incl. lime, fert, and seed	7,808	sy	$2.33				$18,193	$0	$0	$0	$18,193
7 MISCELLANEOUS											
7.1 Construction Oversite (3p*5days*8 weeks)	120	days			$320.00		$0	$0	$38,400	$0	$38,400
7.2 Post Construction Documents	100	hr			$40.00		$0	$0	$4,000	$0	$4,000
Subtotal							298724.82	12134	51000	1404	$363,263
Local Area Adjustments							100.0%	120.5%	88.0%	88.0%	
							$298,725	$14,621	$44,880	$1,236	$359,462
Overhead on Labor Cost @ 30%									$13,464		$13,464
G & A on Labor Cost @ 10%									$4,488		$4,488
G & A on Material Cost @ 10%								$1,462			$1,462
G & A on Subcontract Cost @ 10%							$29,872				$29,872
Total Direct Cost							$328,597	$16,084	$62,832	$1,236	$408,748
Indirects on Total Direct Cost @ 35%			(not including off-site disposal)								$90,002
Profit on Total Direct Cost @ 10%											$40,875
Subtotal											$539,625
Health & Safety Monitoring @ 1%											$5,396
Total Field Cost											$545,021
Contingency on Total Field and Subcontractor Costs @ 20%											$109,004
Engineering on Total Field Cost @ 10%			(Total Field Cost minus Subcontractor's Total Direct Cost)								$21,642
TOTAL COST											**$675,668**