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SAMPLING AND ANALYSIS REPORT FOR ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD BASE REALIGNMENT AND CLOSURE NAS CECIL FIELD FL

11/9/2006

TETRA TECH NUS INC

Comprehensive **L**ong-term **E**nvironmental **A**ction **N**avy

CONTRACT NUMBER N62467-94-D-0888

Sampling and Analysis Report for Abandoned Railroad Bed North of Normandy Boulevard Base Realignment and Closure

Naval Air Station Cecil Field
Jacksonville, Florida

Contract Task Order 0078

November 2006

NAVFAC
Naval Facilities Engineering Command
Southeast
2155 Eagle Drive
North Charleston, South Carolina 29406

TETRA TECH NUS, Inc.

050602/P

SAMPLING AND ANALYSIS REPORT
FOR
ABANDONED RAILROAD BED
NORTH OF NORMANDY BOULEVARD
BASE REALIGNMENT AND CLOSURE

NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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

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CONTRACT NUMBER N62467-94-D-0888
CONTRACT TASK ORDER 0078

NOVEMBER 2006

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The professional opinions rendered in this decision document identified as Sampling and Analysis Report for the Abandoned Railroad Bed North of Normandy Boulevard, 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 the project described in this report.

Mark Speranza, P.E.
Professional Engineer No. PE0050304

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: November 9, 2006

COMPANY CERTIFICATION AUTHORIZATION NUMBER: 7988
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ACRONYMS

ABB-ES	ABB Environmental Services, Inc.
BaP	Benzo(a)pyrene
BaPEq	Benzo(a)pyrene equivalent
BCT	BRAC Cleanup Team
Bgs	Below ground surface
BRAC	Base Realignment and Closure
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	Contaminant of concern
COPC	Chemical of potential concern
cPAH	Carcinogenic PAH
CTO	Contract Task Order
EBS	Environmental Baseline Survey
EISOPQAM	Environmental Investigations Standard Operating Procedure and Quality Assurance Manual
ESV	Ecological screening values
F.A.C.	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FL-UCL	Florida UCL
FOST	Finding of Suitability to Transfer
GPS	Global positioning system
JEDC	Jacksonville Economic Development Commission
LUC	Land use control
MHSP&E	Ministry of Housing, Spatial Planning, and the Environment
NAGS	Naval Air Gunnery School
NAS	Naval Air Station
NAVFAC EFD SOUTH	Naval Facilities Engineering Command, Engineering Field Division South
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear aromatic hydrocarbon
QA	Quality assurance
QC	Quality control
SAR	Sampling and Analysis Report
SCTL	Soil Cleanup Target Level
SOP	Standard Operating Procedure
TRPH	Total recoverable petroleum hydrocarbons
TtNUS	Tetra Tech NUS, Inc.

UCL	Upper confidence limit
U.S. EPA	United States Environmental Protection Agency
YWWA	Yellow Water Weapons Area

1.0 INTRODUCTION

This Sampling and Analysis Report (SAR) for the Abandoned Railroad Bed North of Normandy Boulevard at Naval Air Station (NAS) Cecil Field in Jacksonville, Florida has been prepared by Tetra Tech NUS, Inc. (TtNUS) for the Department of the Navy, Naval Facilities Engineering Command, Engineering Field Division South (NAVFAC EFD SOUTH). 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.

1.1 SITE DESCRIPTION

The Navy operated a system of railroad tracks at NAS Cecil Field, including spurs and sidings, from the 1940s to 1983. The railroad cars distributed supplies and materials throughout the facility. When the system was closed in 1984, the railroad ties and tracks were removed. The tracks and ties were removed and, according to demolition drawings, the remaining ballast was reworked only as required to make areas disturbed by track demolition neat and uniform (Navy, 1986). The remaining physical evidence of the railroad includes the ballast, which is composed of large-sized gravel and cobbles, some elevated portions of the ballast, some contouring of the ground, and drainage swales and culverts associated with tracks. In the northernmost portion of the tracks, remaining ballast is approximately 12 inches thick and extends over a width of approximately 16 to 18 feet. Recently, there has been significant construction activity along the former railroad bed associated with the installation of buried utilities and construction of a road.

In general, railroad tracks may have elevated concentrations of certain contaminants as a result of routine operational activities. These contaminants may include polynuclear aromatic hydrocarbons (PAHs), total recoverable petroleum hydrocarbons (TRPH), and metals from fossil fuels used to power the engines and from ballast materials/ties used along the tracks. These elevated concentrations of contaminants do not constitute a release because they are a result of normal operating practices of the railroad.

As shown on Figures 1-1 and 1-2, the mainline of the abandoned railroad north of Normandy Boulevard runs generally north to south and to the east of most of the former operations in the Yellow Water Weapons Area (YWWA). The portion of the former railroad bed addressed by this document starts at the northern property boundary, about 8,000 feet to the north of Building 635, and extends southward to Normandy Boulevard. The spur adjacent to Building 635 has already been investigated and is excluded from consideration in this report (TtNUS, 2004a). The total length of abandoned railroad bed addressed by this document is approximately 23,000 feet.

There were three spurs from the mainline north of Normandy Boulevard. The first spur branched off to the east just south of property line and traveled about 2,300 feet and ran adjacent to the mainline until it rejoined the mainline. The second spur branched off to the south about 2,100 feet northwest of Building 635. The spur was parallel to the mainline at a distance of about 300 feet from the mainline, passed next to Building 635, and then rejoined the mainline about 1,700 feet southeast of Building 635 (TtNUS, 2004a). A third spur serviced the former Naval Air Gunnery School (NAGS) steam plant and branched off to the west starting at a point about 600 feet north of Normandy Boulevard. This spur, along with most of the NAGS buildings, was demolished in the 1950s and was not evaluated with the rest of the former railroad bed.

With the exception of the spur next to Building 635, the railroad bed north of Normandy Boulevard passed through undeveloped areas. In the reuse plan, land uses for areas adjacent to the abandoned railroad bed include new roads, manufacturing, commercial/office, educational, natural resource corridor, and wetland conservation. A road is planned over the railroad bed for the 8,000-foot section just north of Normandy Boulevard, and approximately 2,000 feet of the road has been constructed so far. A utility corridor and rail access are planned along the abandoned railroad bed from the northern connection of the Building 635 spur north to the property line. Figure 1-3 shows the proposed land uses adjacent to the railroad bed.

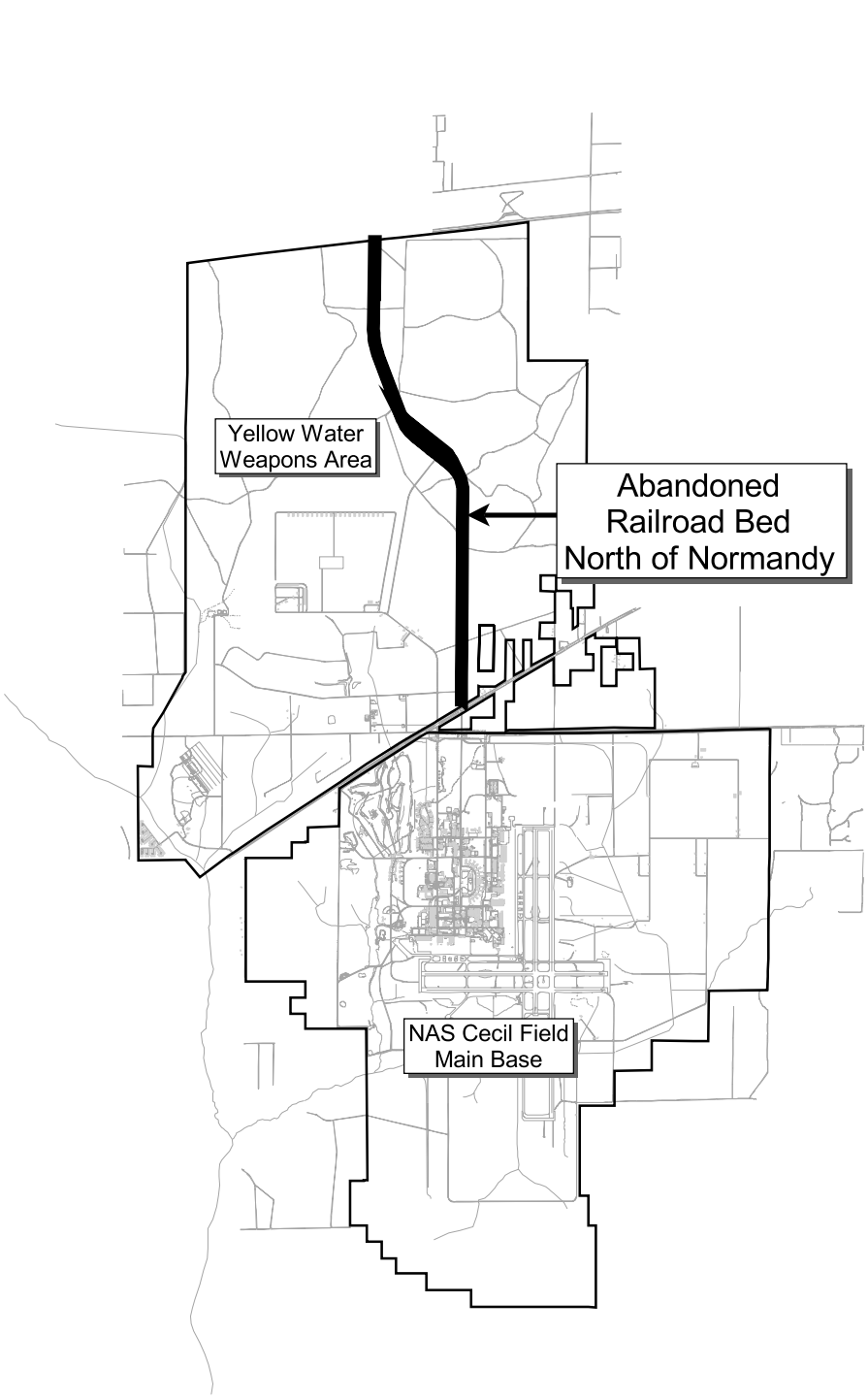
The Abandoned Railroad Bed was not specifically identified during the Environmental Baseline Survey (EBS) (ABB-ES, 1994), although individual buildings served by the railroad, such as Building 635, were evaluated in the EBS.

1.2 PREVIOUS INVESTIGATIONS

In 2000 and 2001, soil samples were collected at the Building 635 railroad loading dock site because of the increased potential for releases based on the activities conducted there including loading and unloading. Soil samples were analyzed for PAHs, pesticides, TRPH, and metals. PAHs and TRPH were determined to be contaminants of concern (COCs). The soil contamination associated with Building 635 was delineated, and contaminated soil was removed such that Florida Department of Environmental Protection (FDEP) industrial Soil Cleanup Target Levels (SCTLs) and leachability-to-groundwater SCTLs were met. In 2002, a shallow monitoring well was installed in the Building 635 area that confirmed that no COCs were present in the groundwater (TtNUS, 2004a).

In October 2001, 17 soil samples were collected for the Jacksonville Economic Development Commission (JEDC) along the mainline in both the Main Base area and YWWA (i.e., north and south of Normandy Boulevard) at an approximate 1,000-foot spacing to establish working conditions for construction activities planned along the former railbed. These samples were analyzed for PAHs based on the results at other

railbed sites. Samples CEF-RB-SS-001 through SS-007 were collected south of Normandy, and SS-008 through SS-017 were collected north of Normandy Boulevard. Sample results north of Normandy Boulevard are further described in Section 2.0 of this SAR.



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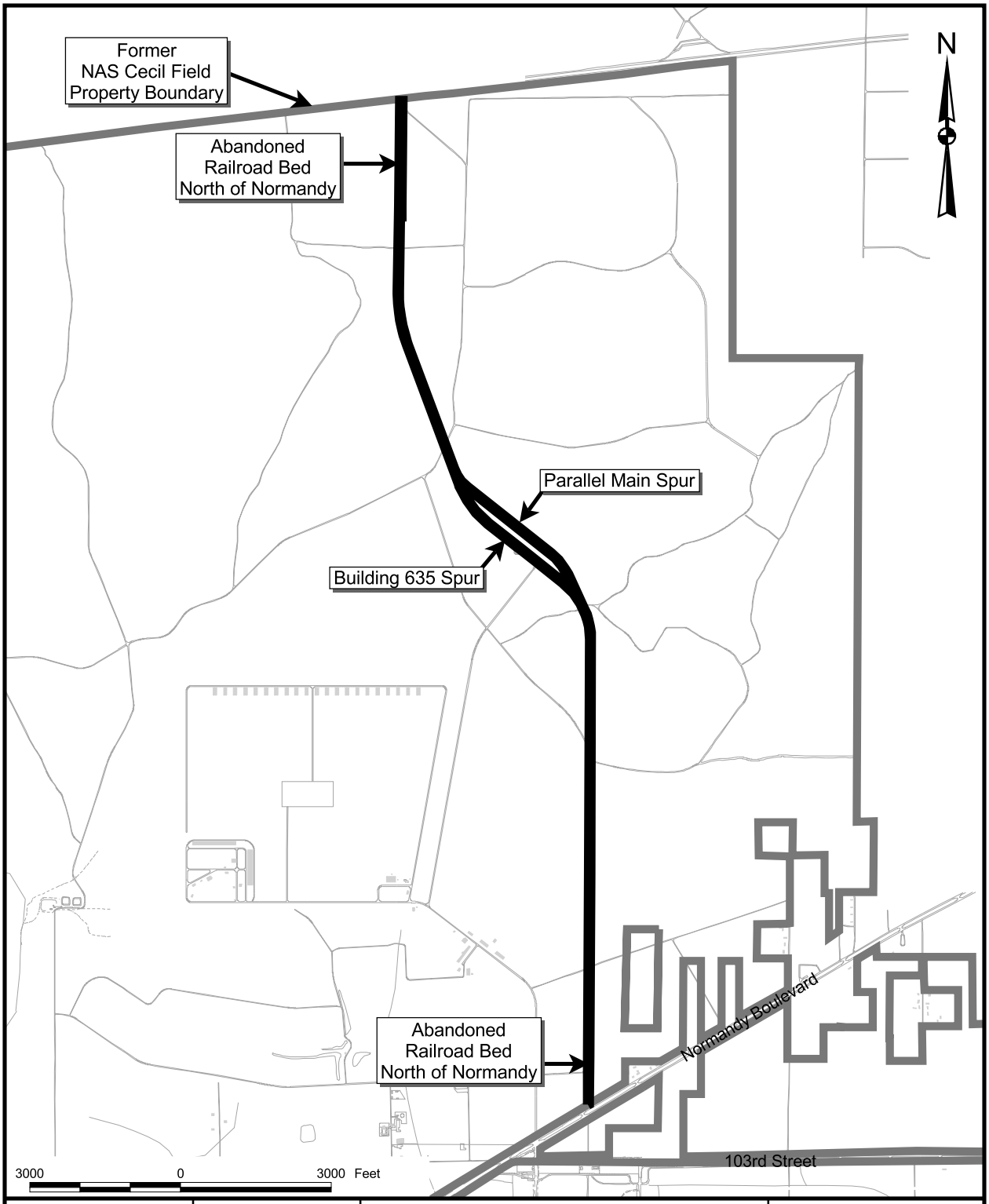

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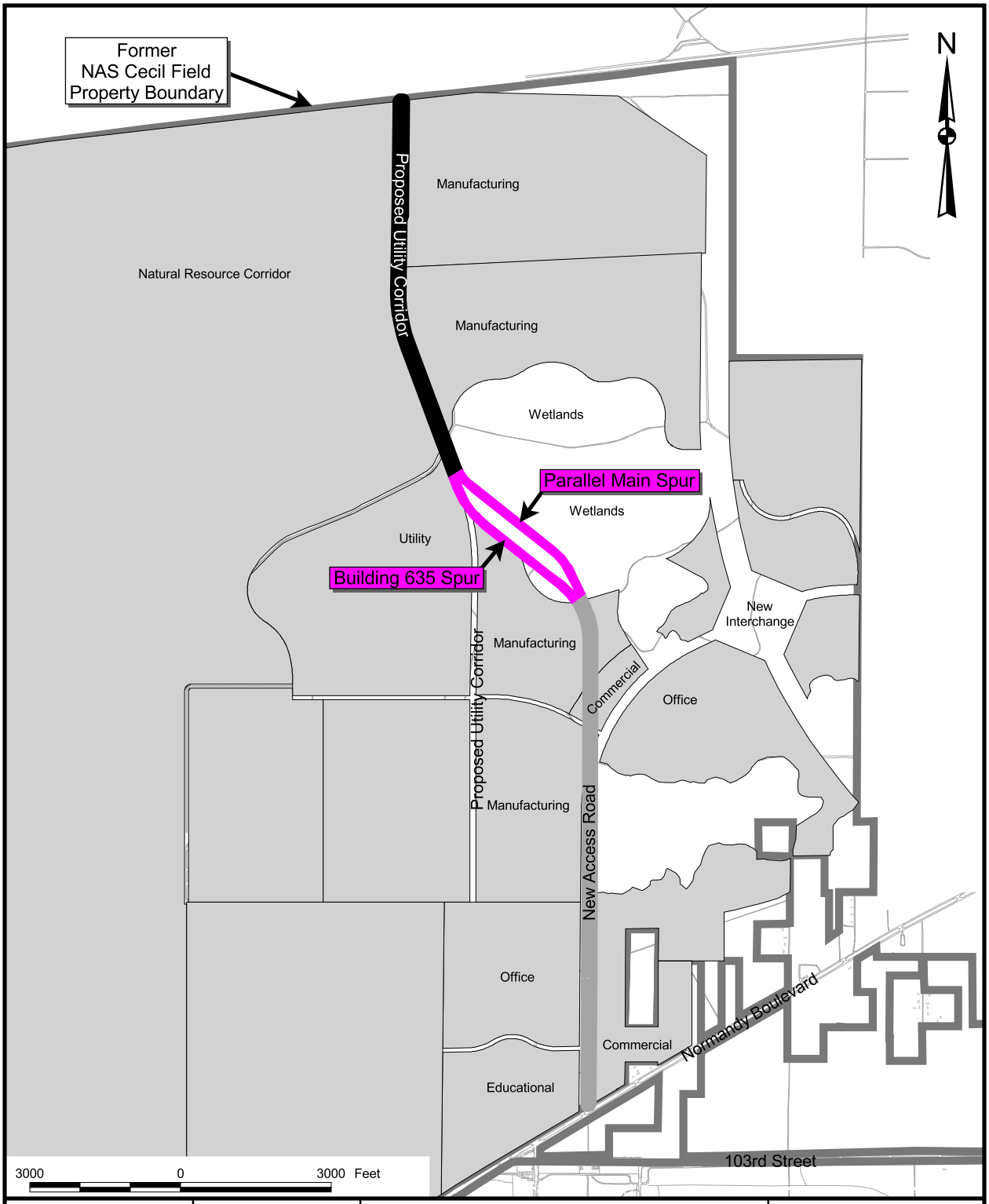

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2.0 FIELD INVESTIGATIONS

A total of 24 surface soil samples were collected at 19 locations along the Abandoned Railroad Bed North of Normandy Boulevard in four phases of investigation from October 2001 to July 2005. Sample locations are shown on Figure 3-1, and results are summarized in Table 3-1.

Phase I soil samples were collected along the abandoned railroad bed north and south of Normandy Boulevard in October 2001 by TtNUS under contract to J.A. Jones Global Services on behalf of JEDC. Samples collected north of Normandy Boulevard began approximately 700 feet north of Normandy Boulevard and then proceeded north at intervals of 1,000 feet thereafter. Ten soil samples were collected from beneath the ballast (CEF-RB-SS-008-02 through CEF-RB-SS-017-02) from about 1 to 2 feet below ground surface (bgs) (see Figure 2-1). Based on the results of sampling at other railroad sites, these samples were analyzed for PAHs only. In addition, one duplicate sample and one rinsate blank were collected and analyzed for PAHs.

After Phase I sampling was conducted, the Base Realignment and Closure (BRAC) Cleanup Team (BCT) agreed that because of the buried utility and roadway construction work to be performed by the City of Jacksonville on the railroad bed, post-construction samples would be collected at four previous locations where benzo(a)pyrene (BaP) concentrations exceeded the residential SCTL, and the most recent results would be used in the site evaluation. These construction activities included removal of ballast and mixing of existing surface soil and residual ballast with backfill and deep soil.

Based on the results of Phase I sampling and locations of subsequent construction activities, four locations (CEF-RB-SS-008, CEF-RB-SS-011, CEF-RB-SS-012, and CEF-RB-SS-017) were resampled during Phase II in February 2004. Prior to Phase II sampling activities, the ballast at these locations, which originally comprised the 0- to 1-foot bgs interval during October 2001 sampling, had been removed from the former railroad bed or mixed in with backfill materials in the area north of Normandy Boulevard. Phase II samples were collected from the existing 0- to 1-foot interval, which after construction activities, corresponded to the same depth interval as the 2001 samples.

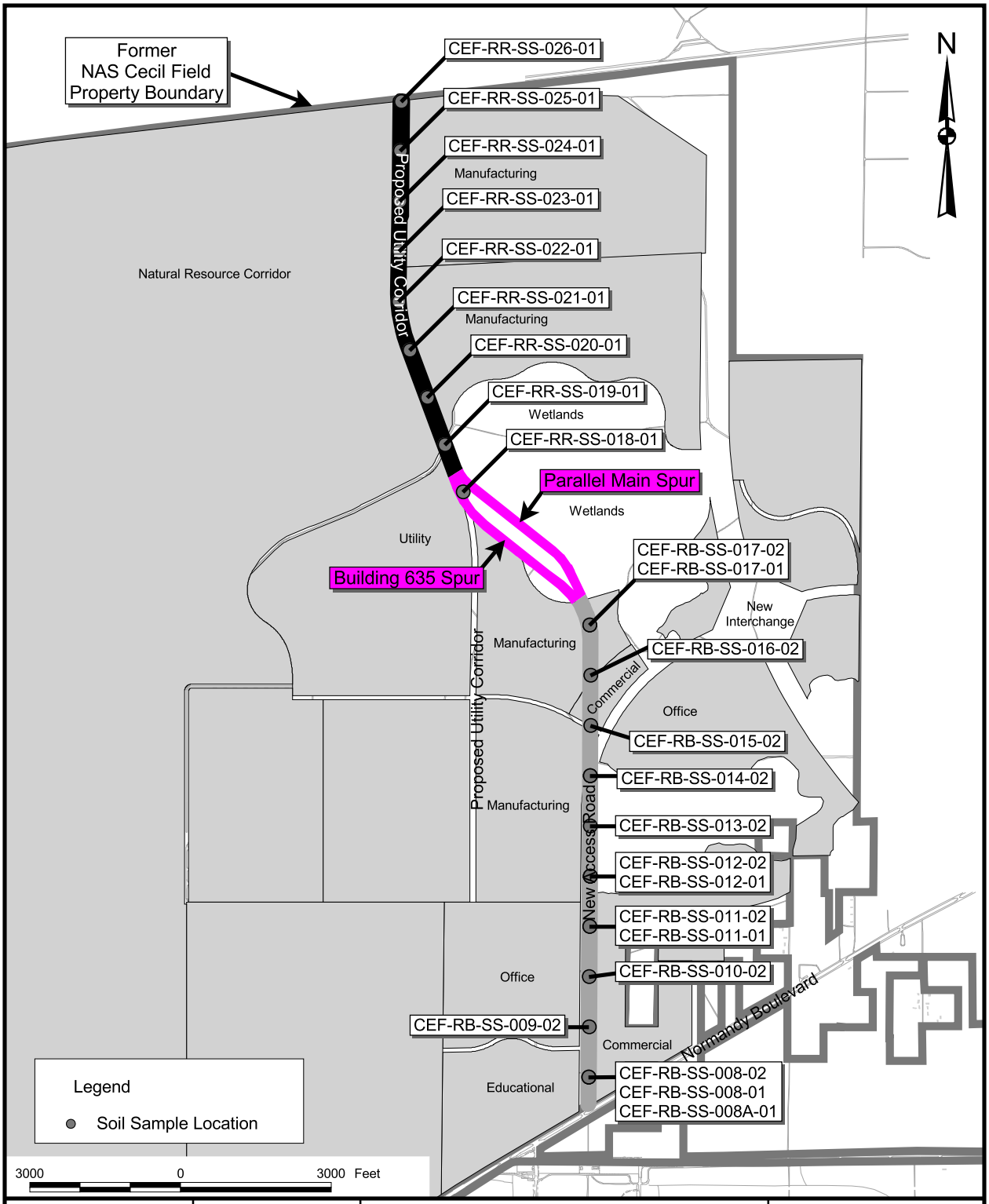
Following the Phase II event, additional construction activities took place in the CEF-RB-008 area, and CEF-RB-SS-008 was resampled again during Phase III sampling in June 2004. This post-construction sample was also collected from the 0- to 1-foot bgs interval.

During the June 2005 BCT Meeting, it was decided that samples would be collected north of the Building 635 area (which had not previously been sampled) to evaluate its proposed reuse as a recreational trail (BCT, 2005a). To evaluate risks associated with this area, it was decided that the most recent data from

samples CEF-RB-SS-008 through SS-017, south of the Building 635 area, would be combined with data from Phase IV samples collected at 1,000-foot intervals north of the Building 635 area. Phase IV sampling was conducted in July 2005 and included samples CEF-RB-SS-018 through SS-026 collected from 0 to 1 foot bgs.

All surface soil samples were collected as grab samples using plastic, disposable trowels. Sampling activities, quality assurance (QA)/quality control (QC) procedures, and data validation were performed in general agreement with the United States Environmental Protection Agency (U.S. EPA) Region 4 Environmental Investigations Standard Operating Procedures and Quality assurance Manual (EISPOQAM), FDEP Standard Operating Procedure (SOP) FS3000, the Remedial Investigation Report for Sites 36 and 37 (TtNUS, 1999), and TtNUS SOPs.

Soil samples were analyzed for PAHs using U.S. EPA Method SW-846 8310. ACCUTEST SouthEast in Orlando, Florida performed the analyses. The laboratory reports are included in Appendix A. Sample locations were surveyed using a global positioning system (GPS) unit.



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3.0 DATA EVALUATION

3.1 DATA EVALUATION

Table 3-1 presents analytical data for PAHs detected in at least one sample during this investigation. Figure 3-1 summarizes the results that exceed residential and industrial criteria. Complete laboratory analytical data for the samples are provided in Appendix A.

Contaminant concentrations in individual soil samples were compared to criteria in Florida Administrative Code (F.A.C.) Chapter 62-777 (FDEP, 2005b). Concentrations of carcinogenic PAHs (cPAHs) were converted to BaP equivalent (BaPEq) concentrations and compared to BaP SCTLs for direct exposure (residential and industrial). Leachability SCTLs are available for individual carcinogenic PAHs. If a specific cPAH was not detected in a sample, one-half of its detection limit was used in the calculation of BaPEqs. If no cPAHs were detected in a sample, one-half of the BaP detection limit was used as the BaPEq concentration. Non-cPAH results were compared to individual FDEP SCTLs for direct exposure and leachability to groundwater. Screening criteria are included in Table 3-1.

Unrestricted Section

Based on an initial evaluation of the data from Phases I and II sampling, it was determined that an approximately 4,250-foot section of the former railroad bed extending south from the Building 635 Section did not require land use controls (LUCs). This area is referred to as the Unrestricted Section on Figure 3-1 and includes the area between samples CEF-RB-SS-013 through SS-017. Phase I (October 2001) BaP and BaPEq concentrations at locations SS-013 through SS-016 were less than detection limits. Phase I BaP and BaPEq concentrations at SS-017 exceeded residential and industrial SCTLs. Location SS-017 was resampled during Phase II (February 2004) after construction activities in the area, and all detected concentrations were less than SCTLs.

Restricted Southern Section

Evaluation of the remaining section of former railroad bed between the Building 635 Section and Normandy Boulevard, referred to as the Restricted Southern Section on Figure 3-1, includes the area from samples CEF-RB-SS-008 through SS-012.

Location SS-008 was sampled during Phase I (October 2001), Phase II (February 2004), and Phase III (June 2004). During Phases I and II, concentrations of BaP and BaPEqs were greater than residential and industrial SCTLs. Phase III BaP and BaPEq concentrations were greater than residential SCTLs and less than industrial SCTLs. Locations CEF-RB-SS-009 and SS-010 were sampled during Phase I only.

At location SS-009, BaP and BaPEq concentrations exceeded residential SCTLs. PAH concentrations at location SS-010 were less than detection limits. Locations SS-011 and SS-012 were sampled during Phase I and Phase II. Based on Phase II data from these locations, benzo(a)anthracene concentrations exceeded its leachability-to-groundwater criterion, and BaP and BaPEq concentrations exceeded residential and industrial SCTLs.

Northern Restricted Section

Sampling was conducted north of the Building 635 Section, referred to as the Northern Restricted Section on Figure 3-1, during Phase IV only, and samples collected included CEF-RB-SS-018 through SS-026.

Benzo(a)anthracene concentrations exceeded its leachability-to-groundwater SCTL in seven of the nine samples collected in the Northern Restricted Section. BaP concentrations exceeded its residential SCTL in one sample and exceeded residential and industrial SCTLs in the other eight of nine samples. Benzo(b)fluoranthene concentrations exceeded its leachability SCTL in seven of nine samples, and dibenzo(a)anthracene concentrations exceeded its leachability SCTL in two of nine samples. BaPEq concentrations exceeded residential and industrial SCTLs in all nine samples collected in the Northern Restricted Area.

Leachability Exceedances

Concentrations of PAHs exceeding leachability SCTLs in railroad bed samples evaluated as part of this report were less than leachability exceedances associated with the Building 635 evaluation (TtNUS, 2004a). A groundwater monitoring well was installed in the Building 635 area near the locations of soil samples with the greatest concentrations of PAHs. PAHs were not detected in the groundwater sample collected from this well. Based on this information, it was decided at the August 2005 BCT meeting that groundwater sampling to evaluate leachability exceedances would not be required for the Abandoned Railroad Bed North of Normandy (BCT, 2005b).

3.2 HUMAN HEALTH RISK EVALUATION

Contaminant concentrations in soil samples were compared to direct contact and leachability-to-groundwater SCTLs in F.A.C. Chapter 62-777 (FDEP, 2005b) and to site-specific recreational and construction/utility worker SCTLs developed using exposure parameters agreed upon by the BCT and based on future use assumptions about the site. Table 3-2 presents a summary of exposure parameters used to calculate the site-specific SCTLs, and Appendix B includes more detailed calculation information. Based on the information in Table 3-2 and Appendix B, the site-specific recreational and

construction/utility worker SCTLs for the Abandoned Railroad Bed North of Normandy Boulevard are 1,090 and 3,060 µg/kg, respectively.

Unrestricted Section

PAH concentrations in samples from this area did not exceed residential or industrial SCTLs; therefore, no further evaluation associated with human health risk is required.

Restricted Southern Section

BaPEq concentrations in samples collected in this area exceeded direct contact SCTLs for residential and industrial exposure and the site-specific recreational SCTL. However, concentrations did not exceed the site-specific construction/utility worker SCTL of 3,060 µg/kg. Based on this information, human health risks are acceptable if land uses in this area are restricted to construction/utility activities.

Restricted Northern Section

To evaluate human health risks for the portion of the former railroad bed north of the Building 635 area, the 95-percent upper confidence limit (UCL) of the mean BaPEq concentration [calculated using the Florida UCL (FL-UCL) tool] was used to represent the exposure concentration of cPAHs along this section of the former railroad bed. Samples utilized in the BaPEq UCL calculations, as agreed on by the BCT, included the most recent results from samples collected south of the Building 635 area (from locations CEF-RB-SS-008 through SS-017) and the Phase IV samples collected in July 2004 from the area north of the Building 635 area (from locations CEF-RB-SS-018 through 26) (see Table 3-3 and Figure 2-1). The BaPEq UCL calculated using FL-UCL was 2,674 µg/kg, as presented in Table 3-4. Because the BaPEq UCL for this portion of the site was less that the site-specific construction/utility worker SCTL (3,060 µg/kg), this section of the former railroad bed from the northern property boundary to the northern boundary of the Building 635 area is acceptable for utility/construction purposes.

3.3 ECOLOGICAL RISK EVALUATION

An ecological risk assessment was conducted to evaluate potential site-related risks to ecological receptors on the Abandoned Railroad Bed North of Normandy Boulevard. The ecological risk assessment consisted of Steps 1 through 3A of U.S. EPA's 8-step ecological risk assessment process, and was conducted in accordance with U.S. EPA and Navy guidance (U.S. EPA, 1997, 2000a, and 2001; Navy, 1999). Steps 1 through 3A consist of the following:

Step 1	Screening-Level Problem Formulation and Ecological Effects Evaluation
Step 2	Screening-Level Exposure Estimate and Risk Calculation
Step 3A	Refinement of Preliminary Chemicals of Potential Concern (COPCs)

3.3.1 Step 1: Screening-Level Problem Formulation and Ecological Effects Evaluation

The site consists of an abandoned railroad bed that extends approximately 4 miles north from Normandy Boulevard. The railroad bed was constructed along the top of a berm that was created for this purpose. The upper 1 to 2 feet of soil along the abandoned railroad bed consists primarily of gravel and cobbles. The 8,000-foot section immediately north of Normandy Boulevard has been cleared of vegetation in preparation for a road that is being constructed atop the abandoned railroad bed. Vegetation on uncleared portions of the berm is a mixture of various grasses and weedy species such as Spanish needle (*Bidens pilosa*), broomsedge (*Andropogon virginicus*), and goldenrod (*Solidago* spp.) and shrubby species such as blackberry (*Rubus* spp.), groundsel bush (*Baccharis halimifolia*), St John's wort (*Hypericum* spp.), yaupon holly (*Ilex vomitoria*), wax myrtle (*Myrica cerifera*), gallberry (*Ilex glabra*), and saw palmetto (*Serenoa repens*). The topography beyond the berm is mostly flat.

The abandoned railroad bed immediately north of Normandy Boulevard passes through pine flatwoods habitat. North of Building 635, the abandoned railroad bed passes through an area that was formerly pine flatwoods and scattered cypress dome wetlands, but most of the pine flatwoods area has been logged and/or burned in recent years so that few trees currently exceed 10 feet in height. Wildlife that utilize habitats surrounding the railroad bed consist of birds, mammals, reptiles, and amphibians that are typically found in forested habitats of the region.

The preliminary assessment endpoints for this ecological risk assessment were adverse effects of chemicals on growth, survival, and reproduction of ecological receptors. The preliminary measurement endpoints were chemical concentrations in surface soil associated with adverse effects on growth, survival, and reproduction of soil-dwelling organisms.

3.3.2 Step 2: Screening-Level Exposure Estimate and Risk Calculation

Maximum concentrations of PAHs detected in surface soil samples were compared to ecological screening values (ESVs) established by U.S. EPA Region 4 (U.S. EPA, 2000b and 2001). Most surface soil samples were collected from depths of 0 to 1 feet, but a few were collected from depths of 0 to 2 feet. PAHs with maximum concentrations that did not exceed screening values were dropped from further consideration, and PAHs with concentrations that exceeded screening values (or did not have screening values) were retained as ecological COPCs.

Soil data for this evaluation consist of 19 samples collected from the abandoned railroad bed north of Normandy Boulevard (Figure 3-1). Concentrations of BaP, fluoranthene, phenanthrene, and pyrene exceeded ESVs in one or more samples, and concentrations of total PAHs (defined as the sum of detected individual PAHs) in some samples also exceeded the ESV for total PAHs (Table 3-5). ESVs were not available for seven PAHs detected in surface soils (Table 3-5).

3.3.3 Step 3A: Refinement of Preliminary Chemicals of Potential Concern

Subsequent to the initial screening, other factors are typically considered to further refine COPCs. Such factors include food-chain modeling, habitat quality, area use factors, frequency of detection, background concentrations, and comparisons of COPCs to alternate guidelines (U.S. EPA, 1997 and 2000b; Navy, 1999). These are discussed below.

3.3.3.1 Step 3A Discussion

PAHs show little tendency to bioconcentrate or biomagnify in the food web (Eisler, 2000). U.S. EPA Region 4 considers the potential toxicity of PAHs in the terrestrial food web to be generally negligible unless PAHs are present at extremely high concentrations (i.e., percent levels: 10,000,000 µg/kg) in soil. Because PAH concentrations in soil samples from the site are significantly less than percent levels, toxicity to upper-level receptors (e.g., birds and mammals) from bioconcentration is not expected, and food-chain modeling to investigate potential risks from ingested PAHs was not conducted.

PAHs can be toxic to fish and other aquatic organisms. However, the exposure pathway for site-related contaminants is essentially incomplete for aquatic organisms. The abandoned railroad bed is atop a berm constructed of packed cobble in such a manner that erosion would be minimal. Because of this and because vegetation covers most of the sloped sides of the berm, the potential for surface runoff of soil contaminants through erosion is minimal. Furthermore, the flat character of the terrain beyond the former railroad bed reduces overland flow and surface runoff. Previous evaluation of groundwater data has confirmed that infiltration of contaminants into groundwater is negligible at the site (see Section 3.1). For the above reasons, surface soil is the only potential exposure medium for ecological receptors at the site.

Direct toxicity of PAHs to birds, mammals, reptiles, and amphibians at the site is considered to be negligible due to the compacted character of the soils along the former railroad bed. Field personnel noted during soil sampling that the soil along the berm is largely comprised of crushed rock and gravel, and is considerably compacted along the entire abandoned railroad bed. Few animals would dig into the soils to any appreciable extent. Thus, dermal and oral exposure to upper-level receptors is probably negligible. PAH-induced phytotoxic effects (i.e., toxicity to plants) are rare (Eisler, 2000). Overall, the soil-to-invertebrate pathway is assumed to be the primary pathway of exposure to PAHs at the site.

Ecologically based toxicity values are sparse for PAHs in soil. U.S. EPA Region 4 has established screening values for only 4 of the 11 PAHs detected on the Abandoned Railroad Bed North of Normandy Boulevard (Table 3-5). The Region 4 screening values for BaP, fluoranthene, phenanthrene, and pyrene are based on values established in the Netherlands during the 1980s. FDEP has no ecologically based soil criteria. In 1994, the Dutch modified their screening values for total PAHs, establishing a "target" value of 1,000 μg/kg and an "intervention" value of 40,000 μg/kg (MHSP&E, 1994). The Dutch target values represent clean soil, and intervention values represent seriously contaminated soil. The concentration midway between the target value and the intervention value (20,500 µg/kg) was designated as the "intermediate" value. The Dutch guidelines specify that concentrations greater than the target value but less than the intermediate value require no further investigation (but minor restrictions may be applied on soil use), and further investigation is required when concentrations exceed the intermediate value but are less than the intervention value (Swartjes, 1999). The 20,500 µg/kg intermediate value is very near the ecological screening value of 20,800 µg/kg for total PAHs calculated by Lingenfelser (2000) for assessing risk to soil invertebrates. Lingenfelser's screening value was derived using toxicity equivalency factors and was based on a study by Neuhauser et al. (1986) in which the effects of fluorene were evaluated using four species of earthworms. The similarity of Lingenfelser's screening value relative to the Dutch intermediate value provides credence for use of the Dutch value as a conservative screening threshold for evaluating risk from total PAHs.

Concentrations of phenanthrene exceeded its ESV in only one sample. Total PAH concentrations exceeded the ESV in 12 samples. Concentrations of BaP, fluoranthene, and pyrene exceeded their ESVs in the same 12 samples in which total PAH concentrations were elevated, plus BaP exceeded its ESV in one additional sample. Therefore, based on Region 4 ecological screening values, PAHs might pose risk to soil invertebrates in the vicinity of 12 or 13 samples.

Concentrations were greatest in the northern portion of the Abandoned Railroad Bed North of Normandy Boulevard where total PAH concentrations exceeded the Dutch intermediate value of 20,500 µg/kg in six samples: SS-19, SS-22, SS-23, SS-24, SS-25, and SS-26 (Table 3-1). PAH concentrations were highest in sample SS-24, which had a total PAH concentration of 37,693 µg/kg. As mentioned earlier, total PAH concentrations in Table 3-5 were derived as the sum of all detected individual PAHs. It should be noted, however, that the Dutch intermediate value for total PAHs is based on the sum of 10 PAHs [anthracene, benzo(a)anthracene, benzo(k)fluoranthene, BaP, chrysene, phenanthrene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, and benzo(g,h,i)perylene] (MHSP&E, 2000). The sum of the same 10 "Dutch" PAHs would exceed the Dutch intermediate value only in sample SS-24 at 25,395 µg/kg.

In summary, potential ecological risk from PAHs is largely limited to soil invertebrates. Invertebrate-based toxicity values are sparse for PAHs in soil, but measured concentrations in sample SS-24 and possibly five or more other samples indicate potential PAH risk to soil invertebrates. Due to soil conditions, adverse toxicological impacts could be lower than indicated by PAH data. Specifically, densely packed cobble and gravel comprise the soil along the Abandoned Railroad Bed North of Normandy Boulevard; these conditions presumably result in fewer invertebrates than in more “normal” soil, and thus lower exposure to PAHs than would be expected under other conditions. This is somewhat speculative, however, and the PAH concentrations do indicate potential risk to soil invertebrates. PAH concentrations at the Abandoned Railroad Bed North of Normandy Boulevard are similar to those in urban areas, which typically range from 1,000 to 45,000 µg/kg based on a compilation of several sources (U.S. EPA, 2003). This is not to say that PAH concentrations at the site are due to urban sources, only that concentrations (and potential risks) are similar to those in urban areas and/or along highways.

3.3.3.2 Uncertainty Analysis

Uncertainties are associated with several aspects of ecological risk assessments. A summary of the specific uncertainties associated with this ecological risk assessment follows.

The reporting limits of fluoranthene, phenanthrene, and pyrene in some non-detect samples were as high as 800 µg/kg (and were typically 390 µg/kg), which exceeded their ESV of 100 µg/kg. This issue is not considered to be a significant flaw in the risk assessment because detection limits of other non-detected analytes were much lower, typically 78 to 80 µg/kg.

The issue of non-detected concentrations also results in some uncertainty regarding the method of calculating total PAH concentrations. Total PAHs were defined as the sum of detected individual PAHs (i.e., non-detects were not included). Some PAHs were not detected, and there is no ideal approach for calculating total PAH concentrations. Uncertainty will exist if non-detected PAHs are assigned concentrations of 0, one-half the reporting limit, or any other value. In addition, there is no standard list of PAHs with which to calculate total PAH concentrations. The Region 4 ecological screening value for total PAHs is based on Dutch guidelines in which only 10 PAHs were used to define total PAHs. The reason for selecting these 10 specific compounds is unclear.

There is some uncertainty associated with the extent to which soils at the site are utilized by ecological receptors. The tightly compacted soil and high gravel/rock content presumably results in low usage by digging and burrowing wildlife and poor habitat for soil invertebrates, especially in comparison to soils in adjacent areas.

3.3.4 Ecological Risk Summary and Conclusions

A screening level ecological risk assessment was performed for the Abandoned Railroad Bed North of Normandy Boulevard. PAH compounds were detected in surface soil at concentrations that exceeded conservative screening values, and some PAHs without screening values were detected. These COPCs were assessed in Step 3A of the risk assessment.

PAH compounds do not significantly bioaccumulate or biomagnify in higher organisms at the concentrations observed here. Therefore, PAH concentrations at the site pose negligible risk via the food chain to upper-level receptors such as mammals, birds, reptiles, and amphibians. Exposure to aquatic organisms though erosion is probably negligible. PAH concentrations at the Abandoned Railroad Bed North of Normandy Boulevard are similar to those in urban areas, and potential PAH-related risks are limited to soil invertebrates. However, potential risk is mitigated to some extent by the densely packed gravel and cobble along the Abandoned Railroad Bed, resulting in poor soil conditions for most invertebrates. This suggests that potential risk to soil invertebrates is minor at worst.

TABLE 3-1

SOIL PAH DATA
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
SAMPLING AND ANALYSIS REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	FDEP SCTL[1]			CEF-RB-				
				SS-008				
	Residential Direct Exposure	Industrial Direct Exposure	Leachability to Groundwater	SS-008-02 Phase I	SS-008-01 Phase II	SS-008A-01 Phase III	SS-009-02 Phase I	SS-010-02 Phase I
Polynuclear Aromatic Hydrocarbons (µg/kg)								
Benzo(a)antharacene	#	#	800	**557 J**	**2,460***	**216 J**	390 UJ	390 UJ
Benzo(a)pyrene	100	700	8,000	**845 J**	**3,300**	**153 J**	**128 J**	78 UJ
Benzo(b)fluoranthene	#	#	2,400	**694 J**	**3,840***	**228 J**	**118 J**	78 UJ
Benzo(g,h,i)perylene	2,500,000	52,000,000	32,000,000	**565 J**	**2,570**	**89.7 J**	**128 J**	78 UJ
Benzo(k)fluoranthene	#	#	24,000	**494 J**	**2,230**	**161 J**	**93.6 J**	78 UJ
Chrysene	#	#	77,000	**840 J**	**3,400**	**217 J**	390 UJ	390 UJ
Dibenzo(a,h)anthracene	#	#	700	150 UJ	**676**	**25.7 J**	79 UJ	78 UJ
Fluoranthene	3,200,000	59,000,000	1,200,000	**1280 J**	**6,400**	**876 J**	390 UJ	390 UJ
Indeno(1,2,3-cd)pyrene	#	#	6,600	**564 J**	**2,230**	**146 J**	**95.8 J**	78 UJ
Phenanthrene	2,200,000	36,000,000	250,000	770 UJ	**832**	190 UJ	390 UJ	390 UJ
Pyrene	2,400,000	45,000,000	880,000	**1350 J**	**6,150**	**536 J**	390 UJ	390 UJ
Benzo(a)pyrene equivalents	100	700	NC	**1,107**	**4,855**	**240**	**210**	39**

TABLE 3-1

SOIL PAH DATA
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
SAMPLING AND ANALYSIS REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	FDEP SCTL[1]			CEF-RB-				
	Residential Direct Exposure	Industrial Direct Exposure	Leachability to Groundwater	SS-011		SS-012-01		
				SS-011-02 Phase I	SS-011-01 Phase II	SS-012-02 Phase I	SS-012-01, Phase II Sample	SS-012-01, Phase II Duplicate
Polynuclear Aromatic Hydrocarbons (µg/kg)								
Benzo(a)antharacene	#	#	800	1,400 UJ	**1,470***	**1,600 J***	**2,980 J***	**418 J**
Benzo(a)pyrene	100	700	8,000	**882 J**	**1,950**	**2240 J**	**1,990 J**	**570 J**
Benzo(b)fluoranthene	#	#	2,400	**932 J**	**2,050**	**2,410 J***	**2,050 J**	**610 J**
Benzo(g,h,i)perylene	2,500,000	52,000,000	32,000,000	**861 J**	**1,480**	**1,990 J**	**1,300 J**	**503 J**
Benzo(k)fluoranthene	#	#	24,000	**698 J**	**1,230**	**1,900 J**	**1,190 J**	**309 J**
Chrysene	#	#	77,000	**1,150 J**	**1,280**	**3,970 J**	**3,160 J**	**447 J**
Dibenzo(a,h)anthracene	#	#	700	280 UJ	**438**	720 UJ	**306 J**	**154 J**
Fluoranthene	3,200,000	59,000,000	1,200,000	**2,820 J**	**2,670**	**11,300 J**	**6,670 J**	**771 J**
Indeno(1,2,3-cd)pyrene	#	#	6,600	**670 J**	**1,170**	**1,850 J**	**1,020 J**	**406 J**
Phenanthrene	2,200,000	36,000,000	250,000	**830 J**	360 U	**3,030 J**	740 U	190 U
Pyrene	2,400,000	45,000,000	880,000	**2,420 J**	**2,850**	**9,030 J**	**5,020 J**	**665 J**
Benzo(a)pyrene equivalents	100	700	NC	**1,260**	**2,871**	**3,209**	**2916**	**871**

TABLE 3-1

SOIL PAH DATA
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
SAMPLING AND ANALYSIS REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	FDEP SCTL[1]			CEF-RB-				
	Residential Direct Exposure	Industrial Direct Exposure	Leachability to Groundwater	SS-013-02 Phase I	SS-014-02, Phase I		SS-015-02 Phase I	SS-016-02 Phase I
					Sample	Duplicate		
Polynuclear Aromatic Hydrocarbons (µg/kg)								
Benzo(a)antharacene	#	#	800	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ
Benzo(a)pyrene	100	700	8,000	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ
Benzo(b)fluoranthene	#	#	2,400	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ
Benzo(g,h,i)perylene	2,500,000	52,000,000	32,000,000	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ
Benzo(k)fluoranthene	#	#	24,000	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ
Chrysene	#	#	77,000	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ
Dibenzo(a,h)anthracene	#	#	700	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ
Fluoranthene	3,200,000	59,000,000	1,200,000	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ
Indeno(1,2,3-cd)pyrene	#	#	6,600	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ
Phenanthrene	2,200,000	36,000,000	250,000	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ
Pyrene	2,400,000	45,000,000	880,000	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ
Benzo(a)pyrene equivalents	100	700	NC	39**	39.5**	39.5**	40**	37**

TABLE 3-1

SOIL PAH DATA
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
SAMPLING AND ANALYSIS REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	FDEP SCTL[1]			CEF-RB-			
	Residential Direct Exposure	Industrial Direct Exposure	Leachability to Groundwater	SS-017		SS-018-01 Phase IV	SS-019-01 Phase IV
				SS-017-02 Phase I	SS-017-01 Phase II		
Polynuclear Aromatic Hydrocarbons (µg/kg)							
Benzo(a)antharacene	#	#	800	**3,040 J***	91 U	**1,180 J***	**1,530***
Benzo(a)pyrene	100	700	8,000	**4010 J**	**30.9 J**	**2,000**	**2,120**
Benzo(b)fluoranthene	#	#	2,400	**3,750* J**	**41.4 J**	**3,010***	**3,440***
Benzo(g,h,i)perylene	2,500,000	52,000,000	32,000,000	**3,260 J**	**34.9 J**	**2,810**	**2,120**
Benzo(k)fluoranthene	#	#	24,000	**3,150 J**	**24.8 J**	**1,640**	**2,250**
Chrysene	#	#	77,000	**7,150 J**	91 U	**1,370 J**	**1,360 J**
Dibenzo(a,h)anthracene	#	#	700	750 UJ	18 U	**392**	**609**
Fluoranthene	3,200,000	59,000,000	1,200,000	**6,690 J**	91 U	**2,030**	**3,270**
Indeno(1,2,3-cd)pyrene	#	#	6,600	**2,740 J**	**26.9 J**	**2,530**	**2,250**
Phenanthrene	2,200,000	36,000,000	250,000	3,700 UJ	190 U	740 U	730 U
Pyrene	2,400,000	45,000,000	880,000	**7,420 J**	91 U	**2,110**	**3,660**
Benzo(a)pyrene equivalents	100	700	NC	**5,377**	**52**	**3,082**	**3,475**

TABLE 3-1

SOIL PAH DATA
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
SAMPLING AND ANALYSIS REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	FDEP SCTL[1]			CEF-RB-			
	Residential Direct Exposure	Industrial Direct Exposure	Leachability to Groundwater	SS-020-01 Phase IV	SS-021-01 Phase IV	SS-022-01 Phase IV	SS-023-01 Phase IV
Polynuclear Aromatic Hydrocarbons (µg/kg)							
Benzo(a)antharacene	#	#	800	**298 J**	**425 J**	**1,890***	**1,650***
Benzo(a)pyrene	100	700	8,000	**467**	**956**	**2,640**	**2,640**
Benzo(b)fluoranthene	#	#	2,400	**696**	**1,320**	**3,220***	**3,050***
Benzo(g,h,i)perylene	2,500,000	52,000,000	32,000,000	**608**	**1,180**	**2,720**	**2,280**
Benzo(k)fluoranthene	#	#	24,000	**374**	**553**	**1,530**	**1,300**
Chrysene	#	#	77,000	**252 J**	**744 J**	**1,970**	**1,400**
Dibenzo(a,h)anthracene	#	#	700	**103**	**451**	**684**	**771***
Fluoranthene	3,200,000	59,000,000	1,200,000	**563**	**1,300 J**	**3,520**	**1,830 J**
Indeno(1,2,3-cd)pyrene	#	#	6,600	**473**	**1,070**	**2,340**	**2,130**
Phenanthrene	2,200,000	36,000,000	250,000	210 U	790 U	780 U	750 U
Pyrene	2,400,000	45,000,000	880,000	**781**	**1,460 J**	**3,720**	**3,940**
Benzo(a)pyrene equivalents	100	700	NC	**721**	**1,695**	**4,086**	**4,108**

TABLE 3-1

SOIL PAH DATA
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
SAMPLING AND ANALYSIS REPORT
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	FDEP SCTL[1]			CEF-RB-			
	Residential Direct Exposure	Industrial Direct Exposure	Leachability to Groundwater	SS-024-01, Phase IV		SS-025-01 Phase IV	SS-026-01 Phase IV
				Sample	Duplicate		
Polynuclear Aromatic Hydrocarbons (µg/kg)							
Benzo(a)antharacene	#	#	800	**2,720***	**2,520***	**1,590 J***	**1,970***
Benzo(a)pyrene	100	700	8,000	**4,740**	**3,680**	**2,570**	**2,630**
Benzo(b)fluoranthene	#	#	2,400	**5,200***	**4,520***	**3,230***	**3,790***
Benzo(g,h,i)perylene	2,500,000	52,000,000	32,000,000	**4,520**	**3,660**	**2,740**	**2,930**
Benzo(k)fluoranthene	#	#	24,000	**2,340**	**1,920**	**1,410**	**2,280**
Chrysene	#	#	77,000	**3,520**	**2,860**	**2,120**	**1,760**
Dibenzo(a,h)anthracene	#	#	700	**977***	**758***	**482**	**602**
Fluoranthene	3,200,000	59,000,000	1,200,000	**7,330**	**4,430**	**2,920**	**3,180**
Indeno(1,2,3-cd)pyrene	#	#	6,600	**3,610**	**2,940**	**2,100**	**2,900**
Phenanthrene	2,200,000	36,000,000	250,000	**1,970**	800 U	780 U	770 U
Pyrene	2,400,000	45,000,000	880,000	**6,100**	**4,670**	**3,430**	**3,660**
Benzo(a)pyrene equivalents	100	700	NC	**6,897**	**5,458**	**3,760**	**4,123**

1 Florida Department of Environmental Protection (FDEP) Soil Cleanup Target Levels (SCTLs) (FDEP, 2005b).
U = Not detected at associated detection limit.
J = Estimated concentration.
Bolded values exceed detection limit.
Gray-shaded cells indicate an exceedance of residential but not industrial SCTL.
Black-shaded cells indicate exceedance of residential and industrial SCTLs.
* = Concentration exceeds leachability SCTL.
# = Based on Florida Administrative Code (F.A.C.) 62-777, site concentrations of carginogenic polynuclear aromatic hydrocarbons (PAHs) are converted to benzo(a)pyrene equivalents (BaPEqs) before comparison to benzo(a)pyrene (BaP) SCTLs (FDEP, 2005a)
NC = No criterion.
** = One-half of the BaP detection limit was used as the BaPEq concentration if no carcinogenic PAHs were detected in a sample.

TABLE 3-2

EXPOSURE PARAMETERS FOR CALCULATION OF SITE-SPECIFIC SCTLs
SAMPLING AND ANALYSIS REPORT
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Exposure Parameter	Recreational	Utility Worker	Construction Worker
Body Weight (kg)	35	76.1	76.1
Exposure Frequency (d/yr)	50	10	180
Exposure Duration (yr)	20	25	1
Ingestion Rate (mg/day)	50	330	330
Adherance Factor (mg/cm^2)	0.07	0.2	0.2

SCTLs = Florida Department of Environmental Protection Soil Cleanup Target Levels (2005b).

TABLE 3-3

SOIL PAH DATA USED FOR HUMAN HEALTH RISK EVALUATION
SAMPLING AND ANALYSIS REPORT
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	FDEP SCTL[1]			CEF-RB-					
	Residential Direct Exposure	Industrial Direct Exposure	Leachability to Groundwater	SS-008A-01 Phase III	SS-009-02 Phase I	SS-010-02 Phase I	SS-011-01 Phase II	SS-012-01, Phase II	
								Sample	Duplicate
Polynuclear Aromatic Hydrocarbons (µg/kg)									
Benzo(a)antharacene	#	#	800	**216 J**	390 U	390 UJ	**1470***	**2,980 J***	**418 J**
Benzo(a)pyrene	100	700	8,000	**153 J**	**128**	78 UJ	**1,950**	**1,990 J**	**570 J**
Benzo(b)fluoranthene	#	#	2,400	**228 J**	**118**	78 UJ	**2,050**	**2,050 J**	**610 J**
Benzo(g,h,i)perylene	2,500,000	52,000,000	32,000,000	**89.7 J**	**128**	78 UJ	**1,480**	**1,300 J**	**503 J**
Benzo(k)fluoranthene	#	#	24,000	**161 J**	**93.6**	78 UJ	**1,230**	**1,190 J**	**309 J**
Chrysene	#	#	77,000	**217 J**	390 U	390 UJ	**1,280**	**3,160 J**	**447 J**
Dibenzo(a,h)anthracene	#	#	700	**25.7 J**	79 U	78 UJ	**438**	**306**	**154 J**
Fluoranthene	3,200,000	59,000,000	1,200,000	**876 J**	390 U	390 UJ	**2,670**	**6,670 J**	**771 J**
Indeno(1,2,3-cd)pyrene	#	#	6,600	**146 J**	**95.8**	78 UJ	**1,170**	**1,020 J**	**406 J**
Phenanthrene	2,200,000	36,000,000	250,000	190 UJ	390 U	390 UJ	360 U	740 U	190 U
Pyrene	2,400,000	45,000,000	880,000	**536 J**	390 U	390 UJ	**2,850**	**5,020 J**	**665 J**
Benzo(a)pyrene equivalents	100	700	NC	**240**	**210**	39**	**2,871**	**2,916**	**871**

TABLE 3-3

SOIL PAH DATA USED FOR HUMAN HEALTH RISK EVALUATION
SAMPLING AND ANALYSIS REPORT
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	CEF-RB-							
	SS-013-02	SS-014-02, Phase I		SS-015-02 Phase I	SS-016-02 Phase I	SS-017-01 Phase II	SS-018-01 Phase IV	SS-019-01 Phase IV
		Sample	Duplicate					
Polynuclear Aromatic Hydrocarbons (µg/kg)								
Benzo(a)antharacene	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	91 U	**1,180***	**1,530***
Benzo(a)pyrene	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ	**30.9 J**	**2,000**	**2,120**
Benzo(b)fluoranthene	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ	**41.4 J**	**3,010***	**3,440***
Benzo(g,h,i)perylene	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ	**34.9 J**	**2,810**	**2,120**
Benzo(k)fluoranthene	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ	**24.8 J**	**1,640**	**2,250**
Chrysene	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	91 U	**1,370 J**	**1,360 J**
Dibenzo(a,h)anthracene	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ	18 U	**392**	**609**
Fluoranthene	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	91 U	**2,030**	**3,270**
Indeno(1,2,3-cd)pyrene	78 UJ	79 UJ	79 UJ	80 UJ	74 UJ	**26.9 J**	**2,530**	**2,250**
Phenanthrene	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	190 U	740 U	730 U
Pyrene	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	91 U	**2,110**	**3,660**
Benzo(a)pyrene equivalents	39**	39.5**	39.5**	40**	37**	**52**	**3,082**	**3,475**

TABLE 3-3

SOIL PAH DATA USED FOR HUMAN HEALTH RISK EVALUATION
SAMPLING AND ANALYSIS REPORT
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

PARAMETER	CEF-RB-							
	SS-020-01 Phase IV	SS-021-01 Phase IV	SS-022-01 Phase IV	SS-023-01 Phase IV	SS-024-01, Phase IV		SS-025-01 Phase IV	SS-026-01 Phase IV
					Sample	Duplicate		
Polynuclear Aromatic Hydrocarbons (µg/kg)								
Benzo(a)antharacene	**298 J**	**425 J**	**1,890***	**1,650***	**2,720***	**2,520***	**1,590 J***	**1,970***
Benzo(a)pyrene	**467**	**956**	**2,640**	**2,640**	**4,740**	**3,680**	**2,570**	**2,630**
Benzo(b)fluoranthene	**696**	**1,320**	**3,220***	**3,050***	**5,200***	**4,520***	**3,230***	**3,790***
Benzo(g,h,i)perylene	**608**	**1,180**	**2,720**	**2,280**	**4,520**	**3,660**	**2,740**	**2,930**
Benzo(k)fluoranthene	**374**	**553**	**1,530**	**1,300**	**2,340**	**1,920**	**1,410**	**2,280**
Chrysene	**252 J**	**744 J**	**1,970**	**1,400**	**3,520**	**2,860**	**2,120**	**1,760**
Dibenzo(a,h)anthracene	**103**	**451**	**684**	**771***	**977***	**758***	**482**	**602**
Fluoranthene	**563**	**1,300 J**	**3,520**	**1,830 J**	**7,330**	**4,430**	**2,920**	**3,180**
Indeno(1,2,3-cd)pyrene	**473**	**1,070**	**2,340**	**2,130**	**3,610**	**2,940**	**2,100**	**2,900**
Phenanthrene	210 U	790 U	780 U	750 U	**1,970**	800 U	780 U	770 U
Pyrene	**781**	**1,460 J**	**3,720**	**3,940**	**6,100**	**4,670**	**3,430**	**3,660**
Benzo(a)pyrene equivalents	**721**	**1,695**	**4,086**	**4,108**	**6,897**	**5,458**	**3,760**	**4,123**

1 Florida Department of Environmental Protection Soil Cleanup Target Levels (FDEP, 2005b).
U = Not detected at associated detection limit.
J = Estimated concentration.
Bolded values exceed detection limits.
Gray-shaded values exceed residential criteria, but not industrial criteria.
Black-shaded values exceed industrial regulatory criteria.
NA = Not applicable. Benzo(a)pyrene equivalent values not calculated if polynuclear aromatic hydrocarbons (PAHs) are not detected.
* = Concentration exceeds leachability SCTL.
# = Based on Florida Administrative Code (F.A.C.) 62-777, site concentrations of carginogenic PAHs are converted to benzo(a)pyrene equivalents before comparison to benzo(a)pyrene SCTLs (FDEP, 2005a).
NC = No criterion.
** = One-half of the BaP detection limit was used as the BaPEq concentration if no carcinogenic PAHs were detected in a sample.

TABLE 3-4

FL-UCL OUTPUT FOR RESTRICTED NORTHERN SECTION
SAMPLING AND ANALYSIS REPORT
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

FDEP UCL Calculator Version 0.97

Note: Bounding estimates are worst case 95% UCLs based on the Chebyshev (mean, std) method.

Censor Estimated Statistics for BaPEq	
Number of Samples	19
Number of Censored Data	5
Minimum Non-censored	0.051544
Maximum	6.89692
Mean	1.603319
Median	1.694774
Standard Deviation	2.691969
Variance	7.246697
Coefficient of Variation	1.678998
Skewness	0.73254
Fit	0.982465
95% UCL (Assuming Normal Data)	
Student's-t	2.674242
95% UCL (Adjusted for Skewness)	
Adjusted-CLT	2.717587
Modified-t	2.68958
95% Non-parametric UCL	
CLT	2.619238
Jackknife	NA
Standard Bootstrap	NA
Bootstrap-t	NA
Chebyshev (Mean, Std)	4.096647

Censor Estimated Statistics for ln(BaPEq)	
Minimum	-3.98998
Maximum	1.931075
Mean	1.603319
Standard Deviation	2.691969
Variance	7.246697
Goodness-of-Fit Results	
Distribution Recommended	Normal
Distribution Used	Normal
Estimates Assuming Lognormal Distribution	
MLE Mean	NA
MLE Standard Deviation	NA
MLE Median	NA
MLE Coefficient of Variation	NA
MVUE Estimate of Mean	NA
MVUE Estimate of Std. Dev.	NA
MVUE Estimate of SE	NA
MVUE Coefficient of Variation	NA
UCL Assuming Lognormal Distribution	
95% H-UCL	NA
95% Chebyshev (MVUE) UCL	NA
99% Chebyshev (MVUE) UCL	NA

FDEP Recommended UCL to Use:

2.674 mg/kg
2,674 µg/kg

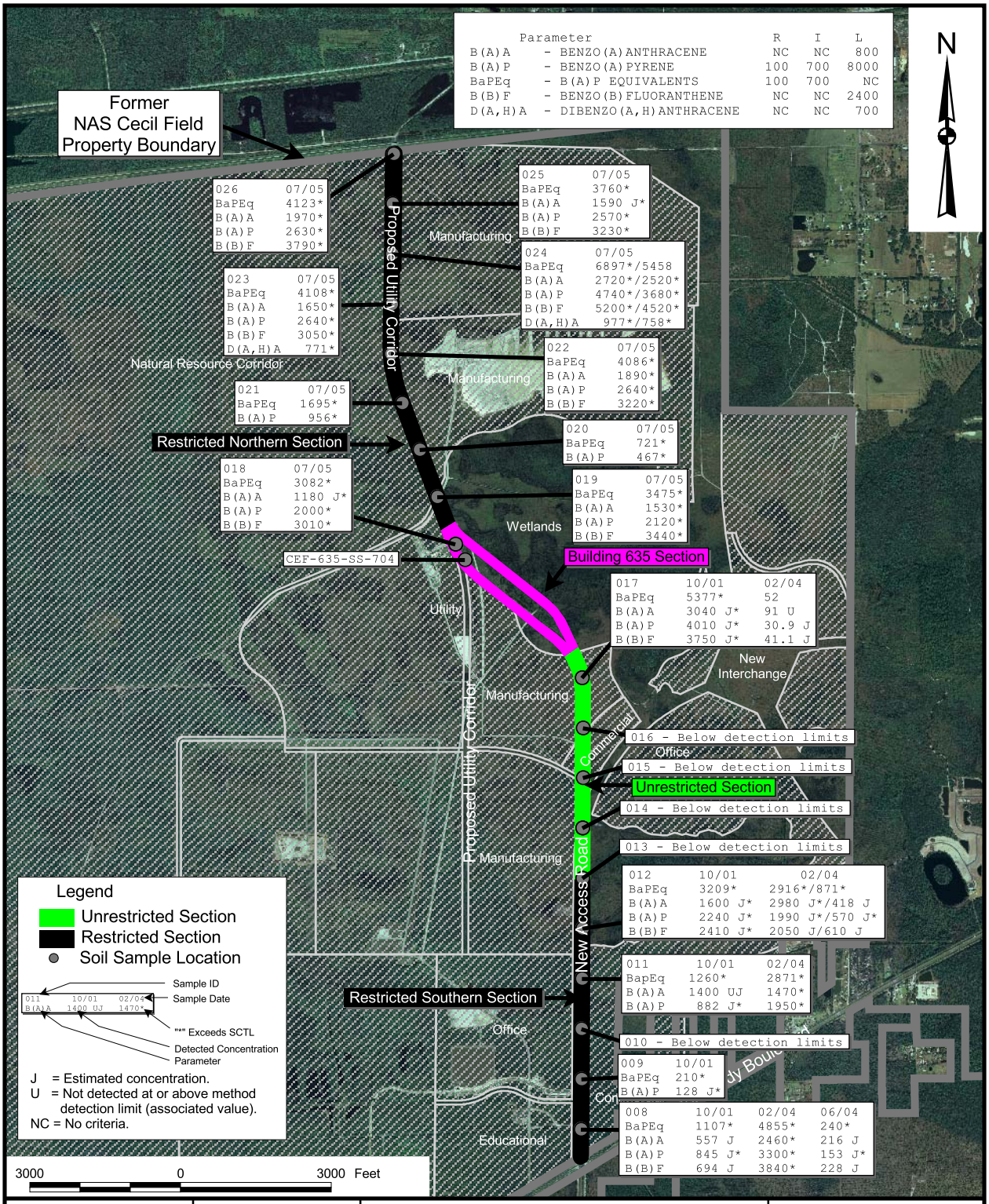
PROUCL 2.1 NA

Note: These estimates are valid ONLY if samples are random and representative.

TABLE 3-5
ECOLOGICAL CONTAMINANTS OF POTENTIAL CONCERN IN SURFACE SOIL
ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD
NAVAL AIR STATION CECIL FIELD
JACKSONVILLE, FLORIDA

Analyte	Frequency of Detection	Range of Detected Values (µg/kg)		Location of Maximum Concentration	Ecological Screening Value (ESV) (µg/kg)	Maximum Hazard Quotient[1]	No. of Samples Exceeding ESV	Average Concentration[2] (µg/kg)
		Minimum	Maximum					
Benzo(a)antharacene	12 / 19	216	2,620	SS-024-01 (Avg.)	NA	NA	NA	934
Benzo(a)pyrene	14 / 19	30.9	4,210	SS-024-01 (Avg.)	100	42.1	13	1262
Benzo(b)fluoranthene	14 / 19	41.4	4,860	SS-024-01 (Avg.)	NA	NA	NA	1609
Benzo(g,h,i)perylene	14 / 19	34.9	4,090	SS-024-01 (Avg.)	NA	NA	NA	1279
Benzo(k)fluoranthene	14 / 19	24.8	2,250	SS-019-01	NA	NA	NA	838
Chrysene	12 / 19	217	3190	SS-024-01 (Avg.)	NA	NA	NA	983
Dibenzo(a,h)anthracene	12 / 19	25.7	868	SS-024-01 (Avg.)	NA	NA	NA	310
Fluoranthene	12 / 19	563	5880	SS-024-01 (Avg.)	100	58.8	12	1735
Indeno(1,2,3-cd)pyrene	14 / 19	26.9	3,275	SS-024-01 (Avg.)	NA	NA	NA	1127
Phenanthrene	1 / 19	985	985	SS-024-01 (Avg.)	100	9.9	1	301
Pyrene	12 / 19	536	5385	SS-024-01 (Avg.)	100	53.9	12	1873
Total PAHs	14 / 19	159	37,693	SS-024-01 (Avg.)	1000	37.5	12	12,252

NA = Ecological screening value not available.
1 Maximum hazard quotient = maximum detected concentration divided by ESV.
2 Average concentrations were calculated using one-half the detection limits for non-detect results.



DRAWN BY	DATE		CONTRACT NUMBER
MJJ	19Feb05	SOIL SAMPLE EXCEEDANCES ABANDONED RAILROAD BED NORTH OF NORMANDY BOULEVARD SAMPLING AND ANALYSIS REPORT NAVAL AIR STATION CECIL FIELD JACKSONVILLE, FLORIDA	0039
CHECKED BY	DATE		APPROVED BY DATE
COST/SCHEDULE-AREA			APPROVED BY DATE
SCALE AS NOTED		NAVFAC	DRAWING NO. FIGURE 3-1 / REV 0

P:\GIS\NAS_CecilField\Railroadbeds.apr 22Apr06 MJJ Layout x-x

4.0 CONCLUSIONS AND RECOMMENDATIONS

Field investigations determined that PAH contamination was present in soil on the Abandoned Railroad Bed North of Normandy Boulevard. PAH concentrations in the Unrestricted Section of the site were less than residential SCTLs; therefore, no further action is required for this portion of the Abandoned Railroad Bed North of Normandy Boulevard. Concentrations in the Restricted Southern Section were greater than residential, industrial/commercial, and site-specific recreational SCTLs but did not exceed the site-specific construction/utility worker SCTL. Therefore, human health risks in this area are acceptable if land use is restricted to utility-related construction activities. In addition, roadway and rail access are allowable uses for this area that are protective of human health and the environment. The UCL of concentrations for the Northern Restricted Section was less than the site-specific construction/utility SCTL; therefore, human health risks in this area are also acceptable if land use is restricted to utility-related construction, roadway, and rail activities. The ecological risk in all portions of the site was estimated to be minimal at worst.

Based on these conclusions, the recommendation for the Restricted Northern and Southern Sections of the Abandoned Railroad Bed North of Normandy Boulevard is no further action with LUCs. The widths of the areas for which LUCs will be implemented are 50 feet for the Restricted Northern Section and 25 feet for the Restricted Southern Section. These widths were based on review of site drawings, standard track and ballast widths, and information from other abandoned railroad bed sites at NAS Cecil Field. The required LUCs for the Restricted Northern and Southern Sections of the Abandoned Railroad Bed North of Normandy Boulevard, which will be detailed in the Finding of Suitability to Transfer (FOST) document associated with transfer of the property to the City of Jacksonville, are summarized as follows:

- Use of the Restricted Northern and Southern Sections other than for utility/roadway/rail uses is prohibited without prior written approval from the Navy and FDEP.

- Excavation of surface and subsurface soils is prohibited unless prior written approval is obtained from the Navy and FDEP.

Allowable uses include utility rights-of-way, utility-related construction activities, roadways, and rail access. Residential (e.g., housing, childcare facilities, schools, adult convalescent facilities), industrial/commercial (e.g., office parks, manufacturing facilities), and recreational (e.g., hiking, camping, ballfields) uses will be prohibited. In addition, notice of Occupational Safety and Health Administration (OSHA) 1910.20 and associated requirements applicable to the site will be provided to the City. The recommendation for the Unrestricted Southern Section is no further action with unrestricted use. As determined in the Building 635 SAR, the Building 635 Section is acceptable for industrial/commercial and wetlands uses (TtNUS, 2004a).

It is recommended that the color code for the Abandoned Railroad Bed North of Normandy be 4\Dark Green to denote that releases of hazardous substances have occurred and that remedial actions to protect human health (i.e., LUCs) have been taken. Although residual concentrations of PAHs in surface soil present a risk to human health under residential, industrial/commercial, and recreational exposure scenarios, LUCs will prevent unacceptable exposure.

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APPENDIX A

LABORATORY ANALYTICAL DATA

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**M. SPERANZA**	**DATE:**	**SEPTEMBER 1, 2004**
FROM:	**BERNARD F SPADA III**	**COPIES:**	**DV FILE**
SUBJECT:	**ORGANIC DATA VALIDATION- PAH CTO 078, NAS CECIL FIELD SDG F24094**		
SAMPLES:	1/Soil CEF-RB-SS-008A-01		

OVERVIEW

The sample set for CTO 078, NAS Cecil Field, SDG F24094 consists of one (1) environmental soil sample. The sample was analyzed for polynuclear aromatic hydrocarbons (PAH).

The sample was collected by TetraTech NUS on May 11, 2004 and analyzed by Accutest Laboratories. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Method 8310 analytical and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

*	•	Data completeness
	•	Holding times
*	•	Initial and continuing calibration
*	•	Laboratory method and field quality control blank 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. Results as reported by the laboratory are presented in Appendix B.

PAH

The sample was extracted outside of holding time. Positive and non-detected results were qualified as estimated (J, UJ).

Positive results below the reporting limit were qualified as estimated (J) due to uncertainty near the detection limit.

EXECUTIVE SUMMARY

Laboratory Performance Issues: Qualifications were made based on holding time non-compliances.

Other Factors Affecting Data Quality: None.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99) and the NFESC guidelines (September, 1999). The text of this report has been formulated to address only those problem areas affecting data quality.

TO: M. SPERANZA – PAGE 2
DATE: SEPTEMBER 1, 2004

"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)."

Tetra Tech NUS
Bernard F Spada III
Chemist/Data Validator

TetraTech NUS
Joseph A. Samchuck
Data Validation Quality Assurance Officer

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

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (i.e., % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery 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 - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
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; i.e.chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is less than sample activity

PROJ_NO: 0039

SDG: F24094 MEDIA: SOIL DATA FRACTION: PAH

nsample	CEF-RB-SS-008A-01
samp_date	5/11/2004
lab_id	F24094-1
qc_type	NM
units	UG/KG
Pct_Solids	88.9
DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	93	UJ	H
2-METHYLNAPHTHALENE	93	UJ	H
ACENAPHTHENE	190	UJ	H
ACENAPHTHYLENE	190	UJ	H
ANTHRACENE	190	UJ	H
BENZO(A)ANTHRACENE	216	J	HP
BENZO(A)PYRENE	153	J	H
BENZO(B)FLUORANTHENE	228	J	H
BENZO(G,H,I)PERYLENE	89.7	J	H
BENZO(K)FLUORANTHENE	161	J	H
CHRYSENE	217	J	HP
DIBENZO(A,H)ANTHRACENE	25.7	J	HP
FLUORANTHENE	876	J	H
FLUORENE	190	UJ	H
INDENO(1,2,3-CD)PYRENE	146	J	H
NAPHTHALENE	93	UJ	H
PHENANTHRENE	190	UJ	H
PYRENE	536	J	H

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-008A-01		
Lab Sample ID:	F24094-1	**Date Sampled:**	05/11/04
Matrix:	SO - Soil	**Date Received:**	05/13/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	88.9
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE024449.D	1	05/29/04	SM	05/26/04	OP10523	GEE974
Run #2 [b]	AA022273.D	1	06/05/04	SM	06/03/04	OP10611	GAA1050

	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2	30.7 g	5.0 ml

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	750	190	ug/kg	
208-96-8	Acenaphthylene	ND	750	190	ug/kg	
120-12-7	Anthracene	ND	370	190	ug/kg	
56-55-3	Benzo(a)anthracene	216	370	93	ug/kg	J
50-32-8	Benzo(a)pyrene	153	75	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	228	75	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	89.7	75	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	161	75	19	ug/kg	
218-01-9	Chrysene	217	370	93	ug/kg	J
53-70-3	Dibenzo(a,h)anthracene	25.7	75	19	ug/kg	J
206-44-0	Fluoranthene	876	370	93	ug/kg	
86-73-7	Fluorene	ND	370	190	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	146	75	19	ug/kg	
91-20-3	Naphthalene	ND	370	93	ug/kg	
90-12-0	1-Methylnaphthalene	ND	370	93	ug/kg	
91-57-6	2-Methylnaphthalene	ND	370	93	ug/kg	
85-01-8	Phenanthrene	ND	370	190	ug/kg	
129-00-0	Pyrene	536	370	93	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	88%	88%	49-124%
92-94-4	p-Terphenyl	89%	90%	56-141%

(a) All hits confirmed by spectral match using a diode array detector. Sample extracted beyond holdtime.
(b) Confirmation run.

ND = Not detected MDL - Method Detection Limit
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

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**M. SPERANZA**	**DATE:**	**MAY 11, 2004**
FROM:	**KELLY CARPER**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION- PAHs**
CTO 078, NAS CECIL FIELD
SDG F22457

SAMPLES: 8/Solid

CEF-RB-SS-017-01	CEF-RB-SS-012-01	CEF-RB-SS-011-01
CEF-RB-SS-008-01	CEF-RB-SS-007-01	CEF-RB-SS-005-01
CEF-RB-SS-001-01	CEF-RB-SS-DU01	

OVERVIEW

The sample set for CTO 078 NAS Cecil Field, SDG F22457 consists of eight (8) solid environmental samples. All samples were analyzed for Polycyclic Aromatic Hydrocarbons (PAHs). One (1) field duplicate pair was included in this SDG: CEF-RB-SS-DU01 / CEF-RB-SS-012-01.

The samples were collected by TetraTech NUS on February 27, 2004 and analyzed by Accutest Laboratories. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 Method 8310 analysis and reporting protocols. The data contained in this SDG were validated with regard to the following parameters:

* • Data completeness
* • Holding times
* • Initial/continuing calibrations
* • Laboratory method blank and field blank results
  • Field Duplicate Precision
* • Detection Limits

The symbol (*) indicates that 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. Results as reported by the laboratory are presented in Appendix B.

The text of this report is formatted to address only gross non-compliances resulting in the rejection of data and the elimination of false positives.

Volatiles

Samples CEF-RB-SS-012-01 and CEF-RB-SS-08-01 were analyzed at a 4 fold dilution. No undiluted analysis was performed. The laboratory cites matrix interference as the reason for dilution.

Sample CEF-RB-SS-011-01 was analyzed at a 2 fold dilution. This sample was also analyzed at a 4 fold dilution to quantify benzo(k)fluoranthene. No undiluted analysis was performed. The laboratory cites matrix interference as the reason for dilution.

Benzo(k)fluoranthene in sample CEF-RB-SS-007-01 was reported from a 2 fold dilution.

Sample CEF-RB-SS-001-01 was analyzed at a 4 fold dilution This sample was also analyzed at a 8 fold

dilution to quantify benzo(k)fluoranthene. No undiluted analysis was performed. The laboratory cites matrix interference as the reason for dilution.

Benzo(k)fluoranthene in sample CEF-RB-SS-DU01 was reported from a 4 fold dilution.

The continuing calibration analyzed on March 8, 2004 at 11:54 contained Percent Differences (%Ds) greater than 15% for benzo(k)fluoranthene and dibenzo(a,h)anthracene. The %Ds were not present on both detectors. No validation action was taken.

Positive results for benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene were qualified as estimated, "J", in the field duplicate pair CEF-RB-SS-DU01 / CEF-RB-SS-012-01 as a result of field duplicate imprecision (i.e. Relative Percent Differences (RPDs) greater than 50%).

Positive results reported at concentrations below the reporting limit were qualified as estimated, "J".

EXECUTIVE SUMMARY

Laboratory Performance Issues: Continuing calibration %Ds for dibenzo(a,h)anthracene and Benzo(k)fluoranthene were greater than 15% but were limited to one detector for each compound.

Other Factors Affecting Data Quality: The laboratory noted matrix interference as the reason for sample dilutions. The field duplicate pair displayed poor precision.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (10/99), and the NFESC guidelines IRCDQM (Sept., 1999). 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)."

for Tetra Tech NUS

Kelly Carper
Chemist/Data Validator

TetraTech NUS

Joseph A. Samchuck
Data Validation Quality Assurance Officer

Attachments:

Appendix A – Qualified Analytical Results
Appendix B – Results as Reported by the Laboratory
Appendix C – Support Documentation

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

PROJ_NO: 0039

SDG: F22457 MEDIA: SOIL DATA FRACTION: PAH

nsample	CEF-RB-SS-001-01	nsample	CEF-RB-SS-005-01	nsample	CEF-RB-SS-007-01
samp_date	2/27/2004	samp_date	2/27/2004	samp_date	2/27/2004
lab_id	F22457-7	lab_id	F22457-6	lab_id	F22457-5
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	87.4	Pct_Solids	88.8	Pct_Solids	84.4
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	380	U	
2-METHYLNAPHTHALENE	380	U	
ACENAPHTHENE	760	U	
ACENAPHTHYLENE	760	U	
ANTHRACENE	760	U	
BENZO(A)ANTHRACENE	2180		
BENZO(A)PYRENE	2790		
BENZO(B)FLUORANTHENE	4440		
BENZO(G,H,I)PERYLENE	3260		
BENZO(K)FLUORANTHENE	2520		
CHRYSENE	3260		
DIBENZO(A,H)ANTHRACENE	917		
FLUORANTHENE	4290		
FLUORENE	760	U	
INDENO(1,2,3-CD)PYRENE	2670		
NAPHTHALENE	380	U	
PHENANTHRENE	760	U	
PYRENE	4810		

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	93	U	
2-METHYLNAPHTHALENE	93	U	
ACENAPHTHENE	190	U	
ACENAPHTHYLENE	190	U	
ANTHRACENE	190	U	
BENZO(A)ANTHRACENE	93	U	
BENZO(A)PYRENE	19	U	
BENZO(B)FLUORANTHENE	19	U	
BENZO(G,H,I)PERYLENE	19	U	
BENZO(K)FLUORANTHENE	19	U	
CHRYSENE	93	U	
DIBENZO(A,H)ANTHRACENE	19	U	
FLUORANTHENE	93	U	
FLUORENE	190	U	
INDENO(1,2,3-CD)PYRENE	19	U	
NAPHTHALENE	93	U	
PHENANTHRENE	190	U	
PYRENE	93	U	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	97	U	
2-METHYLNAPHTHALENE	97	U	
ACENAPHTHENE	190	U	
ACENAPHTHYLENE	190	U	
ANTHRACENE	190	U	
BENZO(A)ANTHRACENE	527		
BENZO(A)PYRENE	1190		
BENZO(B)FLUORANTHENE	1130		
BENZO(G,H,I)PERYLENE	1240		
BENZO(K)FLUORANTHENE	668		
CHRYSENE	658		
DIBENZO(A,H)ANTHRACENE	322		
FLUORANTHENE	831		
FLUORENE	190	U	
INDENO(1,2,3-CD)PYRENE	898		
NAPHTHALENE	97	U	
PHENANTHRENE	190	U	
PYRENE	808		

PROJ_NO: 0039

SDG: F22457 MEDIA: SOIL DATA FRACTION: PAH

nsample	CEF-RB-SS-008-01	nsample	CEF-RB-SS-011-01	nsample	CEF-RB-SS-012-01
samp_date	2/27/2004	samp_date	2/27/2004	samp_date	2/27/2004
lab_id	F22457-4	lab_id	F22457-3	lab_id	F22457-2
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	79.8	Pct_Solids	91.2	Pct_Solids	88.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	410	U	
2-METHYLNAPHTHALENE	410	U	
ACENAPHTHENE	830	U	
ACENAPHTHYLENE	830	U	
ANTHRACENE	830	U	
BENZO(A)ANTHRACENE	2460		
BENZO(A)PYRENE	3300		
BENZO(B)FLUORANTHENE	3840		
BENZO(G,H,I)PERYLENE	2570		
BENZO(K)FLUORANTHENE	2230		
CHRYSENE	3400		
DIBENZO(A,H)ANTHRACENE	676		
FLUORANTHENE	6400		
FLUORENE	830	U	
INDENO(1,2,3-CD)PYRENE	2230		
NAPHTHALENE	410	U	
PHENANTHRENE	832	J	P
PYRENE	6150		

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	180	U	
2-METHYLNAPHTHALENE	180	U	
ACENAPHTHENE	360	U	
ACENAPHTHYLENE	360	U	
ANTHRACENE	360	U	
BENZO(A)ANTHRACENE	1470		
BENZO(A)PYRENE	1950		
BENZO(B)FLUORANTHENE	2050		
BENZO(G,H,I)PERYLENE	1480		
BENZO(K)FLUORANTHENE	1230		
CHRYSENE	1280		
DIBENZO(A,H)ANTHRACENE	438		
FLUORANTHENE	2670		
FLUORENE	360	U	
INDENO(1,2,3-CD)PYRENE	1170		
NAPHTHALENE	180	U	
PHENANTHRENE	360	U	
PYRENE	2850		

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	370	U	
2-METHYLNAPHTHALENE	370	U	
ACENAPHTHENE	740	U	
ACENAPHTHYLENE	740	U	
ANTHRACENE	740	U	
BENZO(A)ANTHRACENE	2980	J	G
BENZO(A)PYRENE	1990	J	G
BENZO(B)FLUORANTHENE	2050	J	G
BENZO(G,H,I)PERYLENE	1300	J	G
BENZO(K)FLUORANTHENE	1190	J	G
CHRYSENE	3160	J	G
DIBENZO(A,H)ANTHRACENE	306	J	G
FLUORANTHENE	6670	J	G
FLUORENE	740	U	
INDENO(1,2,3-CD)PYRENE	1020	J	G
NAPHTHALENE	370	U	
PHENANTHRENE	740	U	
PYRENE	5020	J	G

PROJ_NO: 0039

SDG: F22457 MEDIA: SOIL DATA FRACTION: PAH

nsample	CEF-RB-SS-017-01	nsample	CEF-RB-SS-DU01
samp_date	2/27/2004	samp_date	2/27/2004
lab_id	F22457-1	lab_id	F22457-8
qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG
Pct_Solids	91.0	Pct_Solids	85.7
DUP_OF:		DUP_OF:	CEF-RB-SS-012-01

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	91	U	
2-METHYLNAPHTHALENE	91	U	
ACENAPHTHENE	180	U	
ACENAPHTHYLENE	180	U	
ANTHRACENE	180	U	
BENZO(A)ANTHRACENE	91	U	
BENZO(A)PYRENE	30.9	J	P
BENZO(B)FLUORANTHENE	41.1	J	P
BENZO(G,H,I)PERYLENE	34.9	J	P
BENZO(K)FLUORANTHENE	24.8	J	P
CHRYSENE	91	U	
DIBENZO(A,H)ANTHRACENE	18	U	
FLUORANTHENE	91	U	
FLUORENE	180	U	
INDENO(1,2,3-CD)PYRENE	26.9	J	P
NAPHTHALENE	91	U	
PHENANTHRENE	180	U	
PYRENE	91	U	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	95	U	
2-METHYLNAPHTHALENE	95	U	
ACENAPHTHENE	190	U	
ACENAPHTHYLENE	190	U	
ANTHRACENE	190	U	
BENZO(A)ANTHRACENE	418	J	G
BENZO(A)PYRENE	570	J	G
BENZO(B)FLUORANTHENE	610	J	G
BENZO(G,H,I)PERYLENE	503	J	G
BENZO(K)FLUORANTHENE	309	J	G
CHRYSENE	447	J	G
DIBENZO(A,H)ANTHRACENE	154	J	G
FLUORANTHENE	771	J	G
FLUORENE	190	U	
INDENO(1,2,3-CD)PYRENE	406	J	G
NAPHTHALENE	95	U	
PHENANTHRENE	190	U	
PYRENE	665	J	G

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-001-01		
Lab Sample ID:	F22457-7	**Date Sampled:**	02/27/04
Matrix:	SO - Soil	**Date Received:**	02/28/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	87.4
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE021792.D	4	03/08/04	MRE	03/02/04	OP9878	GEE887
Run #2 [a]	EE021783.D	8	03/05/04	MRE	03/02/04	OP9878	GEE886

	Initial Weight	Final Volume
Run #1	30.2 g	5.0 ml
Run #2	30.2 g	5.0 ml

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	3000	760	ug/kg	
208-96-8	Acenaphthylene	ND	3000	760	ug/kg	
120-12-7	Anthracene	ND	1500	760	ug/kg	
56-55-3	Benzo(a)anthracene	2180	1500	380	ug/kg	
50-32-8	Benzo(a)pyrene	2790	300	76	ug/kg	
205-99-2	Benzo(b)fluoranthene	4440	300	76	ug/kg	
191-24-2	Benzo(g,h,i)perylene	3260	300	76	ug/kg	
207-08-9	Benzo(k)fluoranthene	2520 [b]	610	150	ug/kg	
218-01-9	Chrysene	3260	1500	380	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	917	300	76	ug/kg	
206-44-0	Fluoranthene	4290	1500	380	ug/kg	
86-73-7	Fluorene	ND	1500	760	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2670	300	76	ug/kg	
91-20-3	Naphthalene	ND	1500	380	ug/kg	
90-12-0	1-Methylnaphthalene	ND	1500	380	ug/kg	
91-57-6	2-Methylnaphthalene	ND	1500	380	ug/kg	
85-01-8	Phenanthrene	ND	1500	760	ug/kg	
129-00-0	Pyrene	4810	1500	380	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	87%	100%	49-124%
92-94-4	p-Terphenyl	112%	116%	56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
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 Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-005-01		
Lab Sample ID:	F22457-6	**Date Sampled:**	02/27/04
Matrix:	SO - Soil	**Date Received:**	02/28/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	88.8
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	EE021767.D	1	03/05/04	MRE	03/02/04	OP9878	GEE886
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	740	190	ug/kg	
208-96-8	Acenaphthylene	ND	740	190	ug/kg	
120-12-7	Anthracene	ND	370	190	ug/kg	
56-55-3	Benzo(a)anthracene	ND	370	93	ug/kg	
50-32-8	Benzo(a)pyrene	ND	74	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	74	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	74	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	74	19	ug/kg	
218-01-9	Chrysene	ND	370	93	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	74	19	ug/kg	
206-44-0	Fluoranthene	ND	370	93	ug/kg	
86-73-7	Fluorene	ND	370	190	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	74	19	ug/kg	
91-20-3	Naphthalene	ND	370	93	ug/kg	
90-12-0	1-Methylnaphthalene	ND	370	93	ug/kg	
91-57-6	2-Methylnaphthalene	ND	370	93	ug/kg	
85-01-8	Phenanthrene	ND	370	190	ug/kg	
129-00-0	Pyrene	ND	370	93	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	98%		49-124%
92-94-4	p-Terphenyl	97%		56-141%

ND = Not detected MDL - Method Detection Limit
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 Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-007-01		
Lab Sample ID:	F22457-5	**Date Sampled:**	02/27/04
Matrix:	SO - Soil	**Date Received:**	02/28/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	84.4
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE021794.D	1	03/08/04	MRE	03/02/04	OP9878	GEE887
Run #2 [a]	EE021782.D	2	03/05/04	MRE	03/02/04	OP9878	GEE886

	Initial Weight	Final Volume
Run #1	30.6 g	5.0 ml
Run #2	30.6 g	5.0 ml

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	770	190	ug/kg	
208-96-8	Acenaphthylene	ND	770	190	ug/kg	
120-12-7	Anthracene	ND	390	190	ug/kg	
56-55-3	Benzo(a)anthracene	527	390	97	ug/kg	
50-32-8	Benzo(a)pyrene	1190	77	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	1130	77	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	1240	77	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	668 [b]	150	39	ug/kg	
218-01-9	Chrysene	658	390	97	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	322	77	19	ug/kg	
206-44-0	Fluoranthene	831	390	97	ug/kg	
86-73-7	Fluorene	ND	390	190	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	898	77	19	ug/kg	
91-20-3	Naphthalene	ND	390	97	ug/kg	
90-12-0	1-Methylnaphthalene	ND	390	97	ug/kg	
91-57-6	2-Methylnaphthalene	ND	390	97	ug/kg	
85-01-8	Phenanthrene	ND	390	190	ug/kg	
129-00-0	Pyrene	808	390	97	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	91%	89%	49-124%
92-94-4	p-Terphenyl	97%	96%	56-141%

(a) All hits confirmed by spectral match using a diode array detector.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
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 Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-008-01		
Lab Sample ID:	F22457-4	**Date Sampled:**	02/27/04
Matrix:	SO - Soil	**Date Received:**	02/28/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	79.8
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE021781.D	4	03/05/04	MRE	03/02/04	OP9878	GEE886
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	3300	830	ug/kg	
208-96-8	Acenaphthylene	ND	3300	830	ug/kg	
120-12-7	Anthracene	ND	1700	830	ug/kg	
56-55-3	Benzo(a)anthracene	2460	1700	410	ug/kg	
50-32-8	Benzo(a)pyrene	3300	330	83	ug/kg	
205-99-2	Benzo(b)fluoranthene	3840	330	83	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2570	330	83	ug/kg	
207-08-9	Benzo(k)fluoranthene	2230	330	83	ug/kg	
218-01-9	Chrysene	3400	1700	410	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	676	330	83	ug/kg	
206-44-0	Fluoranthene	6400	1700	410	ug/kg	
86-73-7	Fluorene	ND	1700	830	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2230	330	83	ug/kg	
91-20-3	Naphthalene	ND	1700	410	ug/kg	
90-12-0	1-Methylnaphthalene	ND	1700	410	ug/kg	
91-57-6	2-Methylnaphthalene	ND	1700	410	ug/kg	
85-01-8	Phenanthrene	832	1700	830	ug/kg	J
129-00-0	Pyrene	6150	1700	410	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	73%		49-124%
92-94-4	p-Terphenyl	95%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

ND = Not detected MDL - Method Detection Limit
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 Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-011-01		
Lab Sample ID:	F22457-3	**Date Sampled:**	02/27/04
Matrix:	SO - Soil	**Date Received:**	02/28/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	91.2
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE021791.D	2	03/08/04	MRE	03/02/04	OP9878	GEE887
Run #2 [b]	EE021780.D	4	03/05/04	MRE	03/02/04	OP9878	GEE886

	Initial Weight	Final Volume
Run #1	30.2 g	5.0 ml
Run #2	30.2 g	5.0 ml

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	1500	360	ug/kg	
208-96-8	Acenaphthylene	ND	1500	360	ug/kg	
120-12-7	Anthracene	ND	730	360	ug/kg	
56-55-3	Benzo(a)anthracene	1470	730	180	ug/kg	
50-32-8	Benzo(a)pyrene	1950	150	36	ug/kg	
205-99-2	Benzo(b)fluoranthene	2050	150	36	ug/kg	
191-24-2	Benzo(g,h,i)perylene	1480	150	36	ug/kg	
207-08-9	Benzo(k)fluoranthene	1230 [c]	290	73	ug/kg	
218-01-9	Chrysene	1280	730	180	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	438	150	36	ug/kg	
206-44-0	Fluoranthene	2670	730	180	ug/kg	
86-73-7	Fluorene	ND	730	360	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	1170	150	36	ug/kg	
91-20-3	Naphthalene	ND	730	180	ug/kg	
90-12-0	1-Methylnaphthalene	ND	730	180	ug/kg	
91-57-6	2-Methylnaphthalene	ND	730	180	ug/kg	
85-01-8	Phenanthrene	ND	730	360	ug/kg	
129-00-0	Pyrene	2850	730	180	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	89%	97%	49-124%
92-94-4	p-Terphenyl	98%	98%	56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.
(b) All hits confirmed by spectral match using a diode array detector.
(c) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
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 Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-012-01		
Lab Sample ID:	F22457-2	**Date Sampled:**	02/27/04
Matrix:	SO - Soil	**Date Received:**	02/28/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	88.0
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE021779.D	4	03/05/04	MRE	03/02/04	OP9878	GEE886
Run #2							

	Initial Weight	Final Volume
Run #1	30.9 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	2900	740	ug/kg	
208-96-8	Acenaphthylene	ND	2900	740	ug/kg	
120-12-7	Anthracene	ND	1500	740	ug/kg	
56-55-3	Benzo(a)anthracene	2980	1500	370	ug/kg	
50-32-8	Benzo(a)pyrene	1990	290	74	ug/kg	
205-99-2	Benzo(b)fluoranthene	2050	290	74	ug/kg	
191-24-2	Benzo(g,h,i)perylene	1300	290	74	ug/kg	
207-08-9	Benzo(k)fluoranthene	1190	290	74	ug/kg	
218-01-9	Chrysene	3160	1500	370	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	306	290	74	ug/kg	
206-44-0	Fluoranthene	6670	1500	370	ug/kg	
86-73-7	Fluorene	ND	1500	740	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	1020	290	74	ug/kg	
91-20-3	Naphthalene	ND	1500	370	ug/kg	
90-12-0	1-Methylnaphthalene	ND	1500	370	ug/kg	
91-57-6	2-Methylnaphthalene	ND	1500	370	ug/kg	
85-01-8	Phenanthrene	ND	1500	740	ug/kg	
129-00-0	Pyrene	5020	1500	370	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	105%		49-124%
92-94-4	p-Terphenyl	120%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

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

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-017-01		
Lab Sample ID:	F22457-1	**Date Sampled:**	02/27/04
Matrix:	SO - Soil	**Date Received:**	02/28/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	91.0
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE021759.D	1	03/05/04	MRE	03/02/04	OP9878	GEE886
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	730	180	ug/kg	
208-96-8	Acenaphthylene	ND	730	180	ug/kg	
120-12-7	Anthracene	ND	370	180	ug/kg	
56-55-3	Benzo(a)anthracene	ND	370	91	ug/kg	
50-32-8	Benzo(a)pyrene	30.9	73	18	ug/kg	J
205-99-2	Benzo(b)fluoranthene	41.1	73	18	ug/kg	J
191-24-2	Benzo(g,h,i)perylene	34.9	73	18	ug/kg	J
207-08-9	Benzo(k)fluoranthene	24.8	73	18	ug/kg	J
218-01-9	Chrysene	ND	370	91	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	73	18	ug/kg	
206-44-0	Fluoranthene	ND	370	91	ug/kg	
86-73-7	Fluorene	ND	370	180	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	26.9	73	18	ug/kg	J
91-20-3	Naphthalene	ND	370	91	ug/kg	
90-12-0	1-Methylnaphthalene	ND	370	91	ug/kg	
91-57-6	2-Methylnaphthalene	ND	370	91	ug/kg	
85-01-8	Phenanthrene	ND	370	180	ug/kg	
129-00-0	Pyrene	ND	370	91	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	95%		49-124%
92-94-4	p-Terphenyl	96%		56-141%

(a) All hits confirmed by spectral match using a diode array detector.

ND = Not detected MDL - Method Detection Limit
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 Laboratories

Report of Analysis

Client Sample ID:	CEF-RB-SS-DUO1		
Lab Sample ID:	F22457-8	**Date Sampled:**	02/27/04
Matrix:	SO - Soil	**Date Received:**	02/28/04
Method:	EPA 8310 SW846 3550B	**Percent Solids:**	85.7
Project:	NAS Cecil Field-CTO 78		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE021793.D	1	03/08/04	MRE	03/02/04	OP9878	GEE887
Run #2 [a]	EE021769.D	4	03/05/04	MRE	03/02/04	OP9878	GEE886

	Initial Weight	Final Volume
Run #1	30.7 g	5.0 ml
Run #2	30.7 g	5.0 ml

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	ND	760	190	ug/kg	
208-96-8	Acenaphthylene	ND	760	190	ug/kg	
120-12-7	Anthracene	ND	380	190	ug/kg	
56-55-3	Benzo(a)anthracene	418	380	95	ug/kg	
50-32-8	Benzo(a)pyrene	570	76	19	ug/kg	
205-99-2	Benzo(b)fluoranthene	610	76	19	ug/kg	
191-24-2	Benzo(g,h,i)perylene	503	76	19	ug/kg	
207-08-9	Benzo(k)fluoranthene	309 [b]	300	76	ug/kg	
218-01-9	Chrysene	447	380	95	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	154	76	19	ug/kg	
206-44-0	Fluoranthene	771	380	95	ug/kg	
86-73-7	Fluorene	ND	380	190	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	406	76	19	ug/kg	
91-20-3	Naphthalene	ND	380	95	ug/kg	
90-12-0	1-Methylnaphthalene	ND	380	95	ug/kg	
91-57-6	2-Methylnaphthalene	ND	380	95	ug/kg	
85-01-8	Phenanthrene	ND	380	190	ug/kg	
129-00-0	Pyrene	665	380	95	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	94%	89%	49-124%
92-94-4	p-Terphenyl	101%	98%	56-141%

(a) All hits confirmed by spectral match using a diode array detector.
(b) Result is from Run# 2

ND = Not detected MDL - Method Detection Limit
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

Tetra Tech NUS **INTERNAL CORRESPONDENCE**

TO:	**M. SPERANZA**	**DATE:**	**SEPTEMBER 26, 2005**
FROM:	**ETHAN G. LEE**	**COPIES:**	**DV FILE**

SUBJECT: **ORGANIC DATA VALIDATION – PAH**
NAS CECIL FIELD – CTO 078
SAMPLE DELIVERY GROUP (SDG) – F33161

SAMPLES: 10/SOIL/

CEF-RR-SS-018-01	CEF-RR-SS-019-01	CEF-RR-SS-020-01
CEF-RR-SS-021-01	CEF-RR-SS-022-01	CEF-RR-SS-023-01
CEF-RR-SS-024-01	CEF-RR-SS-025-01	CEF-RR-SS-026-01
CEF-RR-SS-DU01		

Overview

The sample set for NAS Cecil Field, CTO 078, SDG F33161, consists of ten (10) soil environmental samples. One (1) field duplicate pair (CEF-RR-SS-DU01 / CEF-RR-SS-024-01) is included in this SDG.

The samples were analyzed for polycyclic aromatic hydrocarbons (PAHs). The samples were collected by Tetra Tech NUS on July 11-12, 2005 and analyzed by Accutest Laboratories Southeast, Inc. All analyses were conducted in accordance with Naval Facilities Engineering Service Center (NFESC) Quality Assurance/Quality Control (QA/QC) criteria using SW-846 method 8310 analysis and reporting protocols.

These data were evaluated based on the following parameters:

* • Data Completeness
* • Holding Times
* • Initial/Continuing Calibrations
* • Laboratory Method Blank Analyses
* • Field Duplicate Precision
• Detection Limits

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

Detection Limits

Results for PAHs that were between the reporting limit (RL) and the method detection limit (MDL) were qualified as estimated (J) due to uncertainty near the detection limit.

Notes

Dilutions were performed for all analytes in all samples except CEF-RR-SS-020-01 due to matrix interference, resulting in elevated detection limits.

In samples CEF-RR-SS-019-01, CEF-RR-SS-023-01, CEF-RR-SS-024-01, and CEF-RR-SS-DU01, the MDL was elevated to the RL for acenaphthene due to matrix interference and the absence of spectral match. See attached memo from S. Izosimova of Accutest Laboratories Southeast, Inc.

Executive Summary

Laboratory Performance: No laboratory quality control issues were noted for this SDG.

Other Factors Affecting Data Quality: Several analytes were qualified due to uncertainty near the detection limit.

The data for these analyses were reviewed with reference to the EPA Functional Guidelines for Organic Data Validation (Oct. 1999), and the NFESC guidelines IRCDQM (Sept. 1999).

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)."

Tetra Tech NUS
Ethan G. Lee
Environmental Scientist

Tetra Tech NUS
Joseph A. Samchuck
Quality Assurance Officer

Attachments:

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

APPENDIX A

QUALIFIED ANALYTICAL RESULTS

Data Validation Qualifier Codes:

A = Lab Blank Contamination
B = Field Blank Contamination
C = Calibration Noncompliance (e.g. % RSDs, %Ds, ICVs, CCVs, RRFs, etc.)
C01 = GC/MS Tuning Noncompliance
D = MS/MSD Recovery Noncompliance
E = LCS/LCSD Recovery 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 - includes ICS % R Noncompliance
L = Instrument Calibration Range Exceedance
M = Sample Preservation Noncompliance
N = Internal Standard Noncompliance
N01 = Internal Standard Recovery Noncompliance Dioxins
N02 = Recovery Standard Noncompliance Dioxins
N03 = Clean-up Standard Noncompliance Dioxins
O = Poor Instrument Performance (e.g. base-line drifting)
P = Uncertainty near detection limit (< 2 x IDL for inorganics and <CRQL for organics)
Q = Other problems (can encompass a number of issues; e.g. chromatography,interferences, etc.)
R = Surrogates Recovery Noncompliance
S = Pesticide/PCB Resolution
T = % Breakdown Noncompliance for DDT and Endrin
U = % Difference between columns/detectors >25% for positive results determined via GC/HPLC
V = Non-linear calibrations; correlation coefficient $r < 0.995$
W = EMPC result
X = Signal to noise response drop
Y = Percent solids <30%
Z = Uncertainty at 2 sigma deviation is greater than sample activity

PROJ_NO: 0039

SDG: F33161 MEDIA: SOIL DATA FRACTION: PAH

nsample	CEF-RR-SS-018-01	nsample	CEF-RR-SS-019-01	nsample	CEF-RR-SS-020-01
samp_date	7/11/2005	samp_date	7/11/2005	samp_date	7/11/2005
lab_id	F33161-1	lab_id	F33161-2	lab_id	F33161-3
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	89.0	Pct_Solids	91.1	Pct_Solids	77.4
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	370	U	
2-METHYLNAPHTHALENE	370	U	
ACENAPHTHENE	740	U	
ACENAPHTHYLENE	740	U	
ANTHRACENE	740	U	
BENZO(A)ANTHRACENE	1180	J	P
BENZO(A)PYRENE	2000		
BENZO(B)FLUORANTHENE	3010		
BENZO(G,H,I)PERYLENE	2810		
BENZO(K)FLUORANTHENE	1640		
CHRYSENE	1370	J	P
DIBENZO(A,H)ANTHRACENE	392		
FLUORANTHENE	2030		
FLUORENE	740	U	
INDENO(1,2,3-CD)PYRENE	2530		
NAPHTHALENE	370	U	
PHENANTHRENE	740	U	
PYRENE	2110		

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	360	U	
2-METHYLNAPHTHALENE	360	U	
ACENAPHTHENE	2900	U	
ACENAPHTHYLENE	730	U	
ANTHRACENE	730	U	
BENZO(A)ANTHRACENE	1530		
BENZO(A)PYRENE	2120		
BENZO(B)FLUORANTHENE	3440		
BENZO(G,H,I)PERYLENE	2120		
BENZO(K)FLUORANTHENE	2250		
CHRYSENE	1360	J	P
DIBENZO(A,H)ANTHRACENE	609		
FLUORANTHENE	3270		
FLUORENE	730	U	
INDENO(1,2,3-CD)PYRENE	2250		
NAPHTHALENE	360	U	
PHENANTHRENE	730	U	
PYRENE	3660		

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	110	U	
2-METHYLNAPHTHALENE	110	U	
ACENAPHTHENE	210	U	
ACENAPHTHYLENE	210	U	
ANTHRACENE	210	U	
BENZO(A)ANTHRACENE	298	J	P
BENZO(A)PYRENE	467		
BENZO(B)FLUORANTHENE	696		
BENZO(G,H,I)PERYLENE	608		
BENZO(K)FLUORANTHENE	374		
CHRYSENE	252	J	P
DIBENZO(A,H)ANTHRACENE	103		
FLUORANTHENE	563		
FLUORENE	210	U	
INDENO(1,2,3-CD)PYRENE	473		
NAPHTHALENE	110	U	
PHENANTHRENE	210	U	
PYRENE	781		

PROJ_NO: 0039

SDG: F33161 MEDIA: SOIL DATA FRACTION: PAH

nsample	CEF-RR-SS-021-01	nsample	CEF-RR-SS-022-01	nsample	CEF-RR-SS-023-01
samp_date	7/12/2005	samp_date	7/12/2005	samp_date	7/12/2005
lab_id	F33161-9	lab_id	F33161-8	lab_id	F33161-7
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	84.4	Pct_Solids	84.7	Pct_Solids	87.0
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	390	U	
2-METHYLNAPHTHALENE	390	U	
ACENAPHTHENE	790	U	
ACENAPHTHYLENE	790	U	
ANTHRACENE	790	U	
BENZO(A)ANTHRACENE	425	J	P
BENZO(A)PYRENE	956		
BENZO(B)FLUORANTHENE	1320		
BENZO(G,H,I)PERYLENE	1180		
BENZO(K)FLUORANTHENE	553		
CHRYSENE	744	J	P
DIBENZO(A,H)ANTHRACENE	451		
FLUORANTHENE	1300	J	P
FLUORENE	790	U	
INDENO(1,2,3-CD)PYRENE	1070		
NAPHTHALENE	390	U	
PHENANTHRENE	790	U	
PYRENE	1460	J	P

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	390	U	
2-METHYLNAPHTHALENE	390	U	
ACENAPHTHENE	780	U	
ACENAPHTHYLENE	780	U	
ANTHRACENE	780	U	
BENZO(A)ANTHRACENE	1890		
BENZO(A)PYRENE	2640		
BENZO(B)FLUORANTHENE	3220		
BENZO(G,H,I)PERYLENE	2720		
BENZO(K)FLUORANTHENE	1530		
CHRYSENE	1970		
DIBENZO(A,H)ANTHRACENE	684		
FLUORANTHENE	3520		
FLUORENE	780	U	
INDENO(1,2,3-CD)PYRENE	2340		
NAPHTHALENE	390	U	
PHENANTHRENE	780	U	
PYRENE	3720		

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	380	U	
2-METHYLNAPHTHALENE	380	U	
ACENAPHTHENE	3000	U	
ACENAPHTHYLENE	750	U	
ANTHRACENE	750	U	
BENZO(A)ANTHRACENE	1650		
BENZO(A)PYRENE	2640		
BENZO(B)FLUORANTHENE	3050		
BENZO(G,H,I)PERYLENE	2280		
BENZO(K)FLUORANTHENE	1300		
CHRYSENE	1400	J	P
DIBENZO(A,H)ANTHRACENE	771		
FLUORANTHENE	1830		
FLUORENE	750	U	
INDENO(1,2,3-CD)PYRENE	2130		
NAPHTHALENE	380	U	
PHENANTHRENE	750	U	
PYRENE	3940		

PROJ_NO: 0039

SDG: F33161 MEDIA: SOIL DATA FRACTION: PAH

nsample	CEF-RR-SS-024-01	nsample	CEF-RR-SS-025-01	nsample	CEF-RR-SS-026-01
samp_date	7/12/2005	samp_date	7/12/2005	samp_date	7/12/2005
lab_id	F33161-6	lab_id	F33161-5	lab_id	F33161-4
qc_type	NM	qc_type	NM	qc_type	NM
units	UG/KG	units	UG/KG	units	UG/KG
Pct_Solids	81.8	Pct_Solids	82.9	Pct_Solids	84.1
DUP_OF:		DUP_OF:		DUP_OF:	

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	400	U	
2-METHYLNAPHTHALENE	400	U	
ACENAPHTHENE	3200	U	
ACENAPHTHYLENE	810	U	
ANTHRACENE	810	U	
BENZO(A)ANTHRACENE	2720		
BENZO(A)PYRENE	4740		
BENZO(B)FLUORANTHENE	5200		
BENZO(G,H,I)PERYLENE	4520		
BENZO(K)FLUORANTHENE	2340		
CHRYSENE	3520		
DIBENZO(A,H)ANTHRACENE	977		
FLUORANTHENE	7330		
FLUORENE	810	U	
INDENO(1,2,3-CD)PYRENE	3610		
NAPHTHALENE	400	U	
PHENANTHRENE	1970		
PYRENE	6100		

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	390	U	
2-METHYLNAPHTHALENE	390	U	
ACENAPHTHENE	780	U	
ACENAPHTHYLENE	780	U	
ANTHRACENE	780	U	
BENZO(A)ANTHRACENE	1590	J	P
BENZO(A)PYRENE	2570		
BENZO(B)FLUORANTHENE	3230		
BENZO(G,H,I)PERYLENE	2740		
BENZO(K)FLUORANTHENE	1410		
CHRYSENE	2120		
DIBENZO(A,H)ANTHRACENE	482		
FLUORANTHENE	2920		
FLUORENE	780	U	
INDENO(1,2,3-CD)PYRENE	2100		
NAPHTHALENE	390	U	
PHENANTHRENE	780	U	
PYRENE	3430		

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	390	U	
2-METHYLNAPHTHALENE	390	U	
ACENAPHTHENE	770	U	
ACENAPHTHYLENE	770	U	
ANTHRACENE	770	U	
BENZO(A)ANTHRACENE	1970		
BENZO(A)PYRENE	2630		
BENZO(B)FLUORANTHENE	3790		
BENZO(G,H,I)PERYLENE	2930		
BENZO(K)FLUORANTHENE	2280		
CHRYSENE	1760		
DIBENZO(A,H)ANTHRACENE	602		
FLUORANTHENE	3180		
FLUORENE	770	U	
INDENO(1,2,3-CD)PYRENE	2900		
NAPHTHALENE	390	U	
PHENANTHRENE	770	U	
PYRENE	3660		

PROJ_NO: 0039

SDG: F33161 MEDIA: SOIL DATA FRACTION: PAH

nsample	CEF-RR-SS-DU01
samp_date	7/12/2005
lab_id	F33161-10
qc_type	NM
units	UG/KG
Pct_Solids	83.3
DUP_OF:	CEF-RR-SS-024-01

Parameter	Result	Val Qual	Qual Code
1-METHYLNAPHTHALENE	400	U	
2-METHYLNAPHTHALENE	400	U	
ACENAPHTHENE	3200	U	
ACENAPHTHYLENE	800	U	
ANTHRACENE	800	U	
BENZO(A)ANTHRACENE	2520		
BENZO(A)PYRENE	3680		
BENZO(B)FLUORANTHENE	4520		
BENZO(G,H,I)PERYLENE	3660		
BENZO(K)FLUORANTHENE	1920		
CHRYSENE	2860		
DIBENZO(A,H)ANTHRACENE	758		
FLUORANTHENE	4430		
FLUORENE	800	U	
INDENO(1,2,3-CD)PYRENE	2940		
NAPHTHALENE	400	U	
PHENANTHRENE	800	U	
PYRENE	4670		

APPENDIX B

RESULTS AS REPORTED BY THE LABORATORY

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-018-01		
Lab Sample ID:	F33161-1	**Date Sampled:**	07/11/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3510C	**Percent Solids:**	89.0
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE033318.D	4	07/18/05	NJ	07/15/05	OP13847	GEE1295
Run #2							

	Initial Weight	Final Volume
Run #1	30.4 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	740 U	3000	740	ug/kg	
208-96-8	Acenaphthylene	740 U	3000	740	ug/kg	
120-12-7	Anthracene	740 U	1500	740	ug/kg	
56-55-3	Benzo(a)anthracene	1180	1500	370	ug/kg	I
50-32-8	Benzo(a)pyrene	2000	300	74	ug/kg	
205-99-2	Benzo(b)fluoranthene	3010	300	74	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2810	300	74	ug/kg	
207-08-9	Benzo(k)fluoranthene	1640	300	74	ug/kg	
218-01-9	Chrysene	1370	1500	370	ug/kg	I
53-70-3	Dibenzo(a,h)anthracene	392	300	74	ug/kg	
206-44-0	Fluoranthene	2030	1500	370	ug/kg	
86-73-7	Fluorene	740 U	1500	740	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2530	300	74	ug/kg	
91-20-3	Naphthalene	370 U	1500	370	ug/kg	
90-12-0	1-Methylnaphthalene	370 U	1500	370	ug/kg	
91-57-6	2-Methylnaphthalene	370 U	1500	370	ug/kg	
85-01-8	Phenanthrene	740 U	1500	740	ug/kg	
129-00-0	Pyrene	2110	1500	370	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	96%		49-124%
92-94-4	p-Terphenyl	91%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

U = Not detected MDL - Method Detection Limit I = Result > = MDL but < RL J = Estimated value
RL = Reporting Limit V = Indicates analyte found in associated method blank
L = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-019-01		
Lab Sample ID:	F33161-2	**Date Sampled:**	07/11/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3510C	**Percent Solids:**	91.1
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE033319.D	4	07/18/05	NJ	07/15/05	OP13847	GEE1295
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	2900 U	2900	2900	ug/kg	
208-96-8	Acenaphthylene	730 U	2900	730	ug/kg	
120-12-7	Anthracene	730 U	1500	730	ug/kg	
56-55-3	Benzo(a)anthracene	1530	1500	360	ug/kg	
50-32-8	Benzo(a)pyrene	2120	290	73	ug/kg	
205-99-2	Benzo(b)fluoranthene	3440	290	73	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2120	290	73	ug/kg	
207-08-9	Benzo(k)fluoranthene	2250	290	73	ug/kg	
218-01-9	Chrysene	1360	1500	360	ug/kg	I
53-70-3	Dibenzo(a,h)anthracene	609	290	73	ug/kg	
206-44-0	Fluoranthene	3270	1500	360	ug/kg	
86-73-7	Fluorene	730 U	1500	730	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2250	290	73	ug/kg	
91-20-3	Naphthalene	360 U	1500	360	ug/kg	
90-12-0	1-Methylnaphthalene	360 U	1500	360	ug/kg	
91-57-6	2-Methylnaphthalene	360 U	1500	360	ug/kg	
85-01-8	Phenanthrene	730 U	1500	730	ug/kg	
129-00-0	Pyrene	3660	1500	360	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	77%		49-124%
92-94-4	p-Terphenyl	71%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

00012

U = Not detected MDL - Method Detection Limit I = Result > = MDL but < RL J = Estimated value
RL = Reporting Limit V = Indicates analyte found in associated method blank
L = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-020-01		
Lab Sample ID:	F33161-3	**Date Sampled:**	07/11/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3510C	**Percent Solids:**	77.4
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE033326.D	1	07/19/05	NJ	07/15/05	OP13847	GEE1296
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	210 U	860	210	ug/kg	
208-96-8	Acenaphthylene	210 U	860	210	ug/kg	
120-12-7	Anthracene	210 U	430	210	ug/kg	
56-55-3	Benzo(a)anthracene	298	430	110	ug/kg	I
50-32-8	Benzo(a)pyrene	467	86	21	ug/kg	
205-99-2	Benzo(b)fluoranthene	696	86	21	ug/kg	
191-24-2	Benzo(g,h,i)perylene	608	86	21	ug/kg	
207-08-9	Benzo(k)fluoranthene	374	86	21	ug/kg	
218-01-9	Chrysene	252	430	110	ug/kg	I
53-70-3	Dibenzo(a,h)anthracene	103	86	21	ug/kg	
206-44-0	Fluoranthene	563	430	110	ug/kg	
86-73-7	Fluorene	210 U	430	210	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	473	86	21	ug/kg	
91-20-3	Naphthalene	110 U	430	110	ug/kg	
90-12-0	1-Methylnaphthalene	110 U	430	110	ug/kg	
91-57-6	2-Methylnaphthalene	110 U	430	110	ug/kg	
85-01-8	Phenanthrene	210 U	430	210	ug/kg	
129-00-0	Pyrene	781	430	110	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	88%		49-124%
92-94-4	p-Terphenyl	94%		56-141%

(a) All hits confirmed by spectral match using a diode array detector.

C0C13

U = Not detected MDL - Method Detection Limit I = Result >= MDL but < RL J = Estimated value
RL = Reporting Limit V = Indicates analyte found in associated method blank
L = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-021-01		
Lab Sample ID:	F33161-9	**Date Sampled:**	07/12/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3550B	**Percent Solids:**	84.4
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	PP006684.D	4	07/18/05	NJ	07/15/05	OP13850	GPP251
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	790 U	3100	790	ug/kg	
208-96-8	Acenaphthylene	790 U	3100	790	ug/kg	
120-12-7	Anthracene	790 U	1600	790	ug/kg	
56-55-3	Benzo(a)anthracene	425	1600	390	ug/kg	I
50-32-8	Benzo(a)pyrene	956	310	79	ug/kg	
205-99-2	Benzo(b)fluoranthene	1320	310	79	ug/kg	
191-24-2	Benzo(g,h,i)perylene	1180	310	79	ug/kg	
207-08-9	Benzo(k)fluoranthene	553	310	79	ug/kg	
218-01-9	Chrysene	744	1600	390	ug/kg	I
53-70-3	Dibenzo(a,h)anthracene	451	310	79	ug/kg	
206-44-0	Fluoranthene	1300	1600	390	ug/kg	I
86-73-7	Fluorene	790 U	1600	790	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	1070	310	79	ug/kg	
91-20-3	Naphthalene	390 U	1600	390	ug/kg	
90-12-0	1-Methylnaphthalene	390 U	1600	390	ug/kg	
91-57-6	2-Methylnaphthalene	390 U	1600	390	ug/kg	
85-01-8	Phenanthrene	790 U	1600	790	ug/kg	
129-00-0	Pyrene	1460	1600	390	ug/kg	I

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	89%		49-124%
92-94-4	p-Terphenyl	110%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

00019

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-022-01		
Lab Sample ID:	F33161-8	**Date Sampled:**	07/12/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3550B	**Percent Solids:**	84.7
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	PP006683.D	4	07/18/05	NJ	07/15/05	OP13850	GPP251
Run #2							

	Initial Weight	Final Volume
Run #1	30.3 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	780 U	3100	780	ug/kg	
208-96-8	Acenaphthylene	780 U	3100	780	ug/kg	
120-12-7	Anthracene	780 U	1600	780	ug/kg	
56-55-3	Benzo(a)anthracene	1890	1600	390	ug/kg	
50-32-8	Benzo(a)pyrene	2640	310	78	ug/kg	
205-99-2	Benzo(b)fluoranthene	3220	310	78	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2720	310	78	ug/kg	
207-08-9	Benzo(k)fluoranthene	1530	310	78	ug/kg	
218-01-9	Chrysene	1970	1600	390	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	684	310	78	ug/kg	
206-44-0	Fluoranthene	3520	1600	390	ug/kg	
86-73-7	Fluorene	780 U	1600	780	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2340	310	78	ug/kg	
91-20-3	Naphthalene	390 U	1600	390	ug/kg	
90-12-0	1-Methylnaphthalene	390 U	1600	390	ug/kg	
91-57-6	2-Methylnaphthalene	390 U	1600	390	ug/kg	
85-01-8	Phenanthrene	780 U	1600	780	ug/kg	
129-00-0	Pyrene	3720	1600	390	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	96%		49-124%
92-94-4	p-Terphenyl	98%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

0C018

U = Not detected MDL - Method Detection Limit I = Result >= MDL but < RL J = Estimated value
RL = Reporting Limit V = Indicates analyte found in associated method blank
L = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-023-01		
Lab Sample ID:	F33161-7	**Date Sampled:**	07/12/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3550B	**Percent Solids:**	87.0
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	PP006682.D	4	07/18/05	NJ	07/15/05	OP13850	GPP251
Run #2							

	Initial Weight	Final Volume
Run #1	30.6 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	3000 U	3000	3000	ug/kg	
208-96-8	Acenaphthylene	750 U	3000	750	ug/kg	
120-12-7	Anthracene	750 U	1500	750	ug/kg	
56-55-3	Benzo(a)anthracene	1650	1500	380	ug/kg	
50-32-8	Benzo(a)pyrene	2640	300	75	ug/kg	
205-99-2	Benzo(b)fluoranthene	3050	300	75	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2280	300	75	ug/kg	
207-08-9	Benzo(k)fluoranthene	1300	300	75	ug/kg	
218-01-9	Chrysene	1400	1500	380	ug/kg	I
53-70-3	Dibenzo(a,h)anthracene	771	300	75	ug/kg	
206-44-0	Fluoranthene	1830	1500	380	ug/kg	
86-73-7	Fluorene	750 U	1500	750	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2130	300	75	ug/kg	
91-20-3	Naphthalene	380 U	1500	380	ug/kg	
90-12-0	1-Methylnaphthalene	380 U	1500	380	ug/kg	
91-57-6	2-Methylnaphthalene	380 U	1500	380	ug/kg	
85-01-8	Phenanthrene	750 U	1500	750	ug/kg	
129-00-0	Pyrene	3940	1500	380	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	86%		49-124%
92-94-4	p-Terphenyl	98%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

00017

U = Not detected MDL - Method Detection Limit I = Result >= MDL but < RL J = Estimated value
RL = Reporting Limit V = Indicates analyte found in associated method blank
L = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-024-01		
Lab Sample ID:	F33161-6	**Date Sampled:**	07/12/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3550B	**Percent Solids:**	81.8
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	PP006681.D	4	07/18/05	NJ	07/15/05	OP13850	GPP251
Run #2							

	Initial Weight	Final Volume
Run #1	30.2 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	3200 U	3200	3200	ug/kg	
208-96-8	Acenaphthylene	810 U	3200	810	ug/kg	
120-12-7	Anthracene	810 U	1600	810	ug/kg	
56-55-3	Benzo(a)anthracene	2720	1600	400	ug/kg	
50-32-8	Benzo(a)pyrene	4740	320	81	ug/kg	
205-99-2	Benzo(b)fluoranthene	5200	320	81	ug/kg	
191-24-2	Benzo(g,h,i)perylene	4520	320	81	ug/kg	
207-08-9	Benzo(k)fluoranthene	2340	320	81	ug/kg	
218-01-9	Chrysene	3520	1600	400	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	977	320	81	ug/kg	
206-44-0	Fluoranthene	7330	1600	400	ug/kg	
86-73-7	Fluorene	810 U	1600	810	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	3610	320	81	ug/kg	
91-20-3	Naphthalene	400 U	1600	400	ug/kg	
90-12-0	1-Methylnaphthalene	400 U	1600	400	ug/kg	
91-57-6	2-Methylnaphthalene	400 U	1600	400	ug/kg	
85-01-8	Phenanthrene	1970	1600	810	ug/kg	
129-00-0	Pyrene	6100	1600	400	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	66%		49-124%
92-94-4	p-Terphenyl	92%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

000016

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-025-01		
Lab Sample ID:	F33161-5	**Date Sampled:**	07/12/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3550B	**Percent Solids:**	82.9
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	PP006680.D	4	07/18/05	NJ	07/15/05	OP13850	GPP251
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	780 U	3100	780	ug/kg	
208-96-8	Acenaphthylene	780 U	3100	780	ug/kg	
120-12-7	Anthracene	780 U	1600	780	ug/kg	
56-55-3	Benzo(a)anthracene	1590	1600	390	ug/kg	I
50-32-8	Benzo(a)pyrene	2570	310	78	ug/kg	
205-99-2	Benzo(b)fluoranthene	3230	310	78	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2740	310	78	ug/kg	
207-08-9	Benzo(k)fluoranthene	1410	310	78	ug/kg	
218-01-9	Chrysene	2120	1600	390	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	482	310	78	ug/kg	
206-44-0	Fluoranthene	2920	1600	390	ug/kg	
86-73-7	Fluorene	780 U	1600	780	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2100	310	78	ug/kg	
91-20-3	Naphthalene	390 U	1600	390	ug/kg	
90-12-0	1-Methylnaphthalene	390 U	1600	390	ug/kg	
91-57-6	2-Methylnaphthalene	390 U	1600	390	ug/kg	
85-01-8	Phenanthrene	780 U	1600	780	ug/kg	
129-00-0	Pyrene	3430	1600	390	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	87%		49-124%
92-94-4	p-Terphenyl	86%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

0C015

U = Not detected MDL - Method Detection Limit
RL = Reporting Limit
L = Indicates value exceeds calibration range

I = Result >= MDL but < RL J = Estimated value
V = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-026-01		
Lab Sample ID:	F33161-4	**Date Sampled:**	07/12/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3510C	**Percent Solids:**	84.1
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	EE033321.D	4	07/18/05	NJ	07/15/05	OP13847	GEE1295
Run #2							

	Initial Weight	Final Volume
Run #1	30.8 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	770 U	3100	770	ug/kg	
208-96-8	Acenaphthylene	770 U	3100	770	ug/kg	
120-12-7	Anthracene	770 U	1500	770	ug/kg	
56-55-3	Benzo(a)anthracene	1970	1500	390	ug/kg	
50-32-8	Benzo(a)pyrene	2630	310	77	ug/kg	
205-99-2	Benzo(b)fluoranthene	3790	310	77	ug/kg	
191-24-2	Benzo(g,h,i)perylene	2930	310	77	ug/kg	
207-08-9	Benzo(k)fluoranthene	2280	310	77	ug/kg	
218-01-9	Chrysene	1760	1500	390	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	602	310	77	ug/kg	
206-44-0	Fluoranthene	3180	1500	390	ug/kg	
86-73-7	Fluorene	770 U	1500	770	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2900	310	77	ug/kg	
91-20-3	Naphthalene	390 U	1500	390	ug/kg	
90-12-0	1-Methylnaphthalene	390 U	1500	390	ug/kg	
91-57-6	2-Methylnaphthalene	390 U	1500	390	ug/kg	
85-01-8	Phenanthrene	770 U	1500	770	ug/kg	
129-00-0	Pyrene	3660	1500	390	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	77%		49-124%
92-94-4	p-Terphenyl	75%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

00014

U = Not detected MDL - Method Detection Limit I = Result >= MDL but < RL J = Estimated value
RL = Reporting Limit V = Indicates analyte found in associated method blank
L = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	CEF-RR-SS-DU01		
Lab Sample ID:	F33161-10	**Date Sampled:**	07/12/05
Matrix:	SO - Soil	**Date Received:**	07/13/05
Method:	SW846 8310 SW846 3550B	**Percent Solids:**	83.3
Project:	NAS Cecil Field 0039		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	PP006685.D	4	07/18/05	NJ	07/15/05	OP13850	GPP251
Run #2							

	Initial Weight	Final Volume
Run #1	30.1 g	5.0 ml
Run #2		

Polynuclear Aromatic Hydrocarbons

CAS No.	Compound	Result	RL	MDL	Units	Q
83-32-9	Acenaphthene	3200 U	3200	3200	ug/kg	
208-96-8	Acenaphthylene	800 U	3200	800	ug/kg	
120-12-7	Anthracene	800 U	1600	800	ug/kg	
56-55-3	Benzo(a)anthracene	2520	1600	400	ug/kg	
50-32-8	Benzo(a)pyrene	3680	320	80	ug/kg	
205-99-2	Benzo(b)fluoranthene	4520	320	80	ug/kg	
191-24-2	Benzo(g,h,i)perylene	3660	320	80	ug/kg	
207-08-9	Benzo(k)fluoranthene	1920	320	80	ug/kg	
218-01-9	Chrysene	2860	1600	400	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	758	320	80	ug/kg	
206-44-0	Fluoranthene	4430	1600	400	ug/kg	
86-73-7	Fluorene	800 U	1600	800	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	2940	320	80	ug/kg	
91-20-3	Naphthalene	400 U	1600	400	ug/kg	
90-12-0	1-Methylnaphthalene	400 U	1600	400	ug/kg	
91-57-6	2-Methylnaphthalene	400 U	1600	400	ug/kg	
85-01-8	Phenanthrene	800 U	1600	800	ug/kg	
129-00-0	Pyrene	4670	1600	400	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
84-15-1	o-Terphenyl	87%		49-124%
92-94-4	p-Terphenyl	97%		56-141%

(a) All hits confirmed by spectral match using a diode array detector. Dilution required due to matrix interference.

CCC20

U = Not detected MDL - Method Detection Limit I = Result > = MDL but < RL J = Estimated value
RL = Reporting Limit V = Indicates analyte found in associated method blank
L = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

location	CEF-RR-SS-008	CEF-RR-SS-009	CEF-RR-SS-010	CEF-RR-SS-011	CEF-RR-SS-012	CEF-RR-SS-013
nsample	CEF-RB-SS-008-02	CEF-RB-SS-009-02	CEF-RB-SS-010-02	CEF-RB-SS-011-02	CEF-RB-SS-012-02	CEF-RB-SS-013-02
top_depth	1-2	1-2	1-2	1-2	1-2	1-2
sample_dat	10/15/2001	10/15/2001	10/15/2001	10/15/2001	10/15/2001	10/15/2001
sample_cod	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
PAHs (ug/kg)						
1-METHYLNAPHTHALENE	770 UJ	390 UJ	390 UJ	1400 UJ	3600 UJ	390 UJ
2-METHYLNAPHTHALENE	770 UJ	390 UJ	390 UJ	1400 UJ	3600 UJ	390 UJ
ACENAPHTHENE	1500 UJ	790 UJ	780 UJ	2800 UJ	7200 UJ	780 UJ
ACENAPHTHYLENE	1500 UJ	790 UJ	780 UJ	2800 UJ	7200 UJ	780 UJ
ANTHRACENE	770 UJ	390 UJ	390 UJ	1400 UJ	3600 UJ	390 UJ
BAPEQUIVALENT	1107.28	209.511	39	1260.33	3208.97	39
BENZO(A)ANTHRACENE	557 J	390 UJ	390 UJ	1400 UJ	1600 J	390 UJ
BENZO(A)PYRENE	845 J	128 J	78 UJ	882 J	2240 J	78 UJ
BENZO(B)FLUORANTHENE	694 J	118 J	78 UJ	932 J	2410 J	78 UJ
BENZO(G,H,I)PERYLENE	565 J	128 J	78 UJ	861 J	1990 J	78 UJ
BENZO(K)FLUORANTHENE	494 J	93.6 J	78 UJ	698 J	1900 J	78 UJ
CHRYSENE	840 J	390 UJ	390 UJ	1150 J	3970 J	390 UJ
DIBENZO(A,H)ANTHRACENE	150 UJ	79 UJ	78 UJ	280 UJ	720 UJ	78 UJ
FLUORANTHENE	1280 J	390 UJ	390 UJ	2820 J	11300 J	390 UJ
FLUORENE	770 UJ	390 UJ	390 UJ	1400 UJ	3600 UJ	390 UJ
INDENO(1,2,3-CD)PYRENE	564 J	95.8 J	78 UJ	670 J	1850 J	78 UJ
NAPHTHALENE	770 UJ	390 UJ	390 UJ	1400 UJ	3600 UJ	390 UJ
PHENANTHRENE	770 UJ	390 UJ	390 UJ	830 J	3030 J	390 UJ
PYRENE	1350 J	390 UJ	390 UJ	2420 J	9030 J	390 UJ
Misc						
PERCENT SOLIDS	84.2	84.2	83.6	94.8	91.1	85.4

location	CEF-RR-SS-014	CEF-RR-SS-014	CEF-RR-SS-014	CEF-RR-SS-015	CEF-RR-SS-016	CEF-RR-SS-017
nsample	CEF-RB-SS-014-02	CEF-RB-SS-014-02-AVG	CEF-RB-SS-014-02-D	CEF-RB-SS-015-02	CEF-RB-SS-016-02	CEF-RB-SS-017-02
top_depth	1-2	1-2	1-2	1-2	1-2	1-2
sample_dat	10/15/2001	10/15/2001	10/15/2001	10/15/2001	10/15/2001	10/15/2001
sample_cod	ORIG	AVG	DUP	NORMAL	NORMAL	NORMAL
PAHs (ug/kg)						
1-METHYLNAPHTHALENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	3700 UJ
2-METHYLNAPHTHALENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	3700 UJ
ACENAPHTHENE	790 UJ	790 UJ	790 UJ	800 UJ	740 UJ	7500 UJ
ACENAPHTHYLENE	790 UJ	790 UJ	790 UJ	800 UJ	740 UJ	7500 UJ
ANTHRACENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	3700 UJ
BAPEQUIVALENT	39.5	39.5	39.5	40	37	5376.65
BENZO(A)ANTHRACENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	3040 J
BENZO(A)PYRENE	79 UJ	79 UJ	79 UJ	80 UJ	74 UJ	4010 J
BENZO(B)FLUORANTHENE	79 UJ	79 UJ	79 UJ	80 UJ	74 UJ	3750 J
BENZO(G,H,I)PERYLENE	79 UJ	79 UJ	79 UJ	80 UJ	74 UJ	3260 J
BENZO(K)FLUORANTHENE	79 UJ	79 UJ	79 UJ	80 UJ	74 UJ	3150 J
CHRYSENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	7150 J
DIBENZO(A,H)ANTHRACENE	79 UJ	79 UJ	79 UJ	80 UJ	74 UJ	750 UJ
FLUORANTHENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	6690 J
FLUORENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	3700 UJ
INDENO(1,2,3-CD)PYRENE	79 UJ	79 UJ	79 UJ	80 UJ	74 UJ	2740 J
NAPHTHALENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	3700 UJ
PHENANTHRENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	3700 UJ
PYRENE	390 UJ	390 UJ	390 UJ	400 UJ	370 UJ	7420 J
Misc						
PERCENT SOLIDS	83.6	84.05	84.5	80.7	89.7	86.6

APPENDIX B

SITE-SPECIFIC CONSTRUCTION, UTILITY, AND RECREATIONAL SCTL CALCULATIONS

CONSTRUCTION WORKER

Development of SCTL for Carcinogenic PAHs (BaPEq)

SCTL=[(TR)(BW)(AT)]/{(EF)(ED)(FC)[((SFo)(IRo)(10E-06 kg/mg))+((SFd)(SA)(AF)(DA)(10E-06 kg/mg))+((SFi)(IRi)(1/VF+1/PEF))]}

TR	1.00E-06		Target Risk	FDEP target
BW	76.1	kg	Body weight	Adult Construction Worker
AT	25550	d	Averaging time	DEFAULT
EF	250	d	Exposure frequency	6 months per year
ED	1	y	Exposure duration	compromise from cattle dip vat program
FC	1		Fraction from source	fraction from contaminated source
IRo	330	mg/day	Ingestion rate	EPA 2002
SA	3000	cm2	Surface area	default worker state (compromise value)
AF	0.3	mg/cm2	Adherance factor	adult residential EPA dermal guidance (1997)
IRI	15	m3/day	Inhalation rate	default worker state

SFO	7.3		Oral cancer slope factor	
SFD	14.6		Dermal cancer slope factor	FDEP GI absorption factor of 0.5
DA	0.01		Dermal absorption factor	
SFI	3.1		Inhalation cancer slope factor	
VF	2.96E+07		Volatilization factor	
PEF	1.24E+09		Particulate emission factor	

A	0.00777742		GENERAL TERM	[(TR)(BW)(AT)] / [(EF)(ED)(FC)]
B	0.002409		ORAL TERM	(SFo)(IRo)(1E-06)
C	0.0001314		DERMAL TERM	(SFd)(SA)(AF)(DA)(1E-06)
D	1.61E-06		INHALATION TERM	(SFi)(IRi)(1/VF + 1/PEF)

SCTL **3.06E+00 mg/kg** A / (B + C + D)

3.06E+03 ug/kg

UTILITY WORKER

Development of SCTL for Carcinogenic PAHs (BaPEq)

SCTL=[(TR)(BW)(AT)]/{(EF)(ED)(FC)[((SFo)(IRo)(10E-06 kg/mg))+((SFd)(SA)(AF)(DA)(10E-06 kg/mg))+((SFi)(IRi)(1/VF+1/PEF))]}

TR	1.00E-06		Target Risk	FDEP target
BW	76.1	kg	Body weight	ADULT WORKER
AT	25550	d	Averaging time	DEFAULT
EF	10	d	Exposure frequency	2 weeks per year
ED	25	y	Exposure duration	default worker state
FC	1		Fraction from source	fraction from contaminated source
IRo	330	mg/day	Ingestion rate	EPA 2002
SA	3000	cm2	Surface area	default worker state (compromise value)
AF	0.3	mg/cm2	Adherance factor	adult worker (EPA Dermal Guidance)
IRI	15	m3/day	Inhalation rate	default worker state

SFO	7.3		Oral cancer slope factor	
SFD	14.6		Dermal cancer slope factor	FDEP GI absorption factor of 0.5
DA	0.01		Dermal absorption factor	
SFI	3.1		Inhalation cancer slope factor	
VF	2.96E+07		Volatilization factor	
PEF	1.24E+09		Particulate emission factor	

A	0.00777742		GENERAL TERM	[(TR)(BW)(AT)] / [(EF)(ED)(FC)]
B	0.002409		ORAL TERM	(SFo)(IRo)(1E-06)
C	0.0001314		DERMAL TERM	(SFd)(SA)(AF)(DA)(1E-06)
D	1.61E-06		INHALATION TERM	(SFi)(IRi)(1/VF + 1/PEF)

SCTL **3.06E+00 mg/kg** A / (B + C + D)

3.06E+03 ug/kg

RECREATIONAL

Development of SCTL for Carcinogenic PAHs (BaPEq)

SCTL=[(TR)(BW)(AT)]/{(EF)(ED)(FC)[((SFo)(IRo)(10E-06 kg/mg))+((SFd)(SA)(AF)(DA)(10E-06 kg/mg))+((SFi)(IRi)(1/VF+1/PEF))]}

TR	1.00E-06		Target Risk	FDEP target
BW	35	kg	Body weight	ADULT RECREATIONAL USER
AT	25550	d	Averaging time	DEFAULT
EF	50	d	Exposure frequency	1 day/wk; 50 wks/yr compromise from cattle dip vat program
ED	20	y	Exposure duration	compromise from cattle dip vat program
FC	1		Fraction from source	fraction from contaminated source
IRo	100	mg/day	Ingestion rate	default worker state
SA	3000	cm2	Surface area	default worker state (compromise value)
AF	0.2	mg/cm2	Adherance factor	adult residential EPA dermal guidance (1997)
IRI	15	m3/day	Inhalation rate	default worker state

SFO	7.3		Oral cancer slope factor	
SFD	14.6		Dermal cancer slope factor	FDEP GI absorption factor of 0.5
DA	0.01		Dermal absorption factor	
SFI	3.1		Inhalation cancer slope factor	
VF	2.96E+07		Volatilization factor	
PEF	1.24E+09		Particulate emission factor	

A	0.00089425		GENERAL TERM	[(TR)(BW)(AT)] / [(EF)(ED)(FC)]
B	0.00073		ORAL TERM	(SFo)(IRo)(1E-06)
C	0.0000876		DERMAL TERM	(SFd)(SA)(AF)(DA)(1E-06)
D	1.61E-06		INHALATION TERM	(SFi)(IRi)(1/VF + 1/PEF)

SCTL **1.09E+00 mg/kg** A / (B + C + D)

1.09E+03 ug/kg