



C AFB 05

DEPARTMENT OF THE AIR FORCE
27TH CIVIL ENGINEER SQUADRON (ACC)
CANNON AIR FORCE BASE NEW MEXICO

APR 19 2005

Lieutenant Colonel Alexander P. Karibian
Commander
506 N DL Ingram Blvd
Cannon AFB NM 88103-5003

Mr. James Bearzi
Hazardous Waste Bureau Chief
New Mexico Environment Department
2905 Rodeo Dr E Building 1
Santa Fe NM 87505-6303



Dear Mr. Bearzi

Cannon Air Force Base has submitted under separate cover two copies of the Final Report - Phase I Soil Investigation Fire Training Area 04, Cannon Air Force Base, New Mexico, dated Jan 05, for your review and records. These copies were sent to Mr. David Cobrain in your Santa Fe Office.

The purpose of this investigation was to confirm previously identified contamination caused by historical jet fuel releases. Contamination was confirmed and soil excavation is planned as an initial corrective measure at this site.

If you have any questions regarding this information, please contact Mrs. Sheila Newman, Environmental Flight, at (505) 784-6391 or email sheila.newman@cannon.af.mil.

Sincerely

ALEXANDER P. KARIBIAN, Lt Col, USAF



DEPARTMENT OF THE AIR FORCE
27TH CIVIL ENGINEER SQUADRON (ACC)
CANNON AIR FORCE BASE NEW MEXICO

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Lieutenant Colonel Alexander P. Karibian
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506 N DL Ingram Blvd
Cannon AFB NM 88103-5003

Mr. David Cobrain
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Dr E Building 1
Santa Fe NM 87505-6303

Dear Mr. Cobrain

Enclosed for your review and records are two copies of the Final Report – Phase I Investigation at Fire Training Area 04, Cannon Air Force Base, New Mexico, dated Jan 05. Fire Training Area 04 consists of Solid Waste Management Units 109, 110, 111, and 112.

The purpose of this investigation was to confirm previously identified contamination caused by historical jet fuel releases. Contamination was confirmed and soil excavation is planned as an initial corrective measure at this site.

If you have any questions regarding this information, please contact Mrs. Sheila Newman, Environmental Flight, at (505) 784-6391 or email sheila.newman@cannon.af.mil.

Sincerely

A handwritten signature in black ink that reads "Alexander P. Karibian". The signature is written in a cursive style with a large, sweeping initial "A".

ALEXANDER P. KARIBIAN, Lt Col, USAF

Attachment:
Final Report – Phase I Investigation at Fire Training Area 04, Cannon Air Force Base, New Mexico (2 cys)

Report
Phase I Investigation
Soil Corrective Measures
Fire Training Area 04
Cannon AFB,

This disc has been
scanned and found
to be virus free.

Prepared By



January 10, 2005

RESPONSE TO COMMENTS
Draft Report dated December 11, 2004
Phase I Investigation - Soil Corrective Measures
Fire Training Area 04, Cannon Air Force Base, New Mexico

Comments received from Jane Davey, Project Manager, U.S. Army Corps of Engineers (USACE) on December 23, 2004.

1. Page 1, Section 1.0 Introduction, 2nd paragraph: The text states that relevant historical investigative data from Tetra Tech Foster Wheeler's May 21, 2004 Technical Memorandum is included in Appendix A of the report. Is it clearly understood that a complete copy of the Technical Memorandum is included in the Work Plan as NMED had requested? I have checked with the Base to see if NMED will receive a copy of the Work Plan. If not, perhaps the complete Technical Memorandum be included in Appendix A.

Response: For the reader's convenience, the entire Technical Memorandum will be included in Appendix A of the final report.

2. Page 1, Section 1.0 Introduction, 2nd paragraph, last sentence: Correct "an" to "and".

Response: Correction made.

3. Page 3, Section 2.3 Site Investigative History, last paragraph, last sentence: Correct "exceed" to "exceeded".

Response: Correction made.

4. Page 4, Section 2.5 Regulatory Framework, first sentence: Should the date of the current permit (issued 14 Oct 03 and effective 13 Nov 03) be stated rather than "original"?

Response: The first sentence of this section was revised to include the issuance and effective dates as suggested.

5. Page 6, Section 4.2.3 Borehole Abandonment, second sentence: The borehole abandonment was a non-approved variance to the approved SAP. The New Mexico Underground Storage Tank Bureau "Guidelines for Corrective Action" (March 2000) was also specified for borehole abandonment in the Work Plan. Was there a variance from these guidelines?

Response: This section was revised to state that the abandonment method was in variance to the SAP and New Mexico guidance.

6. Page 8, Section 5.0 Results of the Investigation, first sentence: Please correct "Phase II" to "Phase I".

Response: Correction made.

RESPONSE TO COMMENTS
Draft Report dated December 11, 2004
Phase I Investigation - Soil Corrective Measures
Fire Training Area 04, Cannon Air Force Base, New Mexico

Comments received from Sheila Newman, RCRA Coordinator for Cannon AFB on December 29, 2004.

1. Add the word "a" in the Executive Summary second paragraph, seventh line before northeast;

Response: Correction made.

2. The Technical Memorandum is not included in Appendix A as stated on the page 1 introduction. It is however complete in the Work Plan and NMED does have an electronic copy of that Work Plan.

Response: As stated earlier, the entire Technical Memorandum will be included in Appendix A of the final report.

3. The pictures in Appendix F in my hard copy are upside down.

Response: Correction made.

Comments received from Kim Mulhern, Project Geologist, U.S. Army Corps of Engineers (USACE) on January 4, 2005.

1. Page 4. Should the Acronym be LF-4 rather than LF-5?

Response: Landfill 5 is the correct site name. The acronym was changed to LF-05 to be consistent with earlier reports.

2. Page 5, Last paragraph of ES, should "be" instead be "is" or "will be"

Response: Correction to "is" made.

3. Page 7: Second sentence of 2.2.2. This should be LF-5 not LF-4.

Response: Correction made.

4. Page 10: Second paragraph of Section 4.2. Please include a rationale for additional soil boring location as well as the adjustments for field conditions, i.e., what were the offsets and what were the field conditions that necessitated the offsets.

Response: Specific borehole placement information was added to this section.

5. Soil boring logs: If bedrock was not encountered, then log should have 51.0' as overburden thickness and 0.0' as depth drilled into rock.

Response: Corrected on final boring log (CADD version).

6. Soil boring logs: If these are CADD for final version, please format according to the SOP.

Response: Soil boring logs will be converted to CADD (through gINT software) using HTRW forms. Final format will be in accordance with the USACE geologic logging SOP.

RESPONSE TO COMMENTS

Draft Report dated December 11, 2004

Phase I Investigation - Soil Corrective Measures
Fire Training Area 04, Cannon Air Force Base, New Mexico

7. Soil boring logs: boring logs in the final report are supposed to be CADD drafted. Was this requirement included during negotiations?

Response: Final form of the soil boring logs was not included in negotiations; however, in response to this comment we will have soil boring logs in CADD form for the final report.

8. Soil boring logs: Line-outs should be initialed.

Response: Line-outs were initialed on hand-written forms. CADD version of logs will include only corrected information.

9. Soil boring logs: Bottom of hole should be marked across all columns with a double line and BOH depth in feet.

Response: Correction made on hand-written logs and will be shown on CADD version of logs in final report.

Comments received from Paula Peters, Project Chemist, U.S. Army Corps of Engineers (USACE) on January 4, 2005.

1. Figure3 – The field duplicate results for samples CAFB-SB04, CAFB-200405, and CAFB-SB01 need to be included on this figure.

Response: Addition made.

2. Appendix A Chain of Custody Forms

a. Form 232090: Several samples were taken on 15 Nov 04, but not shipped to the lab until 17 Nov 04. In order to make it easier to labs to meet holding times, all samples should be shipped within 24 hours of being taken.

b. Form 232091: Again, a few samples were taken on 15 Nov 04, but not shipped until 2 days later. Also, the date “relinquished by” on the chain of custody was shown as 10/17/04, when it should have been 10/17/04.

Response: TN&A coordinated and communicated with the subcontract laboratory to ensure that holding time requirements were met. No holding time violations resulted for this project. The correct “relinquish” dates were written on both chain of custody forms. No changes were made in the document in response to this comment.

3. Appendix C, Data Validation Report, page 4, Minor Issues – This section needs to better explain the dilution of the nineteen samples for TPH and how that effected the percent recovery for the surrogates. List out all of the samples and the dilutions, and explain what happened. Some samples were diluted 20 times, 50 times, and even 100 times. This will give the reader a clearer picture of how dilution affects recoveries of spiked samples. Because the QC results were not provided (MS/MSD and LCS), I was not able to fully investigate the problem. A complete discussion in the Data Validation Report will clarify the problem.

RESPONSE TO COMMENTS
Draft Report dated December 11, 2004
Phase I Investigation - Soil Corrective Measures
Fire Training Area 04, Cannon Air Force Base, New Mexico

Response: The data validation report states on page 4 that the reason that samples were diluted was because of high analyte concentration. There was no other reason for the dilutions. The effect on surrogate recoveries is also stated. Despite the dilution the resultant data are still considered valid and useable for the purpose of this project, which was to confirm already known areas of TPH contamination. Dilution factors for each sample were added to table 1 for clarification. QA/QC summary pages from the data package were added to Appendix C (see below).

4. Appendix C to Appendix C – Summary of Qualified Results - No qualified results are shown. If none of the results are qualified, then a statement to that effect needs to be included.

Response: Appendix C has been changed to include MS/MSD and LCS recovery forms from the data package instead of qualified results as no qualifiers were added. The statement “No qualification was applied to analytical results as a result of data validation” has been added to the text for clarification.

Comments received from Carol Bieniulis, Project Manager, Tetra Tech Foster Wheeler, on January 5, 2005.

1. General: My review was conducted with regards to the presentation of information and data that will be used to develop a plan for corrective action of the site. The focus of the review was Sections 4 and 5, as well as Appendices B, C, and F.

Response: No response required.

2. General: The correct name of our company is Tetra Tech FW, Inc. and it is abbreviated as TtFW. The use of “Foster Wheeler” is prohibited since the acquisition of Foster Wheeler Environmental by Tetra Tech in March 2003.

Response: Correction made.

3. General: Somewhere in the report it should be noted that vehicle traffic occasionally flows through the area. During staking operations, a vehicle was observed to travel across the FTA4 site. It is very likely that traffic has probably traveled across the area for several years.

Response: This note was added to section 4.1 Site Access, Utility Clearance, and Permits, page 5.

4. Comment withdrawn by TtFW.

5. Section 4.2: Just a note... We may want to revise the GIS coverage of the location of the former concrete pad. The locations of the soil borings were, for the most part, found from original markers still remaining in the field. If the relative location of the former concrete pad and the original soil borings is correct, the GIS coverage for the pad needs to be moved to the southwest as shown in Figure 3.

RESPONSE TO COMMENTS

Draft Report dated December 11, 2004

Phase I Investigation - Soil Corrective Measures
Fire Training Area 04, Cannon Air Force Base, New Mexico

Response: After further discussion of this comment with Ms. Bieniulis, the location of the former concrete pad outline (on Figure 3) was moved to the southwest. This location on the drawing provides better agreement with how the boreholes were located in the field and with Ms. Bieniulis' knowledge of the site. Additionally, the revised Figure 3 pad location coincides with field observations of the depression that collected rain water at the time of the investigation. However, the revised location does not agree with survey coordinates that we were provided.

6. Section 5: Please verify where soil boring SB04 was located in the field. Was it located adjacent to the pipe structure still remaining on the site from previous operations? This area is definitely suspect. While staking sample locations stained and distressed vegetation was observed at this location and we were unsure whether SB04 was originally located here or elsewhere since a marker could not be found at the time for SB04.

Response: We are confident of the location of SB04 as shown on Figure 3. The distressed vegetation area and stand pipe near this boring can be seen in Appendix F, Photo #573. Text for this photograph was revised to indicate the drilling location of SB04.

Response to Comments prepared by:

Nova Clite, PG
Sr. Hydrogeologist/Project Manager
T N & Associates, Inc.

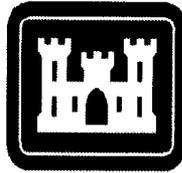
REPORT
PHASE I INVESTIGATION
SOIL CORRECTIVE MEASURES
FIRE TRAINING AREA 04
CANNON AIR FORCE BASE, NEW MEXICO



LIBRARY COPY

Final – January 10, 2005

Prepared for



UNITED STATES ARMY
CORPS OF ENGINEERS
OMAHA DISTRICT
106 South 15th Street
Omaha, Nebraska 68102-1618

Contract No. DACA45-00-D-0006/0006

Prepared by

T N & Associates, Inc.
1033 N. Mayfair Road
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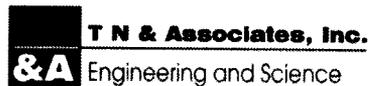


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ABBREVIATIONS AND ACRONYMS

AFB	Air Force Base
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CEV	Base Environmental Flight
CM	Corrective Measure
CMS	Corrective Measures Study
DPT	direct-push technology
DQCR	Daily Quality Control Report
DRO	diesel-range organics
FTA4	Fire Training Area 04
GPS	Global Positioning System
IDW	investigative-derived waste
JP-4	Jet Propellant 4
LF-05	Landfill 5
mg/kg	milligram per kilogram
MS/MSD	matrix spike/matrix spike duplicate
NMED	New Mexico Environment Department
PID	photoionization detector
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SSHP	Site Safety and Health Plan
SWMU	Solid Waste Management Unit
TCE	trichloroethene
TN&A	T N & Associates, Inc.
TPH	total petroleum hydrocarbons
TtFW	Tetra Tech FW, Inc.
USACE	United States Army Corps of Engineers
U.S. EPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

During November 15 – 18, 2004, T N & Associates, Inc. (TN&A) performed a Phase I soil investigation at the former Fire Training Area 04 (FTA4) at Cannon Air Force Base (AFB) in Clovis, New Mexico. This work was performed for the United States Army Corps of Engineers – Omaha District (USACE) under Contract Number DACA45-00-D-0006, Delivery Order 0006. The purpose of the Phase I soil investigation was to confirm previously identified contamination caused by historical jet fuel releases. The investigation was focused primarily at Solid Waste Management Unit (SWMU) 109, but included one boring at SWMU 111/112. The boring at SWMU 111/112 did not identify soil contamination at that location.

TN&A collected 34 soil samples from 13 borings for analysis of total petroleum hydrocarbons – diesel-range organics (TPH-DRO) by a fixed-base laboratory. Field screening of soil head-space was performed using a calibrated photoionization detector (PID). The analytical results confirm that soils in the SWMU 109 area are impacted with residual TPH-DRO at concentrations greater than State of New Mexico standards for both residential direct exposure [940 milligrams per kilograms (mg/kg)] and industrial direct exposure (2,350 mg/kg) for jet fuel. TPH-contaminated soils are in a northeast-southwest trending plume measuring approximately 70 - 90 feet wide by 175 feet long. The depth of contamination ranges from less than 3 feet to greater than 20 feet, but generally declines to below state regulatory criteria within 10 feet below ground surface.

The Phase I soil investigation has met the objective of confirming previously identified TPH contamination in the FTA4 area. Additionally, sufficient soil data now exist to finalize selection of the corrective measure (CM) for this site. If excavation is selected as the final CM, TN&A recommends that PID head-space readings with confirmatory sampling or field tests for TPH-DRO be employed to reliably determine excavation extent.

1.0 INTRODUCTION

TN & Associates, Inc. (TN&A) has prepared this Report for the United States Army Corps of Engineers – Omaha District (USACE) under Contract Number DACA45-00-D-0006, Delivery Order 0006. The purpose of this Report is to describe the work that was performed during November 15 – 18, 2004 to confirm petroleum hydrocarbon contaminated soils at the former Fire Training Area 04 (FTA4) at Cannon Air Force Base (AFB) in Clovis, New Mexico. FTA4 consists of Solid Waste Management Units (SWMUs) 109, 110, 111, and 112. SWMU 109 was the primary focus of the investigation, as it is the area that was impacted the most by recent activities at FTA4.

The *Technical Memorandum, Evaluation of Total Petroleum Hydrocarbons in Soil at Fire Training Area 4, Cannon AFB, New Mexico*, dated May 21, 2004, prepared by Tetra Tech FW, Inc. (TtFW) presents the background information and rationale to confirm the concentration of total petroleum hydrocarbons (TPH) in soil at FTA4. The memorandum is included in Appendix A of this report. TN&A prepared a Work Plan based on this Technical Memorandum, which was reviewed and approved by the USACE and Cannon AFB (TN&A, November 2004).

This Report presents the project purpose and objectives, background information, a description of the field work performed, and results of the investigation. Tables and Figures follow the text. Soil boring logs are provided in Appendix B. Laboratory analytical results, chain-of-custody forms, and a Data Quality Control Summary are provided as Appendix C. Base Civil Engineering Work Clearance paperwork is provided in Appendix D. Daily Quality Control Reports are provided in Appendix E. Photographs documenting the FTA4 site conditions and field work for this project are shown in Appendix F.

2.0 SITE DESCRIPTION

2.1 Site Background

Cannon AFB is an active United States Department of Defense installation located in southeastern Curry County, New Mexico, approximately 5 miles west of Clovis and south of U.S. Highway 60/84 (Figure 1). The installation has been used by the Department of Defense for more than 50 years. The Base started as a training base for B-17 crews during World War II.

As stated above, FTA4 consists of SWMUs 109, 110, 111, and 112. SWMU 109 was used as a fuel truck cleaning area between 1961 and 1974. An estimated 3,000 to 4,000 gallons of fuel percolated into the ground as a result of these activities [Walk, Haydel, and Associates, Inc. (Walk, Haydel, and Associates), 1990]. In 1974, the SWMU 109 site was activated as a fire training area. Commingled waste oils, solvents, and recovered Jet Propellant 4 (JP-4) were burned during fire training exercises conducted from 1974 to 1975. An underground

storage tank (SWMU 110) was installed in 1975. Only recovered JP-4 was used as fuel for fire training exercises from 1975 to 1995. After that, SWMU 109 was no longer used as a fire training area [Harza Environmental Services (Harza), 1997].

SWMU 109 contained a 40-foot by 70-foot, rebar-reinforced, concrete-lined pit with a 4-foot tall berm that was removed in December 2000. The pit was filled with gravel and included internal drainage features that conveyed excess fuel and water to the oil/water separator (SWMU 112) located in the northeastern part of the site. These drainage features included an underground pipe running from the pit to the oil/water separator. The separator was removed in 1997; however, the underground pipe is still in place. A mock airplane was formerly located in the center of the pit. Details of pit construction were confirmed using as-built drawings provided by Cannon AFB. The concrete pit was reportedly saturated with water during some fire training exercises. An above-ground fuel tank supplied fuel to the burn pit via an underground pipeline. The above-ground tank is presently empty and remains on site.

As part of the fire training system SWMU 111 (an unlined pit) was used to collect runoff from SWMU 109 after the fires were extinguished. The pit was backfilled in 1985 when the oil/water separator was installed at SWMU 112. One soil sample collected in the vicinity of SWMU 111 (SB14 on Figure 2) identified TPH at 1,040 milligrams per kilogram (mg/kg) at a depth of 1 foot.

2.2 Physical Conditions

2.2.1 Soils and Geology

Soils underlying FTA4 consist of sandy loam and loamy sand of the Amarillo soil group. The soils consist primarily of a fine-grained, well-sorted silty/clayey, unconsolidated, brown/reddish-brown sand. Such soils are generally classified as silty sand to clayey sand under the Unified Soil Classification System (Harza, 1977).

FTA4 is underlain by Ogallala Formation fluvial deposits consisting primarily of unconsolidated silty sand to clayey sand. These deposits include sporadic caliche layers and more extensive zones containing caliche-cemented nodules (Harza, 1997). The total thickness of the Ogallala Formation beneath the site is not known as bedrock was not encountered during previous boreholes conducted to depths of 90 feet. Based on available regional information, the Ogallala Formation may be as thick as 390 feet at Cannon AFB.

2.2.2 Groundwater

No groundwater was encountered during previous investigations of FTA4 at the maximum drilled depth of 90 feet. Groundwater occurs at depths ranging from 290 to 300 feet at nearby Landfill 5 (LF-05). Occupants of the area surrounding the Base rely primarily on groundwater for irrigation. The nearest downgradient water well is ¼ mile from FTA4.

Groundwater monitoring is conducted annually at several sites on the Base, including LF-05, which is downgradient of FTA4. During sampling conducted in March 2000, wells were monitored for volatile organic compounds, polychlorinated biphenyls, pesticides, and metals. Analytes detected in the downgradient wells included trichloroethene (TCE), chloroform, and metals. Metals were detected at concentrations that were consistent with background levels in the area (U.S. Geological Survey, 2000). Because JP-4 was the fuel used at FTA4 during all but a brief part of its history, TCE and chloroform were not believed to be chemicals of concern at this site. Groundwater analytical data from monitoring wells downgradient of FTA4 indicate that chlorinated solvents have not impacted groundwater due to previous operations at the site (U.S. Geological Survey, 2000).

2.2.3 Surface Water

Stream valleys in Curry County tend to be fairly broad and widely spaced. Streams are ephemeral and drainages are poorly developed. No permanent streams exist on or near Cannon AFB (Harza, 1997).

Historically, runoff at Cannon AFB has drained into four natural ephemeral playas. The two northern playas were converted into plastic-lined golf course ponds. The southern playa is still intact; however, the surrounding drainage patterns have been altered. The eastern playa, known as North Playa Lake, was bermed on the north, west, and south sides with topsoil and concrete debris. Drainage ditches at Cannon AFB are concentrated around the developed/landscaped areas of the Base and carry runoff to the playa lakes and golf course ponds. The playa lakes have no surface outlet and any water they collect is eventually lost to evaporation or infiltration or is used by plants and animals.

2.3 Site Investigative History

Four investigations have been conducted at FTA4. Radian Corporation installed two soil borings in 1985 and collected five soil samples for analysis for oil and grease, lead, and volatile organic compounds. The samples were not analyzed for TPH.

In 1988, Walk, Haydel and Associates performed a remedial investigation where they installed nine soil borings and collected 26 soil samples. The soil was analyzed for metals with 13 samples analyzed for benzene, toluene, ethylbenzene, and xylenes. Again, the soils were not analyzed for TPH.

In 1991, Woodward-Clyde installed two soil borings in the vicinity of FTA4 where the concentrations of TPH exceeded the action limits of 5,000 mg/kg.

A Phase II Remedial Investigation was conducted by Harza in 1996-1997 in which 19 soil borings were installed and 77 soil samples were collected for analysis. A passive soil gas survey was also conducted at that time. Two soil samples collected from borings in the FTA4 area exceeded the action limit of 5,000 mg/kg for TPH.

2.4 Corrective Action Implementation at FTA4

The recommended corrective action alternative identified in the *Final Corrective Measures Study Report for SWMUs 109, 110, 111, and 112 – Fire Training Area Four* [Final Corrective Measures Study (CMS) Report] (Foster Wheeler Environmental, 2001) for SWMU 109 was passive bioventing. Further information on the CMS and the evaluations performed to evaluate corrective measure alternatives is summarized in the *Technical Memorandum* (TtFW, May 2004). The analytical data, upon which the selection of the remedial alternative was based, were collected in 1991 and 1997. In order to define the current extent of contamination, additional sampling at FTA4 was proposed to confirm the levels and extent of TPH in soil. Furthermore, Cannon AFB desires to facilitate cleanup and closure of the FTA4 site within the next year. Therefore, corrective measure alternatives will be re-evaluated based on the results of the Phase I soil investigation results presented in this report.

2.5 Regulatory Framework

Cannon AFB operates its corrective measures program in accordance with the provisions of its Hazardous Waste Facility Permit, issued 14 October 2003, effective 13 November 2003. Based on the investigations conducted to date, the primary chemicals of concern at FTA4 are petroleum hydrocarbons associated with the storage and use of JP-4 during training exercises. Risk assessments performed to date support that no further action is needed to address health risks at this site. However, the New Mexico Environment Department (NMED) is requiring Cannon AFB to meet the TPH standard for soils in the FTA4 area. The residential direct exposure screening guideline for TPH is 940 mg/kg (NMED, June 2003), which has been selected as the "action level" for the re-evaluation of corrective measure alternatives for this site.

3.0 PROJECT OBJECTIVES

The objective of this project was to confirm subsurface TPH soil contamination in the vicinity of SWMU 109 and SWMU 111/112 in the FTA4 area (Figure 2). The investigation was focused primarily around SWMU 109, but included one boring at SWMU 111/112. The field investigation was considered a Phase I investigation effort at the site to confirm the vertical and horizontal extent of contamination. Corrective measure alternatives will be re-evaluated by USACE and TtFW using the results of this investigation. Sample locations and rationale are summarized in Table 1, which includes one additional boring (CAFB-2004006) and two additional samples (0-1 and 9-10) that were added during implementation of the Sampling and Analysis Plan (SAP).

The Phase I sampling program was performed in accordance with United States Environmental Protection Agency (U.S. EPA) Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation and Liability Act

(CERCLA) guidance, the USACE Geology supplemental scope of services, and in compliance with the Cannon AFB RCRA Permit.

Sample analytical results were compared to NMED standard for TPH in residential soils (940 mg/kg) and in industrial soils (2,350 mg/kg) (NMED, June 24, 2003) (Table 2).

4.0 FIELD ACTIVITIES

During November 15 – 18, 2004, TN&A performed the field work in accordance with the approved Work Plan, which incorporated a SAP and a Site Safety and Health Plan (SSHP) (TN&A, 2004). Pre-field planning and implementation of the SAP included the activities described in the following sections.

4.1 Site Access, Utility Clearance, and Permits

TN&A coordinated the field schedule and site access with the Base Environmental Flight (CEV). TN&A obtained vehicle and personnel passes for entry onto the Base. Utility clearance was provided by the Base CEV (Appendix D).

During staking of drilling locations on November 15, 2004, it was noted that a Base vehicle traveled across the FTA4 site. It is likely that Base traffic has used the FTA4 area for some time.

4.2 Drilling and Sampling

An experienced TN&A field geologist supervised the drilling, logged the boreholes, collected samples, and performed field screening and other fieldwork to complete the scope of work. Drilling was performed by ESN Southwest (ESN) of Tijeras, New Mexico using an AMS PowerProbe 9600 Pro for both direct-push technology (DPT) and auger drilling. All sample collection and field data acquisition was performed in accordance with the approved SAP. All field work was performed in Level D personal protective equipment (PPE) and in accordance with the approved SSHP.

Sampling locations were selected by TtFW based on prior investigative information and are shown on Figure 2. Sampling objectives for each borehole are summarized in Table 1. Sampling locations were marked in the field by TtFW on November 15, 2004, prior to the beginning of drilling. At that time, TtFW directed TN&A to add one soil boring location (CAFB-200406) from which soil samples from 0-1 foot and 9-10 foot depths were to be collected. Additionally, soil boring locations were adjusted to accommodate field conditions, particularly in the SWMU 109 area, which was flooded (see site photographs in Appendix F). Final drilling locations are shown on Figure 3. The following is a summary of field adjustments to planned drilling locations:

- CAFB-200401 was located at the estimated southwest corner of the former concrete pad.

- CAFB-200402 was located at the estimated northeast corner of the former concrete pad.
- CAFB-200403 was to be located on the east side of the former concrete pad but was moved about 10 feet east because of standing water.
- CAFB-200404 was located at the estimated southeast corner of the former concrete pad. This boring was offset approximately 15 feet southeast because of standing water.
- CAFB-200405 was located near the middle of the north side of the former concrete pad. The location was moved east because of the proximity of CAFB-1093 and CAFB-SB19.
- CAFB-200406 was positioned at the northwest corner of the former concrete pad.
- CAFB-SB01 was placed about 5 feet offset from the marker for the original boring found in the field.
- CAFB-1094 was located based on survey coordinates of the original boring but was moved south about 5 feet due to standing water.
- CAFB-SB04 was located by TtFW based on an estimated location of the original boring (no survey coordinate available). The location was adjusted to assess a suspect area of soil staining and distressed vegetation near a stand pipe. The drilling location was adjusted about 5 feet west of the pipe due to standing water.
- CAFB-SB19, CAFB-1093 CAFB-SB11 and CAFB-SB14 were located based on available survey coordinates or field markers. Locations were not changed from the planned locations.

A total of 13 boreholes were advanced using DPT drilling techniques; at SB01 both DPT and solid stem auger drilling techniques were used as explained below. The final drilling depths and sampling intervals are summarized in Table 2. A total of 34 soil samples were collected for TPH-DRO analysis [plus additional samples for Quality Assurance/Quality Control (QA/QC) purposes].

A caliche zone was encountered in borehole SB01 at 33 feet below ground surface (bgs), which the DPT drilling rig could not penetrate. The drilling crew then changed to drilling with a 4-inch solid stem auger to 39 feet bgs. The direct-push system was used to collect a sample from 39 – 40 feet bgs. Because the soils below the caliche layer were difficult to penetrate using the DPT, the drillers switched back to the auger setup to advance to 49 feet bgs for collecting the last sample. During extraction of the augers, the auger seized and the drilling sub assembly between the augers and the drive broke, with about 25 feet of auger still in the hole. A second rig was brought in to remove the augers. The last sample was collected with the DPT setup from 49 to 50 ft bgs.

The field geologist used a photoionization detector (PID) to perform air monitoring in the breathing zone and headspace screening of soil samples. The PID was calibrated to 100 parts per million (ppm) isobutylene in air. Samples for head-space screening were collected from each sampling sleeve and placed in a pint canning jar covered with a piece

of aluminum foil secured by the lid ring. When the sample had warmed in the vehicle for a maximum of 10 minutes, the PID probe was used to pierce the aluminum foil and the head-space reading was recorded (Table 2).

Soil samples were collected into laboratory-provided containers and maintained on ice in clean coolers. Chain-of-custody procedures were followed from sample generation until shipment by common carrier for overnight delivery to the subcontract laboratory.

The TN&A geologist logged borehole geology following the USACE General Geology Scope of Services. Soil boring logs are provided in Appendix B. Soil cores were visually examined for indications of soil contamination (staining, etc.); these observations were noted on the boring logs.

4.2.1 Decontamination Procedures

TN&A constructed a decontamination pad in the designated decontamination area within the adjacent landfill site (LF-05). The drilling rig and downhole equipment were decontaminated before and after work at FTA4. Disposable sampling equipment was used to collect soil samples thereby eliminating the need for decontamination procedures and equipment rinsate samples.

4.2.2 Sample Location Surveying

TN&A staked and flagged all borehole locations and surveyed horizontal coordinates using a hand-held Global Positioning System (GPS) surveying instrument. The GPS instrument, a Trimble Geo Explorer XT, provided sub-meter accuracy after differential correction. The survey was performed using the North American Datum 1983 (NAD 83), consistent with prior surveys performed at this location. Borehole location coordinates are provided in Table 2.

4.2.3 Borehole Abandonment

Following sampling, the boreholes were abandoned using bentonite chips, which were emplaced in 5-foot lifts and hydrated with approximately ½ gallon of clean tap water per lift. This method of borehole abandonment was a non-approved variance to the approved SAP and New Mexico Underground Storage Tank Bureau guidance. However, the volume of bentonite chips used (9 cubic feet) indicates the boreholes (borehole volume estimated at 8 cubic feet) were completely filled. TN&A discussed the variance with the USACE project geologist, who indicated a potential safety issue (open holes caused by shrunk hole-plug) with the method used. Most boreholes are within the footprint of the anticipated excavation and will be removed during the next phase of activities. TN&A will recheck the status of all boreholes prior to the excavation work and backfill any shrinkage to prevent unsafe conditions.

4.2.4 Site Restoration

Following completion of all sampling activities, TN&A managed investigative-derived wastes (IDW) as described below (Section 4.2.7). TN&A removed other investigation-related materials and restored the site to pre-drilling condition.

4.2.5 Site Safety and Health

All field work performed by TN&A or under direct supervision of TN&A was in strict accordance with the approved SSHP. A copy of the SSHP was available on site during field operations.

4.2.6 Field Records and Photodocumentation

TN&A prepared and emailed Daily Quality Control Reports (DQCRs) to the USACE Project Manager (PM) during the field event on a daily basis. Copies of the DQCRs are provided in Appendix E. Photographs of the site are provided in Appendix F.

4.2.7 IDW Management and Disposal

Used PPE and investigation incidental wastes were managed as trash, being placed in garbage bags and disposed of in a Base dumpster. The drill cuttings were retained in a steel 35-gallon drum labeled with the appropriate collection and contact information.

Decontamination fluids were placed in a separate 35-gallon drum. The drum was closed because persistent precipitation in the area would not allow evaporation of the fluid to occur. The drums were stored in the FTA-04 area at the direction of the TtFW representative. The drums were labeled with non-hazardous waste labels that included TtFW contact information.

Soils IDW will be disposed of as part of the final corrective measure at the site by TtFW. The IDW fluids will be taken by TtFW to the headwaters of the Cannon AFB water treatment plant for final disposal.

4.3 Sample Analysis

Soil samples were analyzed for TPH-diesel-range organics (DRO) by Modified Method 8015 in general accordance with the New Mexico Underground Storage Tank Bureau "Guidelines for Corrective Action" (March 2000) and the USACE Chemistry Scope of Services. The subcontractor laboratory, STL Laboratories of Chicago, Illinois, is certified by the National Environmental Laboratory Accreditation Program.

A total of 34 field samples were collected as well as the following quality control samples at a rate of one per 10 samples for field duplicates (three samples) (minimum of 5 percent duplicate samples) and a matrix spike/matrix spike duplicate (MS/MSD). All QC samples were analyzed for TPH-DRO by Modified 8015. Analytical results are summarized in Table 2.

4.4 Data Quality Control and Validation

TN&A performed a Level III data validation on 90 percent of the data and a Level IV on the remaining 10 percent of laboratory data, following the U.S. EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (U. S. EPA-540/R-94/012).

The quality of the laboratory analytical data presented in this report was reviewed to assess data precision, accuracy, representativeness, comparability, and completeness as reported by the analytical laboratory. The analytical performance of the chemical data set is very strong. The analytical results meet the data quality objective defined by the applicable method and project objectives, except as noted in the data validation findings (Appendix C).

5.0 RESULTS OF THE INVESTIGATION

The Phase I Remedial Investigation field work was completed November 15 - 17, 2004. The investigation included 13 soil borings ranging from 6 feet bgs to 50 feet bgs. The soil borings were advanced using DPT and solid-stem auger drilling methods. The soil boring locations were identified by a representative from TtFW prior to drilling. Soil samples were submitted to STL-Chicago for analysis by Method SW8015 Modified for TPH-DRO. During field evaluation, a portion of each soil core was field-screened using a calibrated PID. Borehole horizontal coordinates, sampled intervals, PID readings, and sample analytical results are provided in Table 2.

5.1 Site Geology

Most of the soil borings were extended to only 10 feet bgs; one was extended to 5 feet bgs, one to 13 feet bgs; one to 20 feet bgs, and one to 50 feet bgs (Table 1). The soils encountered in the boreholes consisted of silt, sandy silt, and fine sand. Logged geology is shown in two cross-sections on Figure 4. A caliche layer was encountered at approximately 33 feet bgs at the deepest borehole, SB01. Below the caliche, drilling proceeded slowly and with the use of augers through dense fine sands. No saturated sections were encountered in the borings.

5.2 Field Screening Results

Staining and strong odors were generally observed only in the upper 2 to 4 feet of soil in some borings (Table 2). Elevated PID readings and/or high TPH soil concentrations were not always associated with observed staining and strong odors, and vice versa. Of the 14 samples with analytical results exceeding the screening criteria, eight had observed staining and/or odors. PID field screening results appeared to be a somewhat better indicator of soil contamination. Of the 14 samples with analytical results exceeded the screening criteria, 10 had PID readings exceeding 100 ppm (Table 2).

5.3 Soil Sample Analytical Results

The analytical results confirm that soils in the SWMU 109 area are impacted with residual TPH-DRO at concentrations greater than State of New Mexico standards for both residential direct exposure (940 mg/kg) and industrial direct exposure (2,350 mg/kg) for jet fuel (Table 2). The highest concentrations of TPH-DRO (up to 15,000 mg/kg at 0 – 1 feet) were identified at boring SB01, which was located on the south edge of the former concrete pad at SWMU 109 (Figure 3). Two cross-sections of the subsurface in the FTA-4 area were prepared and are shown in Figure 4. The cross-sections show that, at most locations, the soil contamination decline to less than the residential direct contact standard (940 mg/kg) by 5 feet bgs. However, TPH-contaminated soil was found at 10 feet bgs (3,000 mg/kg) in boring 2004-01 and at 20 feet bgs (6,800 mg/kg) in SB01. Soil contamination was not identified in the one boring (SB14) at SWMU 111/112.

5.4 Summary and Discussion

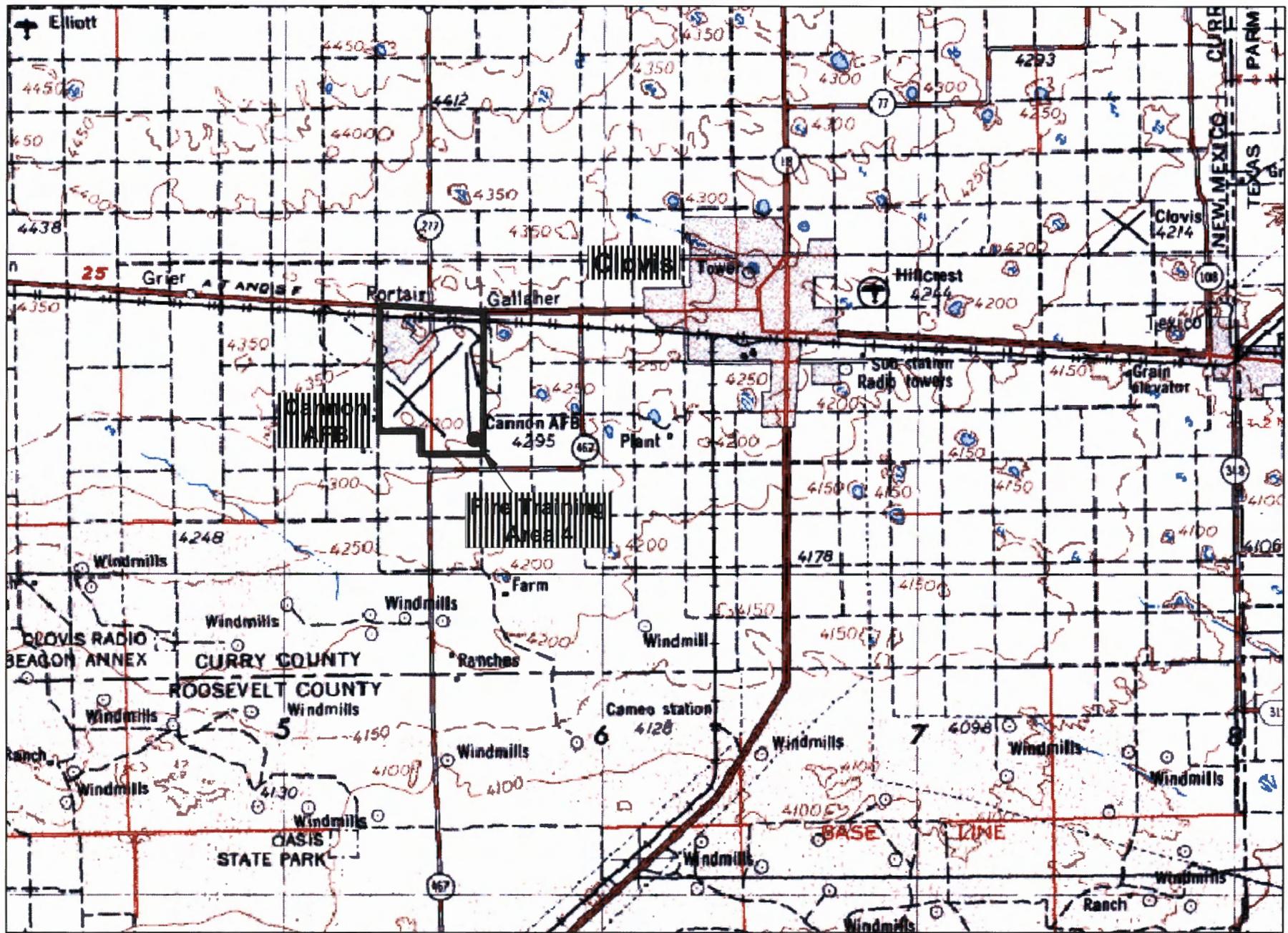
During November 15 – 18, 2004, TN&A collected soil samples from 13 borings at the FTA4 at Cannon AFB, Clovis, New Mexico. The purpose of the soil investigation was to confirm previously identified contamination caused by historical jet fuel releases. The investigation was focused primarily at SWMU 109 but included one boring at SWMU 111/112. The boring at SWMU 111/112 did not identify soil contamination at that location.

Based on the results from this and prior investigations, TPH-contaminated soils are present in the vicinity of SWMU 109 in a northeast-southwest trending plume measuring approximately 70 - 90 feet wide by 175 feet long (Figure 3). The northwest and northeast boundaries of this plume are not defined beyond borings SB04 and SB11, respectively. The depth of contamination ranges from less than 3 feet to greater than 20 feet. The deepest soil contamination was detected within approximately 25 feet south/southeast of the former concrete slab at SWMU 109 (Figure 3). Areas immediately beneath the former SWMU 109 concrete slab appear to be relatively low concentration (Figure 4); however, prior investigative data suggest that higher concentrations may be present (see Table in Appendix A).

The Phase I soil investigation has met the objective of confirming prior identified TPH contamination in the FTA4 area. Additionally, sufficient soil data now exist to finalize selection of the corrective measure (CM) for this site. If excavation be selected as the final CM, TN&A recommends that PID head-space readings with confirmatory sampling or field tests for TPH-DRO be employed to reliably determine excavation extent.

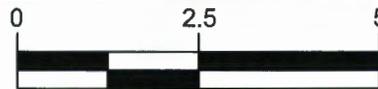
6.0 REFERENCES

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- Radian. August 1988. *Site-Specific Quality Management Plan Installation Restoration Program Fire Protection Training Area, Site 9 Tank Removal, Cannon Air Force Base, New Mexico.*
- T N & Associates, Inc. November 3, 2004. *Work Plan for Phase I Investigation - Soil Corrective Measures, Fire Training Area 04, Cannon Air Force Base, New Mexico.* Prepared for U.S. Army Corps of Engineers – Omaha District, Nebraska.
- Tetra Tech Foster Wheeler, Inc. May 21, 2004. *Technical Memorandum, Evaluation of Total Petroleum Hydrocarbons in Soil at Fire Training Area 4, Cannon AFB, New Mexico.*
- Walk, Haydel, and Associates (Walk, Haydel, and Associates, Inc.). January 1990. *Final Installation Restoration Program Remedial Investigation, Cannon Air Force Base, New Mexico.*
- Woodward-Clyde (Woodward-Clyde Consultants). October 1992. *Remedial Investigation Report for 18 Solid Waste Management Units, Cannon Air Force Base, New Mexico.*



TN & Associates, Inc.
Engineering and Science

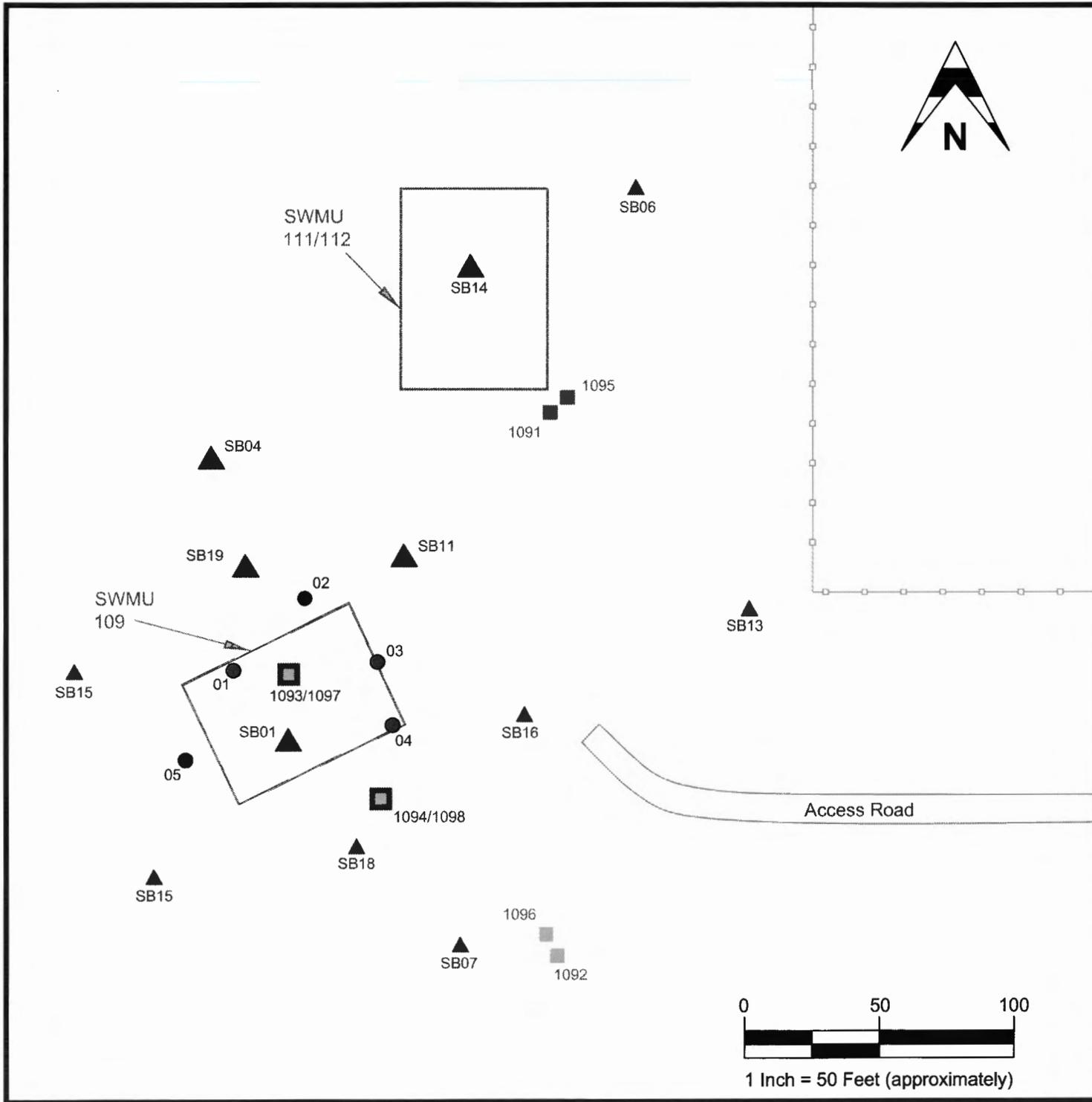
Figure was adapted from USGS Quads:
Midway, NM (1985)
Clovis, NM (1978)
Clovis, NM, TX (1972)



1 Inch = 2.5 Miles (approximately)



Figure 1
Cannon Air Force Base Site
Location Map



Legend

- Woodward-Clyde Sample Location, 1991
- ▲ Harza Soil Boring Location, 1997 (approximate locations)
- ▲ Confirmation Sample Locations (Previously Drilled)
- New Confirmation Sample Location
- SWMU Locations
- Roads
- Existing Fenceline

Figure was adapted from:
 Technical Memorandum
 Evaluation of TPH In Soil at FTA4
 Cannon Air Force Base, New Mexico
 Tetra Tech - Foster Wheeler, May 21, 2004

Figure 2
Proposed Sample Locations



CAFB-SB04	
Depth (ft)	Result (mg/kg)
0-1	2,300
9-10	1,600

CAFB-SB14	
Depth (ft)	Result (mg/kg)
0-1	45 U
9-10	4.8 U

CAFB-200402	
Depth (ft)	Result (mg/kg)
0-1	680
9-10	4.5 U

CAFB-1093	
Depth (ft)	Result (mg/kg)
0-1	1,600
4-5	2,300
9-10	8.3

CAFB-SB11	
Depth (ft)	Result (mg/kg)
0-1	1,100
9-10	4.6 U

CAFB-SB19	
Depth (ft)	Result (mg/kg)
0-1	5,600
4-5	2,900

CAFB-200405	
Depth (ft)	Result (mg/kg)
0-1	22
9-10	16
19-20	4.7 U

CAFB-200403	
Depth (ft)	Result (mg/kg)
0-1	56
9-10	4.6 U

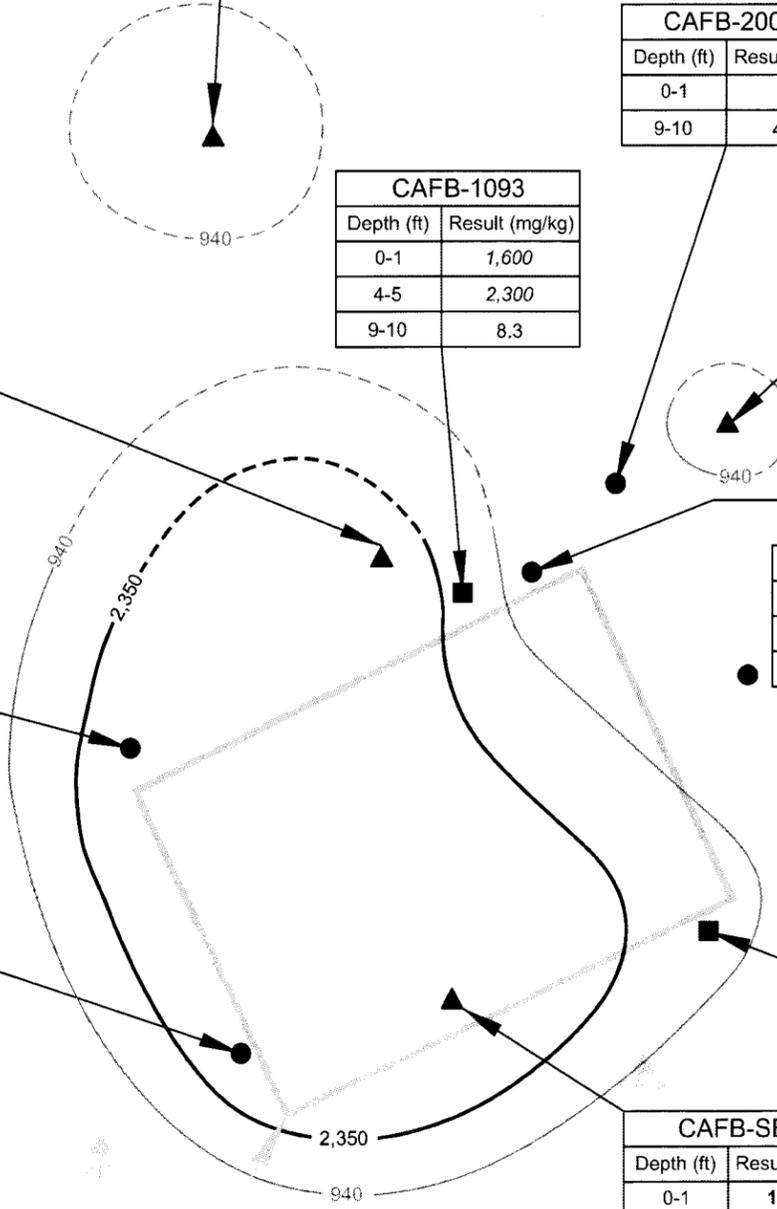
CAFB-200406	
Depth (ft)	Result (mg/kg)
0-1	5,000
9-10	16

CAFB-200404	
Depth (ft)	Result (mg/kg)
0-1	260
9-10	4.6 U

CAFB-200401	
Depth (ft)	Result (mg/kg)
0-1	4,000
9-10	3,000

CAFB-1094	
Depth (ft)	Result (mg/kg)
0-1	1,600
4-5	12
9-10	4.6 U
12-13	4.8

CAFB-SB01	
Depth (ft)	Result (mg/kg)
0-1	15,000
9-10	6,500
19-20	6,800
29-30	52
39-40	24
49-50	17



Legend

- Woodward-Clyde Sample Location, 1991
(All results below 940 mg/kg)
- Harza Soil Boring Location, 1997
(All results below 940 mg/kg)
- Confirmation Sample Locations
(Previously Drilled)
- Confirmation Sample Locations
(Previously Drilled)
- New Confirmation Sample Location

Sample Number	
Sample Depth (ft)	DRO Result (mg/kg)
0-1	5,600
4-5	2,900

* Indicates that a Field Duplicate sample was taken at that depth
 J = Estimated Value
 U = Not detected above listed value

Italicized DRO Result indicates a value over the Residential Direct Exposure (940 mg/kg).

Bolded DRO Result indicates a value over the Industrial Direct Exposure (2350 mg/kg).

———— NMED Industrial Direct Exposure Contour Line (2,350 mg/kg)

- - - - - NMED Residential Direct Exposure Contour Line (940 mg/kg)

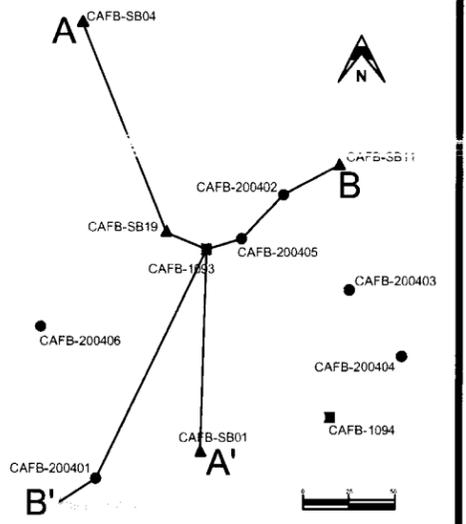
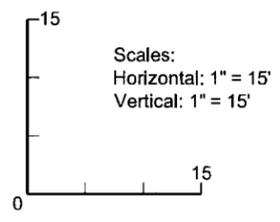
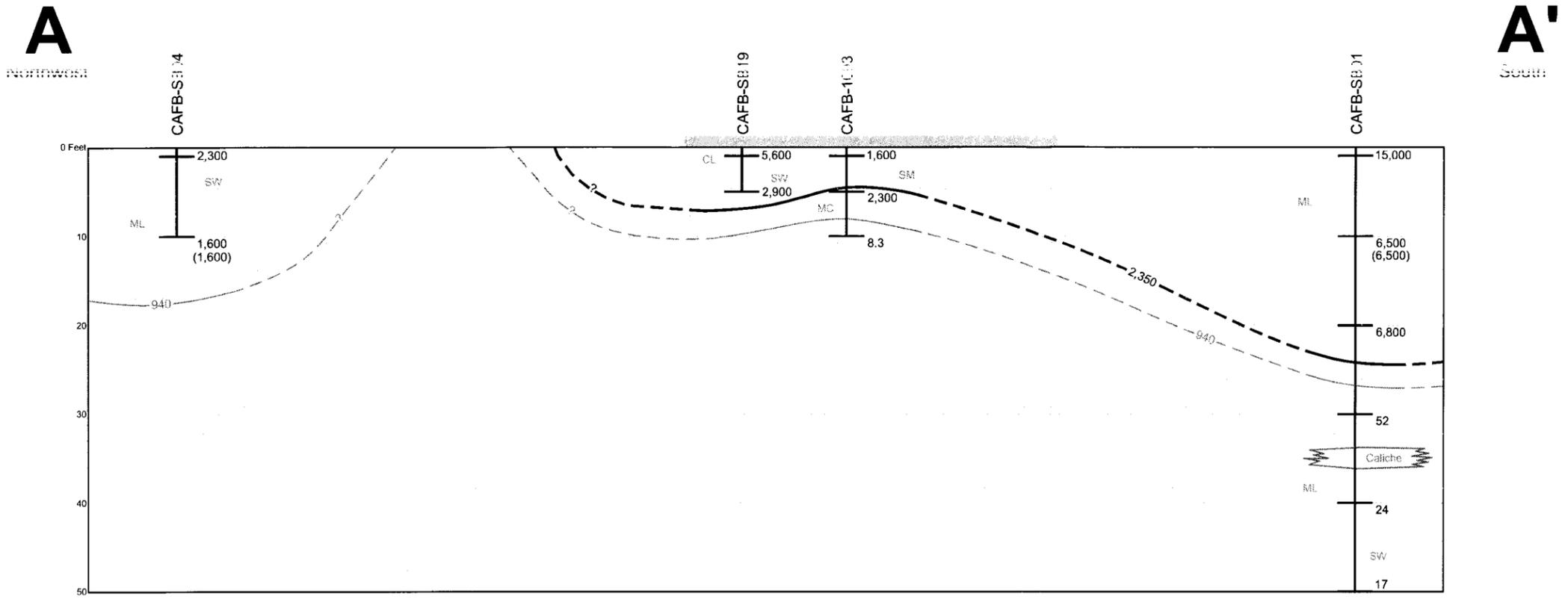
Contours dashed where uncertain

- Solid Waste Management Unit (SWMU) Locations
- Roads
- Existing Fenceline

Figure was adapted from:
 Technical Memorandum
 Evaluation of TPH in Soil at FTA4
 Cannon Air Force Base, New Mexico
 Tetra Tech - Foster Wheeler, May 21, 2004

Figure 3
Sample Locations With Results





Legend

- CAFBSB04 Boring ID (11/2004)
- 2,300 DRO Result (mg/kg)
- SW USCS Symbol (See Table Below)
- 1,600 (1,600) DRO Result (mg/kg) (Field Duplicate Result)
- J = Estimated Value
- U = Not detected above the listed value.
- SB15 was a Harza Soil Boring Location sampled in 1997.
- NMED Industrial Direct Exposure Contour Line (2,350 mg/kg)
- NMED Residential Direct Exposure Contour Line (940 mg/kg)
- Contours dashed where uncertain.
- Concrete Slab (Approx.) (Removed)
- SWMU = Solid Waste Management Unit

Symbol	Typical Names
SW	well-graded sands, gravelly sands, little or no fines
SM	silty sands, sand-silt mixtures
ML	inorganic silts and very fine sands, clayey silts, silty or clayey fine sands, or rock, flour with slight plasticity
CL	inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

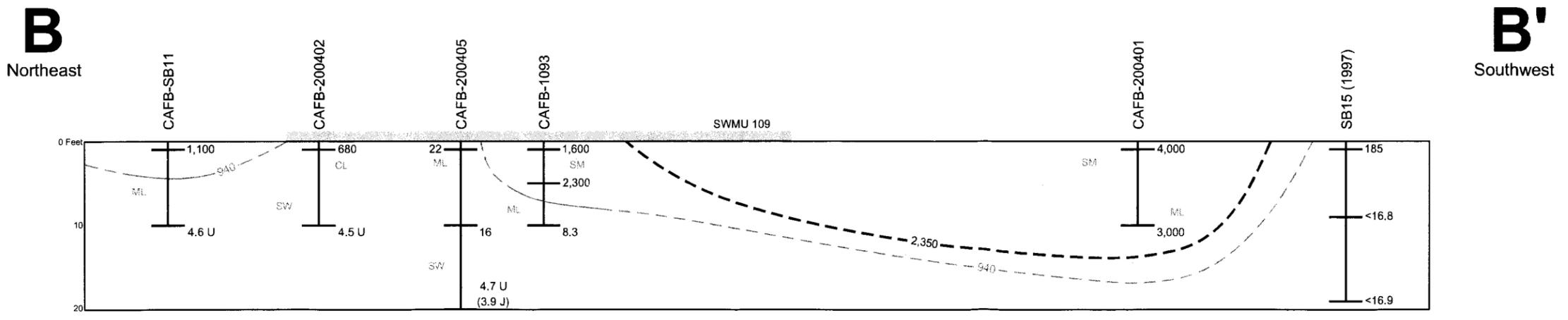


Figure 4
Cross Sections A-A' and B-B'

**Table 1.
FTA4 Sampling Locations and Rationale
Cannon AFB, New Mexico**

Sample Location	Sample Depth Intervals (ft bgs)	Rationale	Number of Samples*
Confirmation Samples			
CAFB-SB01	0-1, 9-10, 19-20, 29-30, 39-40, 49-50	Maximum Depth of TPH contamination > 940 mg/kg at 42 ft; confirm presence and levels of TPH to depth of 50 ft.	6
CAFB--SB04	0-1, 9-10	Maximum Depth of TPH contamination > 940 mg/kg ia 1 ft; confirm presence and levels of TPH to depth of 10 ft.	2
CAFB-SB11	0-1, 9-10	Maximum Depth of TPH contamination > 940 mg/kg is 1 ft; confirm presence and levels of TPH to depth of 10 ft.	2
CAFB-SB14	0-1, 9-10	Maximum Depth of TPH contamination > 940 mg/kg is 1 ft; confirm presence and levels of TPH to depth of 10 ft.	2
CAFB-SB19	0-1, 4-5	Maximum Depth of TPH contamination > 940 mg/kg at 5 ft; confirm presence and levels of TPH in surface soil.	2
CAFB-1093	0-1, 4-5, 9-10	Maximum Depth of TPH contamination > 940 mg/kg at 10 ft; confirm presence and levels of TPH to depth of 10 ft.	3
CAFB-1094	0-1, 4-5, 9-10, 12-13	Maximum Depth of TPH contamination > 940 mg/kg at 12 ft; confirm presence and levels of TPH to depth of 12 ft.	4
Additional Sample Locations			
CAFB-200401	0-1, 9-10	Determine lateral and vertical extent of contamination in area of former concrete pad at SWMU 109.	2
CAFB-200402	0-1, 9-10		2
CAFB-200403	0-1, 9-10		2
CAFB-200404	0-1, 9-10		2
CAFB-200405	0-1, 9-10, 19-20		3
CAFB-2004006	0-1, 9-10	Added in field – same objective as above	2

* Analytical method is total recoverable petroleum hydrocarbons using EPA Method modified 8015M

**Table 2
Soil Boring Locations and Sample Results
November 15 – 18, 2004
Cannon AFB, New Mexico**

Boring	Northing	Easting	Sample Depth (ft bgs)	PID (ppm)	TPH-DRO (mg/kg)	Staining (S) or Odor (O) Observed
CAFB-SB01	1227690.85	851598.56	0-1	2207	15,000	S/O
			9-10	2459	6,500	
			9-10 (dup)	--	9,600	
			19-20	2405	6,800	
			29-30	153	52	
			39-40	50	24	
			49-50	NA	17	
CAFB-SB04	1227813.45	851564.75	0-1	10	2,300	S (to 2')
			9-10	109	1,600	
			9-10 (dup)	--	1,600	
CAFB-SB11	1227772.57	851638.52	0-1	124	1,100	S/O
			9-10	4.2	4.6 U	
CAFB-SB14	1227883.10	851705.17	0-1	4.4	45 U	
			9-10	3	4.8 U	
CAFB-SB19	1227753.65	851588.74	0-1	93	5,600	S/O (to 3')
			4-5	146	2,900	
CAFB-1093	1227742.64	851593.85	0-1	591	1,600	S/O
			4-5	367	2,300	S/O
			9-10	22	8.3	
CAFB-1094	1227692.39	851635.39	0-1	2.9	1,600	
			4-5	2	12	
			9-10	1.6	4.6 U	
			12-13	1	4.8	
CAFB-200401	1227683.70	851568.76	0-1	302	4,000	S/O (to 2')

**Table 2
Soil Boring Locations and Sample Results
November 15 – 18, 2004
Cannon AFB, New Mexico**

Boring	Northing	Easting	Sample Depth (ft bgs)	PID (ppm)	TPH-DRO (mg/kg)	Staining (S) or Odor (O) Observed
			9-10	1848	3,000	
CAFB-200402	1227764.55	851622.59	0-1	156	680	S/O (2'-4')
			9-10	3.3	4.5 U	
CAFB-200403	1227739.33	851641.40	0-1	196	56	S/O (to 4')
			9-10	4	4.6 U	
CAFB-200404	1227718.36	851656.62	0-1	4.8	260	
			9-10	3.4	4.6 U	
CAFB-200405	1227751.96	851610.50	0-1	20	22	S/O (to 6')
			9-10	8.3	16	
			19-20	4	4.7 U	
			19-20 (dup)	–	3.9 J	
CAFB-200406	1227727.01	851553.08	0-1	70	5,000	S/O (to 4')
			9-10	35	16	

TPH-DRO = total petroleum hydrocarbons – diesel range organics (by Modified Method 8015D)

ft bgs = feet below ground surface

PID = photoionization detector

ppm = parts per million

mg/kg = milligrams per kilograms

U = not detected at listed value

J = estimated value; analyte detected between project reporting limit and method detection limit

dup = duplicate sample

S/O = staining and odor observed in soil core; depth (in feet) given when different from sampled interval

Borehole coordinates surveyed by Global Positioning System (GPS) to datum NAD 83

Bolded TPH values exceed the NMED Industrial direct contact standard of 2350 mg/kg. Italicized TPH values exceed the NMED residential direct contact standard of 940 mg/kg.

APPENDIX A

**Technical Memorandum - Evaluation of Total Petroleum
Hydrocarbons in Soil at Fire-Training Area 4,
Cannon Air Force Base, New Mexico.
Tetra Tech FW, Inc. May 21, 2004**

May 21, 2004
TERC-028.001-04X-007

Ms. Jane Davey
U.S. Army Corps of Engineers, Omaha District
Attn: CENWO-PM-HC, 9th FL
106 South 15th Street
Omaha, NE 68102-1618

Subject: TERC Contract No. DACW45-94-D-0003, Delivery Order 28, WAD 1
Submittal of the Final Technical Memorandum for the Evaluation of Total
Petroleum Hydrocarbons in Soil at Fire-Training Area 4, Cannon Air Force Base,
New Mexico

Dear Ms. Davey:

Enclosed are four copies of the Technical Memorandum for the Evaluation of Total Petroleum Hydrocarbons in Soil at Fire-Training Area 4, Cannon Air Force Base (AFB), New Mexico. By copy of this letter, I am sending four copies of the technical memorandum to Mr. Pete Zamie and Mr. Denny Timmons at Cannon AFB.

This technical memorandum presents the background information and rationale for proposed sampling to confirm the concentration of total petroleum hydrocarbons (TPH) in soil at Fire Training Area 4 (FTA4) at Cannon AFB. The rationale for proposed sampling is presented in this memorandum through supporting information from current site conditions, previous investigations, the *Final Corrective Measures Study Report for SWMUs 109, 110, 111, and 112—Fire Training Area Four* (December 2001), and the regulatory framework for addressing residual TPH contamination in soil at the site.

Comments received from the U.S. Army Corps of Engineers were incorporated into this document. If you have any questions or comments, please call me at (505) 878-8924. Thank you.

Sincerely,
Tetra Tech FW, Inc.



Carol L. Bieniulis
Principal Geologist/Delivery Order Manager

CLB/clb
Enclosures

cc: P. Zamie and D. Timmons, Cannon AFB (4 copies)
C. Madewell, TtFW/Albuquerque
S. Seyedian, TtFW/Denver (w/o enclosures)
TERC Project File, Denver

TECHNICAL MEMORANDUM
Evaluation Of Total Petroleum Hydrocarbons In Soil At Fire-Training Area 4
Cannon Air Force Base, New Mexico
May 21, 2004

This technical memorandum presents the background information and rationale for proposed sampling to confirm the concentration of total petroleum hydrocarbons (TPH) in soil at Fire Training Area 4 (FTA4) at Cannon Air Force Base (AFB), New Mexico. The rationale for proposed sampling is presented in this memorandum through supporting information from current site conditions, previous investigations, the *Final Corrective Measures Study Report for SWMUs 109, 110, 111, and 112—Fire Training Area Four* [Final Corrective Measures Study (CMS) Report] [Foster Wheeler Environmental Corporation (Foster Wheeler Environmental), 2001], and the regulatory framework for addressing residual TPH contamination in soil at the site. The primary area of interest at FTA4 addressed in this memorandum is Solid Waste Management Unit (SWMU) 109, the Former Fire-Training Pit. SWMU 109 was identified as the area which was impacted the most by previous activities at FTA4.

CURRENT SITE CONDITIONS

SWMU 109 was used as a fuel truck cleaning area between 1961 and 1974. An estimated 3,000 to 4,000 gallons of fuel percolated into the ground as a result of these activities [Walk, Haydel, and Associates, Inc. (Walk, Haydel, and Associates), 1990]. In 1974 the site was activated as a fire training area. Commingled waste oils, solvents, and recovered Jet Propellant 4 (JP-4) were burned during fire training exercises conducted from 1974 to 1975. The underground waste oil tank (SWMU 110) was installed in 1975, and only recovered JP-4 was burned during exercises conducted from 1975 to 1995. After that time, the SWMU was no longer used as a fire training area [Harza Environmental Services (Harza), 1997].

SWMU 109 contained a 40-foot (ft) by 70-ft rebar-reinforced concrete-lined pit with a 4-ft berm that was removed in December 2000. The pit was filled with gravel and included internal drainage features that conveyed excess fuel and water to the oil/water separator (SWMU 112) located in the northeast part of the site. These drainage features included an underground pipe running from the pit to the oil/water separator. The separator was removed in 1997; however, the underground pipe is still in place. A mock airplane was formerly located in the center of the pit. Details of pit construction were determined using as-built drawings provided by Cannon AFB. The concrete pit was reportedly saturated with water during some fire training exercises. An aboveground fuel tank supplied fuel to the burn pit via an underground pipeline. The aboveground tank is presently empty and remains on site.

PHYSICAL CONDITIONS

Soils and Geology

Soils underlying FTA4 consist of sandy loam and loamy sand of the Amarillo soil group. The soils consist primarily of a fine-grained, well-sorted silty/clayey, unconsolidated, brown/reddish-brown sand. Such soils are generally classified as silty sand to clayey sand under the Unified Soil Classification System (Harza, 1997).

FTA4 is underlain by Ogallala Formation fluvial deposits consisting primarily of unconsolidated silty sand to clayey sand. These deposits include sporadic caliche layers and more extensive zones containing caliche-cemented nodules (Harza, 1997). The total thickness of the Ogallala Formation beneath the site is not known, as bedrock was not encountered during previous field investigation activities, which were

conducted to depths of 90 ft. Based on available regional information, the Ogallala Formation may be as thick as 390 ft at Cannon AFB.

Groundwater

No groundwater was encountered during previous investigations of FTA4 at the maximum drilled depth of 90 ft. Groundwater occurs at depths ranging from 290 to 300 ft at nearby Landfill 5 (LF-05). Occupants of the area surrounding the Base rely primarily on groundwater for irrigation. The nearest downgradient water well is approximately ¼ mile from FTA4.

Groundwater monitoring is conducted annually at several sites on the Base, including LF-05, which is downgradient of FTA4. During sampling conducted in March 2000, wells were monitored for volatile organic compounds, polychlorinated biphenyls, pesticides, and metals. Analytes detected in the downgradient wells included trichloroethylene (TCE), chloroform, and metals. Metals were detected at concentrations that were consistent with background levels in the area (U.S. Geological Survey, 2000). Because JP-4 was the fuel used at FTA4 during all but a brief part of its history, TCE, and chloroform were not believed to be chemicals of concern at this site. Groundwater analytical data from monitoring wells downgradient of FTA4 indicate that chlorinated solvents have not impacted groundwater due to previous operations at the site (U.S. Geological Survey, 2000).

Surface Water

Stream valleys in Curry County tend to be fairly broad and widely spaced. Streams are ephemeral and drainages are poorly developed. No permanent streams exist on or near Cannon AFB (Harza, 1997).

Historically, runoff at Cannon AFB has drained into four natural ephemeral playas. The two northern playas were converted into plastic-lined golf course ponds. The southern playa is still intact; however, the surrounding drainage patterns have been altered. The eastern playa, known as the North Playa Lake, was bermed on the north, west, and south sides with topsoil and concrete debris. Drainage ditches at Cannon AFB are concentrated around the developed/landscaped areas of the Base and carry runoff to the playa lakes and golf course ponds. The playa lakes have no surface outlet, and any water they collect is eventually lost to evaporation or infiltration, or is used by plants and animals.

CONTAMINANT FATE AND TRANSPORT MODELING

Fate and transport modeling of representative contaminants was used to simulate contaminant migration through the unsaturated (vadose) zone to determine whether residual contamination could reach the water table. The representative contaminants modeled were toluene, naphthalene, and total xylenes. These three chemicals were selected based on their mobility and elevated concentrations in soil at FTA4. Simulations were performed assuming excessive precipitation to evaluate the transport effects of these chemicals with increased infiltration.

The Seasonal Soil Compartment (SESOIL) model was used for the fate and transport modeling (General Sciences Corporation, 1998). The SESOIL model has been used by many local, state, and federal agencies at several sites across the country to evaluate unsaturated zone contaminant migration due to surficial or subsurface source releases.

SESOIL is a one-dimensional vertical transport model designed to simultaneously simulate water transport, sediment transport, and contaminant fate for the unsaturated zone (Wisconsin Department of Natural Resources, 1994). Input data include soil physical parameters, contaminant chemical parameters, and meteorological information. The specific input parameters are presented in Appendix A of the Final CMS Report (Foster Wheeler Environmental, 2001).

The processes simulated by the SESOIL model are categorized into three cycles: hydrology, sediment washload, and pollutant transport; each cycle is a separate subroutine within the SESOIL code (Wisconsin Department of Natural Resources, 1994). The SESOIL model is a compartmental model that allows the user flexibility to divide the unsaturated zone into separate layers and simulate contaminant release and migration within each layer down to the water table. The result is a calculated leachate concentration that will be introduced to groundwater. The model simulates leaching to groundwater and subsequent mixing that ultimately provides a groundwater concentration as a calculated result.

The simulations performed for the CMS applied conservative assumptions that tend to overestimate the potential for contaminant migration. The greatest concentrations of residual contamination detected in soil samples from FTA4 were used to calculate loading rates for the representative chemicals. The contaminant sources were modeled as instantaneous releases from the top 22 ft of the soil column. Groundwater was modeled as 290 ft below ground surface (bgs). The simulation of normal conditions for each contaminant used climatic data specific to Clovis, New Mexico.

The results of the 30-year simulations for the current, normal conditions at Cannon AFB predicted vertical contaminant migrations of 101, 65, and 94 ft for toluene, naphthalene, and total xylenes, respectively. Within the 30-year period, simulation under normal, current conditions indicated that none of the contaminants would reach groundwater. The increased infiltration from the addition of one 24-hour, 100-year storm per year had a negligible effect on transport of naphthalene and total xylenes, and these contaminants did not reach groundwater. Under increased infiltration, toluene showed a similar trend in vertical migration as depth increased. The modeling indicated that degradation of groundwater from the migration of the contaminants in soil is unlikely under current conditions where infiltration of water into the vadose zone is minimal.

In summary, even where conservative assumptions are used to overestimate the potential for contaminant migration, the model predicts that there will be no adverse effects on groundwater quality due to the transport of residual contamination in the unsaturated zone at FTA4. An extended discussion of the modeling effort, including model output, is presented in Appendix A of the Final CMS Report.

REGULATORY FRAMEWORK

The New Mexico Environment Department (NMED) is authorized by the U.S. Environmental Protection Agency (EPA) to implement the federal Resource Conservation and Recovery Act (RCRA) hazardous waste program and oversee the corrective action program activities conducted in accordance with Cannon AFB's Hazardous Waste Facility Permit (Permit). NMED issued a RCRA Permit to Cannon AFB on December 17, 1989. Cannon AFB submitted an application to NMED for renewal of the Permit; however, the Permit has not yet been reissued and the Base is operating under the provisions of the original Permit. Cannon AFB's Draft RCRA Part B Permit Application (Operations Plan), refers to the status of various assessment, investigation, and remediation projects for a number of SWMUs on the Base. According to the Operations Plan, SWMUs 109, 110, 111, and 112 were incorporated into one area (FTA4) for the Phase I and Phase II RCRA Facility Investigations (RFIs) based on their proximity and the interrelated nature of their historical operations. Currently, FTA4 is in the CMS phase of the RCRA corrective action process.

Based on the investigations conducted to date, the primary chemicals of concern at FTA4 are petroleum hydrocarbons associated with the storage and use of JP-4 during training exercises (see TCE question above). A risk assessment was conducted as part of the Phase II RFI to evaluate risk to human and ecological receptors from exposure to site contaminants (Harza, 1997). The risk assessment concluded that human health and ecological risks associated with exposure to contamination at FTA4 are negligible under current conditions.

Since the 1997 risk assessment did not characterize potential risks associated with a residential use scenario, the *Technical Background Document for Development of Soil Screening Levels* guidance from NMED (NMED, 2000) was used to identify other chemicals of concern that could require corrective action. Data from the Remedial Investigation (RI) conducted in 1992 by Woodward-Clyde Consultants (Woodward-Clyde) and the RFI conducted in 1997 by Harza were compared to the NMED soil screening levels. This comparison confirmed that there is no significant human health risk requiring further action at FTA4. The detailed results of this evaluation are presented in Appendix B of the Final CMS Report (Foster Wheeler Environmental, 2001).

REGULATION OF TPH IN SOIL

Although no further action is needed to address health risks at this site, NMED is requiring standards for TPH to be met. In June 2003, the NMED Hazardous Waste Bureau issued *Total Petroleum Hydrocarbon (TPH) Screening Guidelines*, a final guidance for RCRA units on the evaluation and determination of cleanup levels for sites impacted by releases of petroleum hydrocarbons (NMED, 2003).

NMED provided a TPH screening guideline for each type of petroleum product based on the assumed composition for petroleum products and the direct soil standards from the Massachusetts Department of Environmental Protection (MADEP) guidance document *Implementation of the MADEP VPH/EPH Approach Final Draft, June 2001* (MADEP, 2001). The TPH screening guidelines are presented in Table 1.

Table 1. TPH Soil Screening Guidelines ^a

Petroleum Product	Residential Direct Exposure (mg/kg)	Industrial Direct Exposure (mg/kg)
Diesel #2/crankcase oil	880	2200
#3 and #6 Fuel Oil	860	2150
Kerosene and jet fuel	940	2350
Mineral oil dielectric fluid	1560	3400
Unknown oil	800	2000
Waste Oil	2500	5000
Gasoline	Not applicable	Not applicable

^a From NMED (2003)

mg/kg milligrams per kilogram

Based on the fact that JP-4 was the fuel used at FTA4, screening guidelines for jet fuel were used to determine the extent of contaminated soil requiring remediation at the site. The residential direct exposure screening guideline for TPH is 940 mg/kg, and the industrial direct exposure guideline is 2,350 mg/kg. The results of the contaminant fate and transport modeling predict that there will be no adverse effects on groundwater quality due to the transport of residual contamination in the unsaturated zone at FTA4. The results of the modeling are supported by analytical data from annual monitoring downgradient of the site at LF-05 which indicate groundwater has not been impacted by activities at FTA4. Therefore, there is no need to assess groundwater quality at this site.

PREVIOUS INVESTIGATIONS OF FTA4

RI Performed by Radian Corporation (Radian)—1985

The initial RI at FTA4 focused on contamination in the area of SWMU 109. Two soil borings were drilled and from these two soil borings five samples were analyzed for oil and grease, lead, and

chlorinated and aromatic volatile organic compounds (EPA Method 8010/8020). Samples were collected at depths from 5.5 to 45 ft. No TPH data were collected during the 1985 RI. (Radian, 1985).

RI Conducted by Walk, Haydel, and Associates—1988

The 1988 RI included 3 soil borings with 13 samples each (0–101.5 ft bgs) analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX); arsenic; barium; cadmium; selenium; and silver. An additional 6 soil borings with 13 samples each (0–101.5 ft bgs) were analyzed for arsenic, barium, cadmium, selenium, and silver. All borings were located near SWMU 110 and the landfarm area associated with the underground waste oil tank removal. No TPH data were collected during the 1988 RI (Walk, Haydel, and Associates, 1990).

RI Performed by Woodward-Clyde—1991

The 1991 RI investigation evaluated the nature and extent of contamination at 18 Cannon AFB SWMUs, including FTA4. Four surface soil samples (0 to 0.5 ft bgs) and 35 subsurface samples (61 to 100 ft bgs) were collected at FTA4. TPH concentrations at two soil boring locations (1093 and 1094) located near SWMU 109 exceeded the action level of 5,000 mg/kg at depths ranging from 0 to 6 ft (Woodward-Clyde, 1992). A summary of soil boring locations with detected TPH concentrations exceeding 940 mg/kg is presented in Figure 1 and data are summarized in Table 2.

Phase II RFI Conducted by Harza—1996–1997

The Phase II RFI included a passive soil gas survey, 19 soil borings, and 77 soil samples collected at various locations at FTA4. TPH concentrations in soil detected at two borehole locations (SB01 and SB11) associated with SWMU 109 exceeded the action level of 5,000 mg/kg (Harza, 1997). A summary of soil boring locations with detected TPH concentrations exceeding 940 mg/kg is presented in Figure 1 and data are summarized in Table 2.

CORRECTIVE ACTION IMPLEMENTATION AT FTA4

Based on the corrective measures alternative evaluation presented in the Final CMS Report (Foster Wheeler Environmental, 2001), the preferred corrective measures alternative for SWMU 109 was Alternative 5, passive bioventing. This alternative was selected because it can attain all of the evaluation criteria and can meet the corrective action objective for SWMU 109 at the lowest estimated cost. Passive bioventing is relatively easy to implement and can be conducted on site with periodic maintenance and sampling over a period spanning several years.

Prior to implementing the selected remedial alternative, additional sampling should be conducted to determine the current extent of TPH contamination in soil requiring remediation. Figure 1 is a map presenting the locations of TPH in soil samples collected during the 1991 and 1997 site investigations at FTA4. Only data are presented for sample locations where TPH was detected at concentrations that exceed the 940 mg/kg screening level.

The primary area of concern is centered at the location of the former concrete pad at SWMU 109. Additional outlying shallow contamination north of SWMU 109 (to depths ranging from 0–4 ft) and in the area of SWMU 112 (in surface soil, 0–1 ft) are also areas of concern. The deepest contamination was located in soil boring locations SB01 (to a depth of 42 ft bgs) and 1094 (to a depth of 12 ft bgs).

**Table 2. TPH Concentrations in Soil Samples Collected During Site Investigations
Fire Training Area Four Cannon Air Force Base, New Mexico**

Site ID/ Sample Number	Sample Depth (ft bgs)	TPH Concentration (mg/kg)
Phase 2 RFI (Harza, 1997)		
SB01		
SB01-0103	2-3	1940
SB01-0119	18-19	5560
SB01-0127	26-27	5120
SB01-0138	37-38	1600
SB01-0142	41-42	1990
SB01-0155	54-55	63.2
SB01-0165	64-65	141
SB01-0173	72-73	16.1
SB01-0180	79-80	17.6
SB02		
SB02-0101	0-1	145
SB02-0109	8-9	27.8
SB02-0119	18-19	< 16.7
SB03		
SB03-0101	0-1	24.2
SB03-0109	8-9	< 16.9
SB03-0119	18-19	< 16.9
SB04		
SB04-0101	0-1	3270
SB04-0109	8-9	139
SB04-0119	18-19	< 17.2
SB05		
SB05-0101	0-1	73.9
SB05-0109	8-9	< 16.0
SB05-0112	11-12	< 16.3
SB06		
SB06-0101	0-1	118
SB06-0107	6-7	44.2
SB06-0117	16-17	< 16.5
SB07		
SB07-0101	0-1	28.5
SB07-0109	8-9	18.5
SB07-0119	18-19	< 16.8
SB08		
SB08-0101	0-1	380
SB08-0103	2-3	< 16.7
SB08-0110	9-10	16.1
SB09		
SB09-0101	0-1	29.5
SB09-0102	1-2	< 15.9
SB09-0115	14-15	< 16.5
SB10		
SB10-0101	0-1	140
SB10-0106	6-7	< 16.7
SB10-0110	9-10	38.6
SB11		
SB11-0101	0-1	14,400
SB11-0107	6-7	< 16.9
SB11-0117	16-17	16.8
SB12		
SB12-0101	0-1	69.7
SB12-0102	1-2	34.4
SB12-0110	9-10	77.5
SB12-0121	20-21	16.9
SB12-0130	29-20	21.5

**Table 2. TPH Concentrations in Soil Samples Collected During Site Investigations
Fire Training Area Four Cannon Air Force Base, New Mexico**

Site ID/ Sample Number	Sample Depth (ft bgs)	TPH Concentration (mg/kg)
SB13		
SB13-0101	0-1	44
SB13-0104	3-4	< 15.8
SB13-0115	14-15	< 16.2
SB14		
SB14-0101	0-1	1040
SB14-0102	1-2	17.6
SB14-0115	14-115	17.9
SB15		
SB15-0101	0-1	185
SB15-0109	8-9	< 16.8
SB15-0119	18-19	< 16.9
SB16		
SB16-0101	0-1	43.9
SB16-0104	3-4	216
SB16-0110	9-10	82.8
SB17		
SB17-0101	0-1	583
SB17-0109	8-9	20.4
SB17-0119	18-19	18
SB17-0129	28-29	18
SB17-0139	38-39	19
SB17-0145	44-45	37.8
SB17-0159	58-59	270
SB18		
SB18-0101	0-1	42.6
SB18-0109	8-9	< 16.9
SB18-0119	18-19	< 16.6
SB18-0124	24	< 16.7
SB18-0133	33	< 16.4
SB18-0143	43	40
SB18-0159	59	< 16.1
SB19		
SB19-0101	0-1	104
SB19-0104	3-4	1530
SB19-0117	16-17	< 16.7
SB19-0129	28-29	< 16.8
SB19-0133	32-33	< 16.8
SB19-0145	44-45	< 16.2
SB19-0159	58-59	17.3
Phase 1 RFI (Woodward-Clyde, 1991)		
1091/1095 (1091 sampled 0-0.5 ft; 1095 sampled 0.5-62 ft)	0-0.5	27.3
	5-7	56.6
	10-12	< 45.1
	20-22	< 45.7
	30-32	< 44.5
	40-42	< 46.3
	50-52	< 43.9
60-62	< 42.6	
1092/1096 (1092 sampled 0-0.5 ft; 1096 sampled 0.5-60 ft)	0-0.5	TPH not detected
	>0.5-62 (multiple samples)	TPH not detected

**Table 2. TPH Concentrations in Soil Samples Collected During Site Investigations
Fire Training Area Four Cannon Air Force Base, New Mexico**

Site ID/ Sample Number	Sample Depth (ft bgs)	TPH Concentration (mg/kg)
1093/1097 (1093 sampled 0-0.5 ft; 1097 sampled 0.5-100 ft)	0-0.5	(38,500)
	4-6	12900
	10-12	< 45
	20-22	< 46.6
	30-32	< 44
	40-42	< 45.6
	50-52	215
	60-62	203
	70-72	< 42.8
	80-82	< 41.8
	90-92	< 40.6
1094/1098 (1094 sampled 0-0.5 ft; 1098 sampled 4-92 ft)	98-100	< 41.2
	0-0.5	(13,600)
	4-6	8300
	10-12	1870
	20-22	46.7
	30-32	< 44
	40-42	< 44.1
	50-52	< 42.7
	60-62	< 43.2
	70-72	< 43
	80-82	< 42.2
90-92	< 42.1	

Notes:

The values in parentheses are results from samples recollected due to laboratory-missed holding

Values in bold exceed NMED TPH screening guideline of 940 mg/kg.

bgs - below ground surface

ft - feet

mg/kg - milligrams per kilogram

TPH - Total petroleum hydrocarbons analyzed by EPA method 418.1

The analytical data upon which the selection of the remedial alternative is based was collected in 1991 and 1997. In order to define the current extent of contamination, additional sampling at FTA4 is proposed. Sampling is proposed to confirm the levels of TPH in soil at locations where previous investigations indicated elevated levels of contamination and at new locations to help define the lateral and vertical extent of contamination. The new sample locations were further defined by the passive soil gas data collected for diesel-range organics (DRO) as depicted in Figure 5-7 of the Phase II RFI report (Harza, 1997). The area of the highest DRO concentrations in soil gas is presented in Figure 2 and is centered around the former concrete pad at SWMU 109, and the new locations were placed around within this area. Figure 2 presents a map showing the proposed sample locations and Table 3 presents a summary of the proposed sampling program.

Table 3. Proposed Sampling at FTA4

Proposed Sample Location	Sample Depth Intervals (ft bgs)	Rationale	Number of Samples ^a
Confirmation Samples			
SB01	0-1, 9-10, 19-20, 29-30, 39-40, 49-50	Maximum depth of TPH contamination > 940 mg/kg at 42 ft; confirm presence and levels of TPH to depth of 50 ft	6
SB04	0-1	Maximum depth of TPH contamination > 940 mg/kg is 1 ft; Confirm presence and levels of TPH in surface soil	1
SB11	0-1	Maximum depth of TPH contamination >940 mg/kg is 1 ft; Confirm presence and levels of TPH in surface soil	1
SB14	0-1	Maximum depth of TPH contamination >940 mg/kg is 1 ft; Confirm presence and levels of TPH in surface soil	1
SB19	0-1, 3-4	Maximum depth of TPH contamination >940 mg/kg is 4 ft; Confirm presence and levels of TPH in surface soil	2
1093	0-1, 4-5, 9-10	Maximum depth of TPH contamination >940 mg/kg is 10 ft; Confirm presence and levels of TPH in surface soil	3
1094	0-1, 4-5, 9-10, 12-13	Maximum depth of TPH contamination >940 mg/kg is 12 ft; Confirm presence and levels of TPH in surface soil	4
Additional Sample Locations			
2004-01	0-1, 9-10	Determine lateral and vertical extent of contamination in area of former concrete pad at SWMU 109	2
2004-02	0-1, 9-10		2
2004-03	0-1, 9-10		2
2004-04	0-1, 9-10		2
2004-05	0-1, 9-10, 19-20		3

^a Analytical method proposed at this time is total recoverable petroleum hydrocarbons using EPA Method modified 8015M.

The proposed sampling presented in Table 3 is based on use of an "action level" of 940 mg/kg which corresponds to evaluating the site for direct residential exposure. By comparison, assuming a future use of the site under an industrial scenario with an "action level" of 2,350 mg/kg, fewer samples would need to be collected.

Under a conservative residential future-use scenario using the data currently available, an area approximately 100 ft by 100 ft would require remediation to a depth of 42 ft with a volume of contaminated soil of 16,000 cubic yards (c.y.). If direct exposure is defined to occur to a depth of 12 ft, the volume of contaminated soil decreases to 4,500 c.y. By collecting confirmation samples and additional data to more accurately define the extent of contamination, it is likely that the lateral and vertical extent of contaminated soil has decreased based on the assumption that TPH in soil has degraded over the past seven years since the most recent investigation of the site.

The results of the proposed sampling program will be utilized to determine the final corrective action required for the site. Upon completion of the sampling program, the alternatives evaluated in the Final CMS Report will be re-evaluated to determine the preferred alternative based on the evaluation criteria established during the CMS (Foster Wheeler Environmental, 2001). At this time Cannon AFB would like to accelerate cleanup of FTA4 to facilitate site closure within the next year. In order to accomplish this goal, corrective measures including soil removal and disposal will be the primary focus of the corrective measures evaluation for this site.

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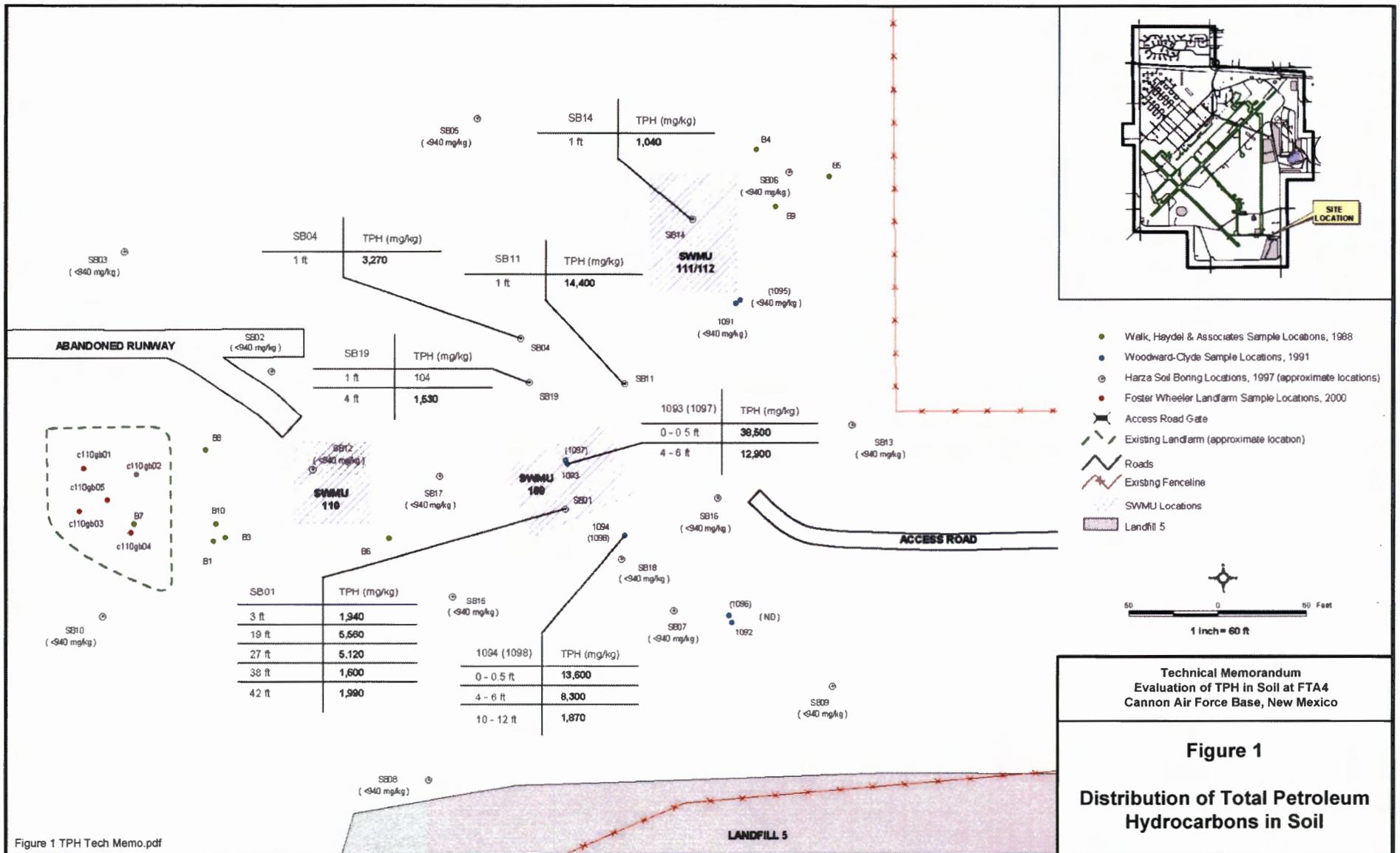


Figure 1 TPH Tech Memo.pdf

Technical Memorandum
 Evaluation of TPH in Soil at FTA4
 Cannon Air Force Base, New Mexico

Figure 1
Distribution of Total Petroleum Hydrocarbons in Soil

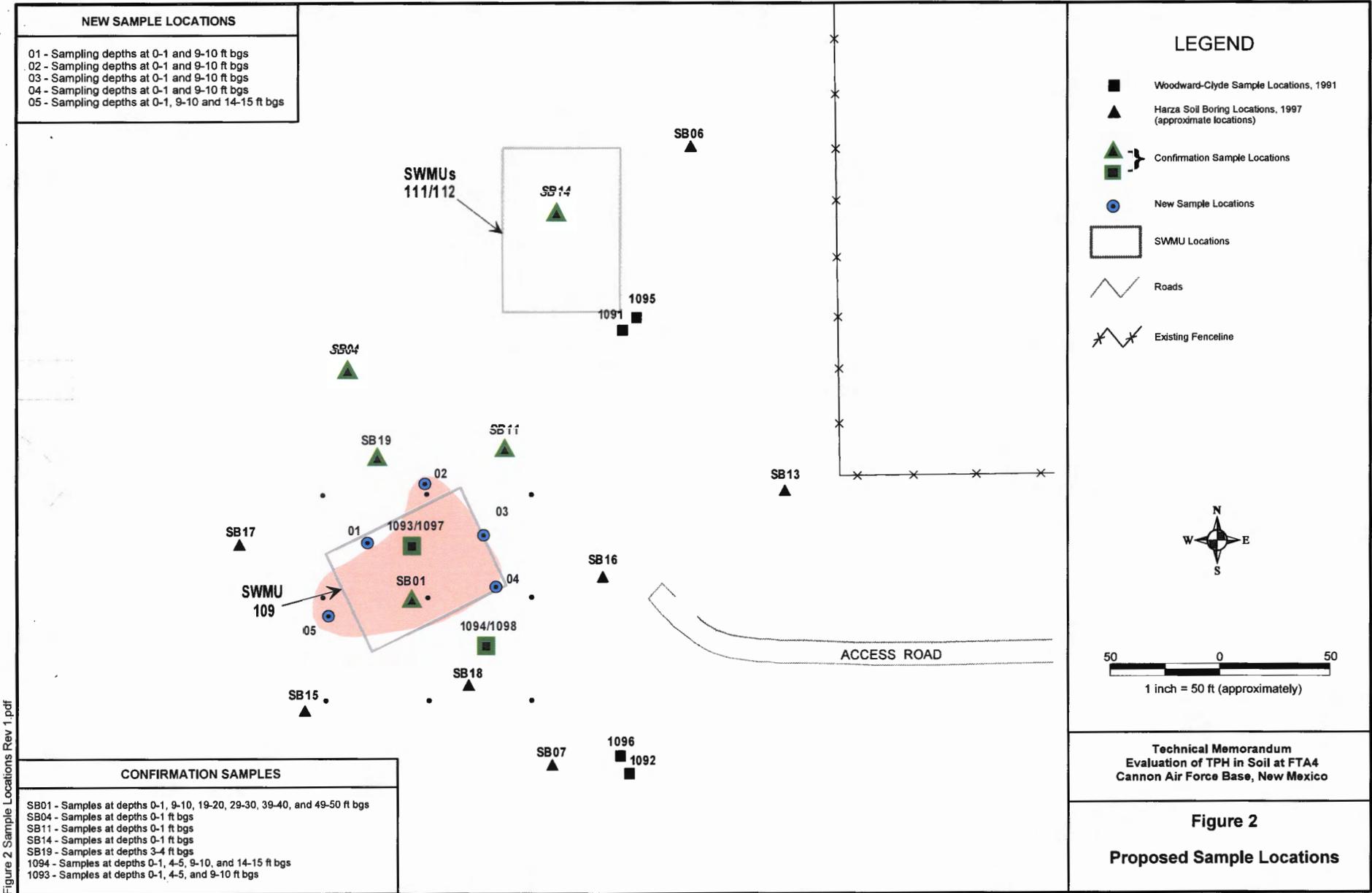


Figure 2 Sample Locations Rev 1.pdf

APPENDIX B
HTRW SOIL BORING LOGS

HTW DRILLING LOG

HOLE NO.
CAFB-1093

1. COMPANY NAME
T N & Associates

2. DRILLING CONTRACTOR
ESN Southwest

SHEET 1
OF 2 SHEETS

3. PROJECT
FTA-04 Cannon AFB

4. LOCATION
Cannon AFB

5. NAME OF DRILLER
Dustin McNiel

6. MANUFACTURER'S DESIGNATION OF DRILL
AMS Power Probe 9600 PRO

7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT
2.125" Sampler

8. HOLE LOCATION
1,227,742.6 North 851,593.9 East

9. SURFACE ELEVATION
4263.1'

10. DATE STARTED
11/15/04

11. DATE COMPLETED
11/15/04

12. OVERBURDEN THICKNESS
9'

15. DEPTH GROUNDWATER ENCOUNTERED
NA

13. DEPTH DRILLED INTO ROCK
0'

16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
NA

14. TOTAL DEPTH OF HOLE
9.0

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
NA

18. GEOTECHNICAL SAMPLES
0

DISTURBED
--

UNDISTURBED
--

19. TOTAL NUMBER OF CORE BOXES
--

20. SAMPLES FOR CHEMICAL ANALYSIS
3

VOC

METALS

OTHER (SPECIFY)

OTHER (SPECIFY)

OTHER (SPECIFY)

21. TOTAL CORE REC %
TPH-DRO

22. DISPOSITION OF HOLE
Bentonite Chips

BACKFILLED
X

MONITORING WELL

OTHER (SPECIFY)

23. SIGNATURE OF INSPECTOR
[Signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4263.1	0	Black Gravel with clay	HS = 591		2002189-0001		4.8' Rec
4262.1	1	Strong fuel odor and staining					
4261.1	2						
4260.1	3						
4259.1	4	10YR 4/8 Red Silty Sand (SM), strong odor and staining (10R 3/4) to about 4' bgs	HS = 367		2002189-0002		
4258.1	5						

HTW DRILLING LOG

HOLE NO.
CAFB-1093

PROJECT FTA-04 Cannon AFB
Cannon AFB

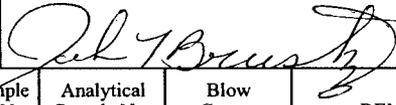
INSPECTOR
John Bruskevitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4257.1	6	7.5YR 7/8 Reddish Yellow Silt (ML), hard, no staining, no odor					4' Rec
4256.1	7						
4255.1	8						
4254.1	9		HS = 22		2002189-0003		
4253.1	10	EOH @ 9' bgs PID HS = Head Space					
4252.1	11						
4251.1	12						
4250.1	13						
4249.1	14						

HTW DRILLING LOG

HOLE NO.
CAFB-1094

1. COMPANY NAME T N & Associates		2. DRILLING CONTRACTOR ESN Southwest			SHEET 1 OF 2 SHEETS	
3. PROJECT FTA-04 Cannon AFB			4. LOCATION Cannon AFB			
5. NAME OF DRILLER Dustin McNeil			6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO			
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	2.125" Sampler		8. HOLE LOCATION 1,227,692.4 North 851,635.4 East		9. SURFACE ELEVATION 4263.7'	
			10. DATE STARTED 11/15/04			
			11. DATE COMPLETED 11/15/04			
12. OVERBURDEN THICKNESS 13'			15. DEPTH GROUNDWATER ENCOUNTERED NA			
13. DEPTH DRILLED INTO ROCK 0'			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA			
14. TOTAL DEPTH OF HOLE 13.0			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA			
18. GEOTECHNICAL SAMPLES 0	DISTURBED --	UNDISTURBED --	19. TOTAL NUMBER OF CORE BOXES --			
20. SAMPLES FOR CHEMICAL ANALYSIS 4	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %	
				TPH-DRO		
22. DISPOSITION OF HOLE Bentonite Chips	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR 		
	X					

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4263.7	0	Black Clay, minor sand, with gravel (upper 3"), no odor, no staining	HS = 2.9		2002189-0004		3.7' Rec
4262.7	1	10R 4/8 Red Medium Grained Sand (SW), well sorted, well rounded, soft, no odor, no staining					
4261.7	2						
4260.7	3						
4259.7	4						
4258.7	5		HS = 2.0		2002189-0005		

HTW DRILLING LOG

HOLE NO.
CAFB-1094
SHEET 2
OF 2 SHEETS

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
							5' Rec
4257.7	6	7.5YR 7/8 Reddish Yellow Silt (ML), no staining, no odor					
4256.7	7						
4255.7	8						
4254.7	9						
4253.7	10		HS = 1.6		2002189-0006		2.9' Rec
4252.7	11	5YR 5/8 Yellowish Red Sandy Silt (ML), with silty nodule (7.5YR 7/8), no odor, no staining					Photo 567
4251.7	12						
4250.7	13		HS = 1		2002189-0007		
4249.7	14	EOH @ 13' bgs PID HS = Head Space					

HTW DRILLING LOG

HOLE NO.
CAFB-200401

1. COMPANY NAME T N & Associates	2. DRILLING CONTRACTOR ESN Southwest
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SHEET 1
OF 2 SHEETS

3. PROJECT FTA-04 Cannon AFB	4. LOCATION Cannon AFB
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5. NAME OF DRILLER Dustin McNeil	6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO
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7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT 2.125" Sampler	8. HOLE LOCATION 1,227,683.7 North 851,568.8 East
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9. SURFACE ELEVATION 4264.8'	10. DATE STARTED 11/16/04
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11. DATE COMPLETED 11/16/04	12. OVERBURDEN THICKNESS 9' 10"
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13. DEPTH DRILLED INTO ROCK 0'	15. DEPTH GROUNDWATER ENCOUNTERED NA
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14. TOTAL DEPTH OF HOLE 9.9	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA
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17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA	18. GEOTECHNICAL SAMPLES 0
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DISTURBED --	UNDISTURBED --	19. TOTAL NUMBER OF CORE BOXES --
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20. SAMPLES FOR CHEMICAL ANALYSIS 2	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
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22. DISPOSITION OF HOLE Bentonite Chips	BACKFILLED X	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR <i>John T. Brewster</i>
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ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
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4264.8	0	Black Silty Sand, gravel (upper 6"), stained, strong odor	HS = 301		2002189-0008		3.8' Rec
4263.8	1						
4262.8	2	2.5YR 5/4 Reddish Brown Silty Sand (SM), damp, hard, no odor, no staining					
4261.8	3						
4260.8	4						
4259.8	5						

HTW DRILLING LOG

HOLE NO.
CAFB-200401

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4258.8	6						4.3' Rec
4257.8	7	7.5YR 7/8 Reddish Yellow Clayey Silt (ML), hard, damp, no odor, no staining					
4256.8	8						
4255.8	9						
4254.8	10	EOH @ 9' 10" bgs PID HS = Head Space	HS = 1848		2002189-0009		
4253.8	11						
4252.8	12						
4251.8	13						
4250.8	14						

HTW DRILLING LOG

HOLE NO.
CAFB-200402

1. COMPANY NAME T N & Associates	2. DRILLING CONTRACTOR ESN Southwest	SHEET 1 OF 2 SHEETS
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3. PROJECT FTA-04 Cannon AFB	4. LOCATION Cannon AFB
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5. NAME OF DRILLER Dustin McNiel	6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO
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7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	2.125" Sampler	8. HOLE LOCATION 1,227,764.6 North 851,622.6 East
		9. SURFACE ELEVATION 4262.2'
		10. DATE STARTED 11/16/04
		11. DATE COMPLETED 11/16/04

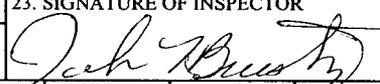
12. OVERBURDEN THICKNESS 10'	15. DEPTH GROUNDWATER ENCOUNTERED NA
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13. DEPTH DRILLED INTO ROCK 0'	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA
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14. TOTAL DEPTH OF HOLE 10.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA
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18. GEOTECHNICAL SAMPLES 0	DISTURBED --	UNDISTURBED --	19. TOTAL NUMBER OF CORE BOXES --
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20. SAMPLES FOR CHEMICAL ANALYSIS 2 (MS/MSD)	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
				TPH-DRO		

22. DISPOSITION OF HOLE Bentonite Chips	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR 
	X			

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4262.2	0	Gravel, Silty Clay, damp	HS = 156		2002189-0010 (MS/MSD)		3.1' Rec
4261.2	1	Black stained, Slight odor					
4260.2	2						
4259.2	3						
4258.2	4	2.5YR 5/4 Reddish Brown Silty Clay (CL), no odor, no staining					
4257.2	5						

HTW DRILLING LOG

HOLE NO.
CAFB-200402

PROJECT FTA-04 Cannon AFB
Cannon AFB

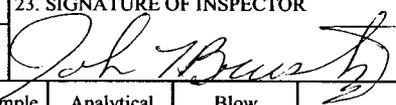
INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
		bits of PVC					5' Rec
4256.2	6	7.5YR 7/8 Reddish Yellow Sand (SW), hard, damp, no odor, no staining					
4255.2	7						
4254.2	8						
4253.2	9						
4252.2	10		HS = 3.3		2002189 -0011		
		EOH @ 10' bgs PID HS = Head Space					
4251.2	11						
4250.2	12						
4249.2	13						
4248.2	14						

HTW DRILLING LOG

HOLE NO.
CAFB-200403

1. COMPANY NAME T N & Associates			2. DRILLING CONTRACTOR ESN Southwest			SHEET 1 OF 2 SHEETS		
3. PROJECT FTA-04 Cannon AFB				4. LOCATION Cannon AFB				
5. NAME OF DRILLER Dustin McNeil				6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO				
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT		2.125" Sampler			8. HOLE LOCATION 1,227,737.3 North 851,641.4 East			
		9. SURFACE ELEVATION 4264.0'						
		10. DATE STARTED 11/16/04		11. DATE COMPLETED 11/16/04				
		12. OVERBURDEN THICKNESS 10'				15. DEPTH GROUNDWATER ENCOUNTERED NA		
13. DEPTH DRILLED INTO ROCK 0'				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA				
14. TOTAL DEPTH OF HOLE 10.0				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA				
18. GEOTECHNICAL SAMPLES 0		DISTURBED --	UNDISTURBED --		19. TOTAL NUMBER OF CORE BOXES --			
20. SAMPLES FOR CHEMICAL ANALYSIS 2		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %	
					TPH-DRO			
22. DISPOSITION OF HOLE Bentonite Chips		BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR 			
		X						
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c		Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4264.0	0	Black Gravel		HS = 196		2002189-0012		3.6' Rec
4263.0	1	Dark Brown Sand (SW), damp, stained, odor						
4262.0	2							
4261.0	3			FS = 2.5				
4260.0	4	2.5YR 5/4 Reddish Brown Sand (SW), hard, damp, no staining, no odor						
4259.0	5							

HTW DRILLING LOG

HOLE NO.
CAFB-200403

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4258.0	6	Black Staining	FS = 3.5				5' Rec
4257.0	7	7.5YR 7/8 Reddish Yellow Silt (ML), no odor, no staining					
4256.0	8						
4255.0	9						
4254.0	10		HS = 4.0		2002189 -0013		
4253.0	11	EOH @ 10' bgs PID FS = Field Screen HS = Head Space					
4252.0	12						
4251.0	13						
4250.0	14						

HTW DRILLING LOG

HOLE NO.
CAFB-200404

1. COMPANY NAME T N & Associates		2. DRILLING CONTRACTOR ESN Southwest			SHEET 1 OF 2 SHEETS	
3. PROJECT FTA-04 Cannon AFB			4. LOCATION Cannon AFB			
5. NAME OF DRILLER Dustin McNeil			6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO			
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	2.125" Sampler		8. HOLE LOCATION 1,227,718.4 North 851,656.6 East			
			9. SURFACE ELEVATION 4265.0'			
			10. DATE STARTED 11/16/04	11. DATE COMPLETED 11/16/04		
12. OVERBURDEN THICKNESS 10'			15. DEPTH GROUNDWATER ENCOUNTERED NA			
13. DEPTH DRILLED INTO ROCK 0'			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA			
14. TOTAL DEPTH OF HOLE 10.0			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA			
18. GEOTECHNICAL SAMPLES 0	DISTURBED --	UNDISTURBED --	19. TOTAL NUMBER OF CORE BOXES --			
20. SAMPLES FOR CHEMICAL ANALYSIS 2	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY) TPH-DRO	OTHER (SPECIFY)	
21. TOTAL CORE REC %						
22. DISPOSITION OF HOLE Bentonite Chips		BACKFILLED X	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR <i>Jeh T. Beust</i>	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4265.0	0	Gravel	HS = 4.8		2002189-0014		3.8' Rec
4264.0	1	2.5YR 5/4 Reddish Brown Sand (SW), damp, soft, no staining, no odor					
4263.0	2						
4262.0	3						
4261.0	4	Black Gravel (GP), no odor, no staining 2.5YR 5/4 Reddish Brown Sand (SW), no odor, no staining	FS = 0.0				
4260.0	5						

HTW DRILLING LOG

HOLE NO.
CAFB-200404

PROJECT FTA-04 Cannon AFB
Cannon AFB

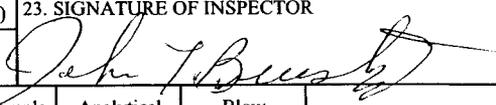
INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4259.0	6	7.5YR 7/8 Reddish Yellow Silt (ML), hard, damp, no odor, no staining					5' Rec
4258.0	7						
4257.0	8						
4256.0	9						
4255.0	10						
			HS = 3.4		2002189 -0015		
4254.0	11	EOH @ 10' bgs PID FS = Field Screen HS = Head Space					
4253.0	12						
4252.0	13						
4251.0	14						

HTW DRILLING LOG

HOLE NO.
CAFB-200405

1. COMPANY NAME T N & Associates		2. DRILLING CONTRACTOR ESN Southwest		SHEET 1 OF 3 SHEETS		
3. PROJECT FTA-04 Cannon AFB			4. LOCATION Cannon AFB			
5. NAME OF DRILLER Dustin McNiel			6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO			
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT		2.125" Sampler		8. HOLE LOCATION 1,227,752.0 North 851,610.5 East		
				9. SURFACE ELEVATION 4261.7'		
				10. DATE STARTED 11/16/04		
				11. DATE COMPLETED 11/16/04		
12. OVERBURDEN THICKNESS 20'			15. DEPTH GROUNDWATER ENCOUNTERED NA			
13. DEPTH DRILLED INTO ROCK 0'			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA			
14. TOTAL DEPTH OF HOLE 20.0			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA			
18. GEOTECHNICAL SAMPLES 0		DISTURBED --	UNDISTURBED --	19. TOTAL NUMBER OF CORE BOXES --		
20. SAMPLES FOR CHEMICAL ANALYSIS 3		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY) TPH-DRO	21. TOTAL CORE REC %
22. DISPOSITION OF HOLE Bentonite Chips		BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR 	
		X				

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4261.7	0	Black Stained	HS = 20		200218-0016		1.7' Rec
4260.7	1	Odor, No Staining					
4259.7	2						
4258.7	3						
4257.7	4	2.5YR 5/4 Reddish Brown Silt (ML), damp, hard	FS = 14				
4256.7	5						

HTW DRILLING LOG

HOLE NO.
CAFB-200405

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 3 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
		Reddish Brown Sand (SW)	FS = 12				3.8' Rec
4255.7	6	7.5YR 7/8 Reddish Yellow Sand (SW), no odor, no staining	FS = 9				
4254.7	7						
4253.7	8						
4252.7	9						
4251.7	10		HS = 9.3		2002189 -0017		3.8' Rec
4250.7	11						
4249.7	12						
4248.7	13						
4247.7	14						

HTW DRILLING LOG

HOLE NO.
CAFB-200405

PROJECT FTA-04 Cannon AFB
Cannon AFB

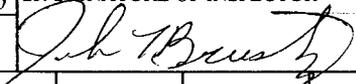
INSPECTOR
John Bruskwitz (TN&A)

SHEET 3
OF 3 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4246.7	15	7.5 YR 7/8 Reddish Yellow Sand (SW), no odor, no staining	FS = 0				4.1' Rec
4245.7	16						
4244.7	17						
4243.7	18						
4242.7	19						
4241.7	20	EOH @ 20' bgs	FS = 0 HS = 4.0		2002189 -0018 2002189 0034 (DUP)		
4240.7	21	PID FS = Field Screen HS = Head Space					
4239.7	22						
4238.7	23						

HTW DRILLING LOG

HOLE NO.
CAFB-200406

1. COMPANY NAME T N & Associates		2. DRILLING CONTRACTOR ESN Southwest			SHEET 1 OF 2 SHEETS	
3. PROJECT FTA-04 Cannon AFB			4. LOCATION Cannon AFB			
5. NAME OF DRILLER Dustin McNeil			6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO			
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	2.125" Sampler		8. HOLE LOCATION 1,227,727.0 North 851,553.1 East			
			9. SURFACE ELEVATION 4265.0'			
			10. DATE STARTED 11/16/04	11. DATE COMPLETED 11/16/04		
12. OVERBURDEN THICKNESS 9' 11"			15. DEPTH GROUNDWATER ENCOUNTERED NA			
13. DEPTH DRILLED INTO ROCK 0'			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA			
14. TOTAL DEPTH OF HOLE 9.9			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA			
18. GEOTECHNICAL SAMPLES 0	DISTURBED --	UNDISTURBED --	19. TOTAL NUMBER OF CORE BOXES --			
20. SAMPLES FOR CHEMICAL ANALYSIS 2	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %	
				TPH-DRO		
22. DISPOSITION OF HOLE Bentonite Chips	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR 		
	X					

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4265.0	0	Gravel (GM) Black Silt (ML), damp, soft, odor, staining 2.5YR 5/4 Reddish Brown Silt (ML), hard, damp, no staining	HS = 70		2002189-0036		3.4' Rec
4264.0	1		FS = 27				
4263.0	2			FS = 12.3			
4262.0	3						
4261.0	4		FS = 6.8				
4260.0	5						

HTW DRILLING LOG

HOLE NO.
CAFB-200406

PROJECT
FTA-04 Cannon AFB
Cannon AFB

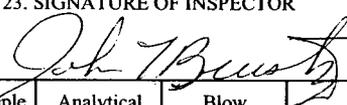
INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4259.0	6		FS = 27				4.2' Rec
4258.0	7	7.5YR 7/8 Reddish Yellow Silt (ML), hard, damp, no staining	FS = 30				
4257.0	8		FS = 45				
4256.0	9		FS = 13		2002189-0037		
4255.0	10	EOH @ 9' 11" bgs	HS = 35				
4254.0	11	PID FS = Field Screen HS = Head Space					
4253.0	12						
4252.0	13						
4251.0	14						

HTW DRILLING LOG

HOLE NO.
CAFB-SB01

1. COMPANY NAME T N & Associates				2. DRILLING CONTRACTOR ESN Southwest				SHEET 1 OF 7 SHEETS		
3. PROJECT FTA-04 Cannon AFB				4. LOCATION Cannon AFB						
5. NAME OF DRILLER Dustin McNeil				6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO						
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT		2.125" Sampler		8. HOLE LOCATION 1,227,690.9 North 851,598.6 East						
		4" Solid Stem Augers								
				9. SURFACE ELEVATION 4264.0'						
12. OVERBURDEN THICKNESS 51'				15. DEPTH GROUNDWATER ENCOUNTERED NA						
13. DEPTH DRILLED INTO ROCK 0'				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA						
14. TOTAL DEPTH OF HOLE 51.0				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA						
18. GEOTECHNICAL SAMPLES 0		DISTURBED --		UNDISTURBED --		19. TOTAL NUMBER OF CORE BOXES --				
20. SAMPLES FOR CHEMICAL ANALYSIS 6 (+1 DUP)		VOC		METALS		OTHER (SPECIFY)		OTHER (SPECIFY)		21. TOTAL CORE REC %
						TPH-DRO				
22. DISPOSITION OF HOLE Bentonite Chips		BACKFILLED		MONITORING WELL		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR 		
		X								

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4264.0	0	Black Clay and gravel (CL), stained, strong odor	HS = 2207		2002189-0019		3.1' Rec
4263.0	1						
4262.0	2	10R 5/4 Red Silt (ML), damp, no odor, no staining					
4261.0	3						
4260.0	4						
4259.0	5						

HTW DRILLING LOG

HOLE NO.
CAFB-SB01

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskewitz (TN&A)

SHEET 2
OF 7 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4258.0	6	7.5YR 7/8 Reddish Yellow Silt (ML), damp, no odor, no staining					5.0' Rec
4257.0	7						
4256.0	8						
4255.0	9						
4254.0	10		HS = 2459		2002189 -0020 2002189 -0033 (DUP)		3.1' Rec
4253.0	11						
4252.0	12						
4251.0	13	7.5 YR 7/8 Reddish Yellow Silt (ML), no staining, no odor					
4250.0	14						

HTW DRILLING LOG

HOLE NO.
CAFB-SB01

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 3
OF 7 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
		7.5 YR 7/8 Reddish Yellow Silt (ML), no staining, no odor					
4249.0	15						
4248.0	16						
4247.0	17						
4246.0	18						
4245.0	19		HS = 2405		2002189 -0021		
4244.0	20						
4243.0	21						
4242.0	22						
4241.0	23						

HTW DRILLING LOG

HOLE NO.
CAFB-SB01

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 4
OF 7 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4240.0	24	7.5 YR 7/8 Reddish Yellow Silt (ML), no staining, no odor					5.0' Rec
4239.0	25						
4238.0	26						
4237.0	27						
4236.0	28						
4235.0	29		HS = 153		2002189 -0022		
4234.0	30	7.5 YR 6/8 Reddish Yellow Silt (ML), no staining, no odor					
4233.0	31						
4232.0	32						

HTW DRILLING LOG

HOLE NO.
CAFB-SB01

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 5
OF 7 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4231.0	33	7.5 YR 6/8 Reddish Yellow Silt (ML), no staining, no odor					
		Refusal at 33' bgs					
4230.0	34						
4229.0	35						
4228.0	36	Solid Stem Augered to 39' bgs No Sampling or Logging					
4227.0	37						
4226.0	38						
4225.0	39						
		2.5YR 8/3 Very Fine Sandy Silt (ML), hard, damp, no staining, no odor	HS = 50		2002189 -0023		1.5' Rec
4224.0	40						
4223.0	41						

HTW DRILLING LOG

HOLE NO.
CAFB-SB01

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskevitz (TN&A)

SHEET 6
OF 7 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4222.0	42	Solid Stem Augered to 49' bgs No Sampling or Logging					
4221.0	43						
4220.0	44						
4219.0	45						
4218.0	46						
4217.0	47						
4216.0	48						
4215.0	49		10YR 6/6 Reddish Fine Sand (SW), poorly sorted, well rounded, hard, damp, no staining, no odor			2002189 -0024 (11/17/04)	2.5' Rec
4214.0	50						

HTW DRILLING LOG

HOLE NO.
CAFB-SB01

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 7
OF 7 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4213.0	51	10YR 6/6 Reddish Fine Sand (SW), poorly sorted, well rounded, hard, damp, no staining, no odor					
4212.0	52	EOH @ 51' bgs PID HS = Head Space					
4211.0	53						
4210.0	54						
4209.0	55						
4208.0	56						
4207.0	57						
4206.0	58						
4205.0	59						

HTW DRILLING LOG

HOLE NO.
CAFB-SB04
SHEET 1
OF 2 SHEETS

1. COMPANY NAME T N & Associates		2. DRILLING CONTRACTOR ESN Southwest	
3. PROJECT FTA-04 Cannon AFB		4. LOCATION Cannon AFB	
5. NAME OF DRILLER Dustin McNiel		6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO	
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	2.125" Sampler		8. HOLE LOCATION 1,227,813.5 North 851,564.8 East
			9. SURFACE ELEVATION 4263.6'
			10. DATE STARTED 11/16/04
			11. DATE COMPLETED 11/16/04
12. OVERBURDEN THICKNESS 10'		15. DEPTH GROUNDWATER ENCOUNTERED NA	
13. DEPTH DRILLED INTO ROCK 0'		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
14. TOTAL DEPTH OF HOLE 10.0		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA	
18. GEOTECHNICAL SAMPLES 0	DISTURBED --	UNDISTURBED --	19. TOTAL NUMBER OF CORE BOXES --
20. SAMPLES FOR CHEMICAL ANALYSIS 2 (+1 DUP)	VOC	METALS	OTHER (SPECIFY) TPH-DRO
			OTHER (SPECIFY)
21. TOTAL CORE REC %			
22. DISPOSITION OF HOLE Bentonite Chips	BACKFILLED X	MONITORING WELL	23. SIGNATURE OF INSPECTOR <i>John B. ...</i>

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4263.6	0	Black Gravel/Sand, no odors, staining	HS = 10		2002189-0025		3.7' Rec
4262.6	1	Dark Brown Sand (SW) grading to Red 10YR 4/8, damp, soft, no staining, no odor					
4261.6	2		FS = 2				
4260.6	3		FS = 4.4				
4259.6	4		FS = 5.0				
4258.6	5						

HTW DRILLING LOG

HOLE NO.
CAFB-SB04

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4257.6	6	2.5YR 7/8 Reddish Yellow Silt (ML), few pebbles, hard, damp, no staining, no odor	FS = 9.3				4' Rec
4256.6	7		FS = 11.8				
4255.6	8		FS = 11.9				
4254.6	9		HS = 109				
4253.6	10	EOH @ 10' bgs			2002189 -0026 2002189 -0035 (DUP)		
4252.6	11	PID FS = Field Screen HS = Head Space					
4251.6	12						
4250.6	13						
4249.6	14						

HTW DRILLING LOG

HOLE NO.
CAFB-SB11
SHEET 1
OF 2 SHEETS

1. COMPANY NAME T N & Associates		2. DRILLING CONTRACTOR ESN Southwest			3. PROJECT FTA-04 Cannon AFB		4. LOCATION Cannon AFB		
5. NAME OF DRILLER Dustin McNiel		6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO				7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT 2.125" Sampler		8. HOLE LOCATION 1,227,772.6 North 851,638.5 East	
9. SURFACE ELEVATION 4260.0'		10. DATE STARTED 11/16/04		11. DATE COMPLETED 11/16/04				12. OVERBURDEN THICKNESS 10'	
13. DEPTH DRILLED INTO ROCK 0'		14. TOTAL DEPTH OF HOLE 10.0		15. DEPTH GROUNDWATER ENCOUNTERED NA				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA		18. GEOTECHNICAL SAMPLES 0		DISTURBED --		UNDISTURBED --		19. TOTAL NUMBER OF CORE BOXES --	
20. SAMPLES FOR CHEMICAL ANALYSIS 2		VOC		METALS		OTHER (SPECIFY) TPH-DRO		OTHER (SPECIFY)	
21. TOTAL CORE REC %		BACKFILLED X		MONITORING WELL		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR <i>Jeh B...</i>	
22. DISPOSITION OF HOLE Bentonite Chips		20. SAMPLES FOR CHEMICAL ANALYSIS 2		VOC		METALS		OTHER (SPECIFY) TPH-DRO	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Bx No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4260.0	0	Black Gravel, stained, slight odor	HS = 124		2002189-0027		3.6' Rec
4259.0	1	2.5YR 5/4 Reddish Brown Silt (ML), soft, damp, no odor, no staining	FS = 4				
4258.0	2						
4257.0	3		FS = 3				
4256.0	4						
4255.0	5	7.5YR 7/8 Reddish Yellow Silt (ML), hard, damp, no staining, no odor					

HTW DRILLING LOG

HOLE NO.
CAFB-SB11

PROJECT FTA-04 Cannon AFB
Cannon AFB

INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
			FS = 2				5.0' Rec
4254.0	6						
4253.0	7						
4252.0	8						
4251.0	9						
4250.0	10		HS = 4.2		2002189 -0028		
		EOH @ 10' bgs PID FS = Field Screen HS = Head Space					
4249.0	11						
4248.0	12						
4247.0	13						
4246.0	14						

HTW DRILLING LOG

HOLE NO.
CAFB-SB14

1. COMPANY NAME T N & Associates		2. DRILLING CONTRACTOR ESN Southwest		SHEET 1 OF 2 SHEETS	
3. PROJECT FTA-04 Cannon AFB			4. LOCATION Cannon AFB		
5. NAME OF DRILLER Dustin McNiel			6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO		
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT	2.125" Sampler		8. HOLE LOCATION 1,227,883.1 North 851,705.2 East		
			9. SURFACE ELEVATION 4264.1'		
			10. DATE STARTED 11/16/04	11. DATE COMPLETED 11/16/04	
12. OVERBURDEN THICKNESS 10'			15. DEPTH GROUNDWATER ENCOUNTERED NA		
13. DEPTH DRILLED INTO ROCK 0'			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA		
14. TOTAL DEPTH OF HOLE 10.0			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA		
18. GEOTECHNICAL SAMPLES 0	DISTURBED --	UNDISTURBED --	19. TOTAL NUMBER OF CORE BOXES --		
20. SAMPLES FOR CHEMICAL ANALYSIS 2	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE REC %
				TPH-DRO	
22. DISPOSITION OF HOLE Bentonite Chips	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR <i>Jak T. Brusch</i>	
	X				

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4264.1	0	Dark Brown Sand (SW), no odor, no staining, plant roots to about 1' bgs	HS = 4.4		2002189-0029		3.9' Rec
4263.1	1						
4262.1	2						
4261.1	3						
4260.1	4	7.5YR 7/8 Reddish Yellow Silt (ML), damp, hard, no staining, no odor					
4259.1	5						

HTW DRILLING LOG

HOLE NO.
CAFB-SB14

PROJECT FTA-04 Cannon AFB
Cannon AFB

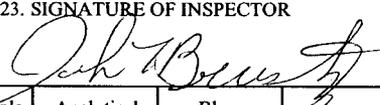
INSPECTOR
John Bruskwitz (TN&A)

SHEET 2
OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4258.1	6						4' Rec
4257.1	7						
4256.1	8						
4255.1	9	7.5YR 7/8 Reddish Yellow Sand (SW) with minor gravel, no staining, no odor					
4254.1	10		HS = 3.0		2002189 -0030		
4253.1	11	EOH @ 10' bgs PID HS = Head Space					
4252.1	12						
4251.1	13						
4250.1	14						

HTW DRILLING LOG

HOLE NO.
CAFB-SB19

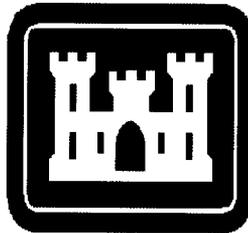
1. COMPANY NAME T N & Associates				2. DRILLING CONTRACTOR ESN Southwest				SHEET 1 OF 1 SHEET'S	
3. PROJECT FTA-04 Cannon AFB				4. LOCATION Cannon AFB					
5. NAME OF DRILLER Dustin McNeil				6. MANUFACTURER'S DESIGNATION OF DRILL AMS Power Probe 9600 PRO					
7. SIZES & TYPES OF DRILLING & SAMPLING EQUIPMENT		2.125" Sampler		8. HOLE LOCATION 1,227,753.7 North 851,588.7 East					
				9. SURFACE ELEVATION 4263.2'					
				10. DATE STARTED 11/16/04		11. DATE COMPLETED 11/16/04			
12. OVERBURDEN THICKNESS 4'				15. DEPTH GROUNDWATER ENCOUNTERED NA					
13. DEPTH DRILLED INTO ROCK 0'				16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA					
14. TOTAL DEPTH OF HOLE 4.0				17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA					
18. GEOTECHNICAL SAMPLES 0		DISTURBED --		UNDISTURBED --		19. TOTAL NUMBER OF CORE BOXES --			
20. SAMPLES FOR CHEMICAL ANALYSIS 2		VOC		METALS		OTHER (SPECIFY)		21. TOTAL CORE REC %	
						TPH-DRO			
22. DISPOSITION OF HOLE Bentonite Chips		BACKFILLED		MONITORING WELL		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR	
		X							

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	Field Screening Results d	Geotech Sample or Core Box No. e	Analytical Sample No. f	Blow Counts g	REMARKS h
4263.2	0	Silty Clay (CL) black stained, damp, hard, odors	HS = 93		2002189-0031		3.7' Rec
4262.2	1		FS = 10				
4261.2	2		FS = 62				
4260.2	3						
		2.5YR 5/4 Reddish Brown Sand (SW), no odor, no staining	FS = 56				
4259.2	4	EOH @ 4' bgs	HS = 146		2002189-0032		
		PID FS = Field Screen HS = Head Space					
4258.2	5						

APPENDIX C

**LABORATORY ANALYTICAL DATA SUMMARY
DATA VALIDATION REPORT
LABORATORY ANALYTICAL DATA REPORT
CHAIN-OF-CUSTODY FORMS**

**Data Validation Report
PHASE I INVESTIGATION
SOIL CORRECTIVE MEASURES
FIRE TRAINING AREA 04
CANNON AIR FORCE BASE, NEW MEXICO**



UNITED STATES ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
106 South 15th Street
Omaha, Nebraska 68102-1618
Contract No. DACA45-00-D-0006/0006
Project No. 2002189

Prepared by
T N & Associates, Inc.
1033 N. Mayfair Road
Milwaukee, WI 53226



January 2005
Revision 1.0

Overview

The TN & Associates, Inc. performed soil sampling and analysis in conjunction with a Phase I Investigation at Fire Training Area Number 4 located at Cannon AFB, New Mexico. This report describes the validation of laboratory analytical data.

TN & Associates collected soil samples along with associated field quality control samples between November 15th and 17th, 2004. Environmental samples were collected at 34 soil sampling locations. Three field duplicate samples were also included. A summary of the samples collected is shown in Table 1. The laboratory prepared project-specific samples for matrix spike/matrix spike duplicate (MS/MSD) analyses.

TABLE 1
Sample Cross-Reference Summary
(Fire Training Area 4, Cannon AFB, New Mexico)

Lab Sample ID	Sample ID	Sample Location	Sample Date	Dilution Factor
232090-001	2002189-0001 (N)	CAFB-1093	15-Nov-04	20
232090-002	2002189-0002 (N)	CAFB-1093	15-Nov-04	50
232090-003	2002189-0003 (N)	CAFB-1093	15-Nov-04	1
232090-004	2002189-0004 (N)	CAFB-1094	15-Nov-04	20
232090-005	2002189-0005 (N)	CAFB-1094	15-Nov-04	1
232090-006	2002189-0006 (N)	CAFB-1094	15-Nov-04	1
232090-007	2002189-0007 (N)	CAFB-1094	15-Nov-04	1
232090-008	2002189-0008 (N)	CAFB-2004-01	16-Nov-04	100
232090-009	2002189-0009 (N)	CAFB-2004-01	16-Nov-04	20
232090-010	2002189-0010 (N)	CAFB-2004-02	16-Nov-04	20
232090-011	2002189-0011 (N)	CAFB-2004-02	16-Nov-04	1
232090-012	2002189-0012 (N)	CAFB-2004-03	16-Nov-04	1
232090-013	2002189-0013 (N)	CAFB-2004-03	16-Nov-04	1
232090-014	2002189-0014 (N)	CAFB-2004-04	16-Nov-04	10
232090-015	2002189-0015 (N)	CAFB-2004-04	16-Nov-04	1
232090-016	2002189-0016 (N)	CAFB-2004-05	16-Nov-04	1
232090-017	2002189-0017 (N)	CAFB-2004-05	16-Nov-04	1
232090-018	2002189-0018 (N)	CAFB-2004-05	16-Nov-04	1
232090-019	2002189-0019 (N)	CAFB-SB01	15-Nov-04	100
232090-020	2002189-0020 (N)	CAFB-SB01	15-Nov-04	100
232091-001	2002189-0021 (N)	CAFB-SB01	15-Nov-04	50
232091-002	2002189-0022 (N)	CAFB-SB01	15-Nov-04	1
232091-003	2002189-0023 (N)	CAFB-SB01	15-Nov-04	1
232091-004	2002189-0024 (N)	CAFB-SB01	17-Nov-04	1
232091-005	2002189-0025 (N)	CAFB-SB04	16-Nov-04	20
232091-006	2002189-0026 (N)	CAFB-SB04	16-Nov-04	20
232091-007	2002189-0027 (N)	CAFB-SB11	16-Nov-04	10
232091-008	2002189-0028 (N)	CAFB-SB11	16-Nov-04	1
232091-009	2002189-0029 (N)	CAFB-SB14	16-Nov-04	10

TABLE 1

Sample Cross-Reference Summary
(Fire Training Area 4, Cannon AFB, New Mexico)

Lab Sample ID	Sample ID	Sample Location	Sample Date	Dilution Factor
232091-010	2002189-0030 (N)	CAFB-SB14	16-Nov-04	1
232091-011	2002189-0031 (N)	CAFB-SB19	16-Nov-04	100
232091-012	2002189-0032 (N)	CAFB-SB19	16-Nov-04	20
232091-013	2002189-0033 (FD)	CAFB-SB01	15-Nov-04	100
232091-014	2002189-0034 (FD)	CAFB-2004-05	16-Nov-04	1
232091-015	2002189-0035 (FD)	CAFB-SB04	16-Nov-04	10
232091-016	2002189-0036 (N)	CAFB-2004-06	16-Nov-04	100
232091-017	2002189-0037 (N)	CAFB-2004-06	16-Nov-04	1

Overnight carrier delivered samples to STL Laboratories located in University Park, IL for analytical testing. Analyses for Total Extractable Hydrocarbons (DRO) were performed using U.S. EPA SW-846 method 8015. All analyses were conducted at the University Park, IL facility.

After laboratory analyses were completed and reviewed, STL assembled a hardcopy data package and electronic data deliverable (EDD), which were delivered to TN & Associates. STL provided six data packages with EDDs, which include laboratory work group ID numbers 232090, and 232091.

Data validation was conducted as described in the U.S. EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review dated July, 2002 (EPA 540-R-01-008), U.S. EPA SW-846 method 8015, and laboratory established quality control limits. A copy of the laboratory reports with data qualifiers applied as a result of data validation are provided in Appendix A. Appendix B contains copies of the completed checklists used to document the data validation effort.

Summary of Sample Analyses

Hardcopy Data Packages

Project completeness is calculated at 100 percent. No major issues were identified. Minor issues are described below. Project data qualifiers are added to the laboratory Form 1 reports. A list of project data qualifiers is shown in Table 2.

TABLE 2
List of Project Qualifiers
(Fire Training Area 4, Cannon AFB, New Mexico)

Qualifier	Description
[=]	Confirmed Identification
U	Not Detected
R	Unreliable result
N	Tentative Identification. Consider Present. Special methods may be needed to confirm its presence or absence in future sampling efforts
J	Analyte present. Reported value may or may not be accurate or precise
UJ	Not detected, quantitation limit may be inaccurate or imprecise
Q	No Analytical Result
NJ	Qualitative identification questionable due to poor resolution. Presumptively present at approximate quantity
I	Interferences present which may cause the results to be biased high

Qualification codes explain why data qualifiers have been applied and identify possible limitations of data use. Table 3 presents all data qualifier codes used in data validation.

TABLE 3
Data Qualifier Code Reference
(Fire Training Area 4, Cannon AFB, New Mexico)

Qualifier	Organics	Inorganics
H	Holding times were exceeded.	Holding times were exceeded.
S	Surrogate recovery was outside QC limits.	ICP Serial Dilution %D were not within control limits.
C	Calibration %RSD or %D were noncompliant.	Correlation coefficient is <0.995.
R	Calibration RRF was <0.05.	%R for calibration is not within control limits.
B	Presumed contamination from preparation (method) blank.	Presumed contamination from preparation (method) blank or calibration blank.
L	Laboratory Control Sample %R was not within control limits.	Laboratory Control Sample %R was not within control limits.
M	MS/MSD recovery was poor or RPD high.	MS recovery was poor.
E	The analytical result was above the calibrated range of the instrument.	The analytical result was above the calibrated/linear range of the instrument.
I	Internal standard performance was unsatisfactory.	ICP ICS results were unsatisfactory.
T	Presumed contamination from trip blank.	Not applicable.
F	Presumed contamination from FB or ER.	Presumed contamination from FB or ER
D	The analysis with this flag should not be used because another more technically sound analysis is available.	The analysis with this flag should not be used because another more technically sound analysis is available.
P	Instrument performance for pesticides was poor.	Duplicates showed poor agreement.

Field samples are qualified for the introduction of contaminants resulting from laboratory and field activities as measured in the laboratory method blank, field blank, and trip blank audit samples.

No qualification was applied to analytical results as a result of data validation.

Major Issues

TPH by GC

No major issues were identified during the data validation effort.

Minor Issues

TPH by GC

SDG 232090

Ten of twenty samples analyzed for TPH were diluted due to high analyte concentrations. The dilutions resulted in 0% recoveries for both surrogate compounds (2-fluorobiphenyl and o-terphenyl). No action was taken for surrogate recoveries of 0% in diluted samples. Similarly, MS/MSD recoveries were 0% due to dilutions. LCS recoveries were acceptable. No action was taken.

SDG 232091

Nine of seventeen samples analyzed for TPH were diluted due to high analyte concentrations. The dilutions resulted in 0% recoveries for both surrogate compounds (2-fluorobiphenyl and o-terphenyl). No action was taken for surrogate recoveries of 0% in diluted samples. Similarly, MS/MSD recoveries were 0% due to dilutions. LCS recoveries were acceptable. No action was taken.

Appendix A
Validated Laboratory Reports
and Chain-of-Custody Forms

**Validated Laboratory Reports
TPH by GC**

STL Chicago is part of Severn Trent Laboratories, Inc.

Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0001			Laboratory Sample ID: 232090-1									
Date Sampled.....: 11/15/2004			Date Received.....: 11/18/2004									
Time Sampled.....: 09:45			Time Received.....: 09:45									
Sample Matrix.....: Soil												
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	1600			57	92	20.0000	mg/Kg	135986		12/01/04 1251	pjg
Method	% Solids Determination											
	% Solids, Solid	90.0			0.10	0.10	1	%	134999		11/21/04 1203	clb
	% Moisture, Solid	10.0			0.10	0.10	1	%	134999		11/21/04 1203	clb

* In Description = Dry Wgt.

RAF
12/13/04

STL Chicago is part of Severn Trent Laboratories, Inc.

Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004			
CUSTOMER: TM & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Balduino					
Customer Sample ID: 2002189-0002 Date Sampled.....: 11/15/2004 Time Sampled.....: 09:59 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-2 Date Received.....: 11/18/2004 Time Received.....: 09:45								
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	FLAGS	NDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	2300		140	220	50.0000	mg/Kg	135986		12/01/04 1327	pjg
Method	% Solids Determination										
	% Solids, Solid	92.0		0.10	0.10	1	%	134999		11/21/04 1206	clb
	% Moisture, Solid	8.0		0.10	0.10	1	%	134999		11/21/04 1206	clb

* In Description = Dry Wgt.

PAJ
12/13/04

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TM & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0003 Date Sampled.....: 11/15/2004 Time Sampled.....: 09:55 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-3 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH	
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	8.3		2.9	4.7	1.00000	mg/Kg	135986		12/01/04 1404	pjs	
Method	% Solids Determination											
	% Solids, Solid	89.7		0.10	0.10	1	%	134999		11/21/04 1208	clb	
	% Moisture, Solid	10.3		0.10	0.10	1	%	134999		11/21/04 1208	clb	

* In Description = Dry Wgt.

MB
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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0004 Date Sampled.....: 11/15/2004 Time Sampled.....: 09:15 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-4 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MPL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	1600			58	94	20.0000	mg/Kg	135986		12/01/04 1441	plg
Method	% Solids Determination											
	% Solids, Solid	86.3			0.10	0.10	1	%	134999		11/21/04 1211	clb
	% Moisture, Solid	13.7			0.10	0.10	1	%	134999		11/21/04 1211	clb

* In Description = Dry Wgt.

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Job Number: 232090		LABORATORY TEST RESULTS					Date: 12/02/2004					
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0005			Laboratory Sample ID: 232090-5									
Date Sampled.....: 11/15/2004			Date Received.....: 11/18/2004									
Time Sampled.....: 09:16			Time Received.....: 09:45									
Sample Matrix.....: Soil												
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	12			2.7	4.4	1.00000	mg/Kg	135986		12/01/04 1054	pig
Method	% Solids Determination											
	% Solids, Solid	92.4			0.10	0.10	1	%	134999		11/21/04 1214	clb
	% Moisture, Solid	7.6			0.10	0.10	1	%	134999		11/21/04 1214	clb

* In Description = Dry Wgt.

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Job Number: 232090		LABORATORY TEST RESULTS					Date: 12/02/2004					
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0006 Date Sampled.....: 11/15/2004 Time Sampled.....: 09:20 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-6 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH	
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4.6	U	2.9	4.6	1.00000	mg/Kg	135986		12/01/04 1131	pjg	
Method	% Solids Determination											
	% Solids, Solid	88.4		0.10	0.10	1	%	134999		11/21/04 1217	clb	
	% Moisture, Solid	11.6		0.10	0.10	1	%	134999		11/21/04 1217	clb	

* In Description = Dry Wgt.

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Job Number: 232090		LABORATORY TEST RESULTS					Date: 12/02/2004					
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0007 Date Sampled.....: 11/15/2004 Time Sampled.....: 09:25 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-7 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4.8			2.7	4.4	1.00000	mg/Kg	135986		12/01/04 1518	pjg
Method	% Solids Determination	92.1			0.10	0.10	1	%	134999		11/21/04 1220	clb
	% Solids, Solid	7.9			0.10	0.10	1	%	134999		11/21/04 1220	clb

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 232090

Date: 12/02/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldino

Customer Sample ID: 2002189-0008
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 08:35
 Sample Matrix.....: Soil

Laboratory Sample ID: 232090-8
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4000			290	460	100.000	mg/Kg	135986		12/01/04 1555	pjg
Method	% Solids Determination											
	% Solids, Solid	88.6			0.10	0.10	1	%	134999		11/21/04 1222	clb
	% Moisture, Solid	11.4			0.10	0.10	1	%	134999		11/21/04 1222	clb

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0009 Date Sampled.....: 11/16/2004 Time Sampled.....: 08:40 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-9 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	3000			57	92	20.0000	mg/Kg	135986		12/02/04 1248	pjs
Method	% Solids Determination											
	% Solids, Solid	90.4			0.10	0.10	1	%	134999		11/21/04 1225	clb
	% Moisture, Solid	9.6			0.10	0.10	1	%	134999		11/21/04 1225	clb

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LABORATORY TEST RESULTS

Job Number: 232090

Date: 12/02/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldino

Customer Sample ID: 2002189-0010
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 10:15
 Sample Matrix.....: Soil

Laboratory Sample ID: 232090-10
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	680			57	93	20.0000	mg/Kg	135986		12/02/04 0852	pjs
Method	% Solids Determination											
	% Solids, Solid	90.7			0.10	0.10	1	%	134999		11/21/04 1228	clb
	% Moisture, Solid	9.3			0.10	0.10	1	%	134999		11/21/04 1228	clb

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB				ATTN: Richard Baldino					
Customer Sample ID: 2002189-0011			Laboratory Sample ID: 232090-11									
Date Sampled.....: 11/16/2004			Date Received.....: 11/18/2004									
Time Sampled.....: 10:20			Time Received.....: 09:45									
Sample Matrix.....: Soil												
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MCL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4.5		U	2.8	4.5	1.00000	mg/Kg	135986		12/01/04 2051	pjg
Method	% Solids Determination	89.3			0.10	0.10	1	%	134999		11/21/04 1234	clb
	% Solids, Solid	10.7			0.10	0.10	1	%	134999		11/21/04 1234	clb

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Job Number: 232090 LABORATORY TEST RESULTS Date: 12/02/2004

CUSTOMER: TN & Associates, Inc. PROJECT: CANNON AFB ATTN: Richard Baldino

Customer Sample ID: 2002189-0012 Laboratory Sample ID: 232090-12
 Date Sampled.....: 11/16/2004 Date Received.....: 11/18/2004
 Time Sampled.....: 10:45 Time Received.....: 09:45
 Sample Matrix.....: Soil

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	56		2.8	4.5	1.00000	mg/Kg	135986		12/01/04 2128	pig
Method	% Solids Determination										
	% Solids, Solid	90.1		0.10	0.10	1	%	134999		11/21/04 1237	clb
	% Moisture, Solid	9.9		0.10	0.10	1	%	134999		11/21/04 1237	clb

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldwin						
Customer Sample ID: 2002189-0013			Laboratory Sample ID: 232090-13									
Date Sampled.....: 11/16/2004			Date Received.....: 11/18/2004									
Time Sampled.....: 10:50			Time Received.....: 09:45									
Sample Matrix.....: Soil												
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4.6	U		2.8	4.6	1.00000	mg/Kg	135986		12/01/04 2205	pjg
Method	% Solids Determination											
	% Solids, Solid	88.1			0.10	0.10	1	%	134999		11/21/04 1239	clb
	% Moisture, Solid	11.9			0.10	0.10	1	%	134999		11/21/04 1239	clb

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldwin						
Customer Sample ID: 2002189-0014 Date Sampled.....: 11/16/2004 Time Sampled.....: 11:05 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-14 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RE	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	260			28	46	10.0000	mg/Kg	135986		12/02/04 1043	pjg
Method	% Solids Determination											
	% Solids, Solid	90.5			0.10	0.10	1	%	134999		11/21/04 1242	clb
	% Moisture, Solid	9.5			0.10	0.10	1	%	134999		11/21/04 1242	clb

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Job Number: 232090		LABORATORY TEST RESULTS					Date: 12/02/2004					
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0015			Laboratory Sample ID: 232090-15									
Date Sampled.....: 11/16/2004			Date Received.....: 11/18/2004									
Time Sampled.....: 11:10			Time Received.....: 09:45									
Sample Matrix.....: Soil												
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RC	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4.6		U	2.8	4.6	1.00000	mg/Kg	135986		12/01/04 2355	pig
Method	% Solids Determination											
	% Solids, Solid	87.8			0.10	0.10	1	%	134999		11/21/04 1245	clb
	% Moisture, Solid	12.2			0.10	0.10	1	%	134999		11/21/04 1245	clb

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0016			Laboratory Sample ID: 232090-16									
Date Sampled.....: 11/16/2004			Date Received.....: 11/18/2004									
Time Sampled.....: 09:45			Time Received.....: 09:45									
Sample Matrix.....: Soil												
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
80156 MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	22			2.8	4.6	1.00000	mg/Kg	135986		12/02/04 0032	png
Method	% Solids Determination											
	% Solids, Solid	90.1			0.10	0.10	1	%	134999		11/21/04 1248	clb
	% Moisture, Solid	9.9			0.10	0.10	1	%	134999		11/21/04 1248	clb

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: IN & Associates, Inc.			PROJECT: CANNON AFB				ATTN: Richard Baldino					
Customer Sample ID: 2002189-0017 Date Sampled.....: 11/16/2004 Time Sampled.....: 09:50 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-17 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	16			2.8	4.5	1.00000	mg/Kg	135986		12/02/04 0109	pij
Method	% Solids Determination	87.8			0.10	0.10	1	%	134999		11/21/04 1251	clb
	% Solids, Solid	12.2			0.10	0.10	1	%	134999		11/21/04 1251	clb
	% Moisture, Solid											

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TR & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldwin						
Customer Sample ID: 2002189-0018			Laboratory Sample ID: 232090-18									
Date Sampled.....: 11/16/2004			Date Received.....: 11/18/2004									
Time Sampled.....: 10:00			Time Received.....: 09:45									
Sample Matrix.....: Soil												
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4.7	U		2.9	4.7	1.00000	mg/Kg	135986		12/02/04 0223	pjg
Method	% Solids Determination	86.0			0.10	0.10	1	%	134999		11/21/04 1253	clb
	% Solids, Solid	14.0			0.10	0.10	1	%	134999		11/21/04 1253	clb

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Job Number: 232090		LABORATORY TEST RESULTS						Date: 12/02/2004				
CUSTOMER: TM & Associates, Inc.			PROJECT: CANNON APB				ATTN: Richard Beldino					
Customer Sample ID: 2002189-0019 Date Sampled.....: 11/15/2004 Time Sampled.....: 10:55 Sample Matrix.....: Soil			Laboratory Sample ID: 232090-19 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	15000			280	450	100.000	mg/Kg	135986		12/02/04 0300	pjg
Method	% Solids Determination											
	% Solids, Solid	89.6			0.10	0.10	1	%	134999		11/21/04 1256	clb
	% Moisture, Solid	10.4			0.10	0.10	1	%	134999		11/21/04 1256	clb

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Job Number: 232090 LABORATORY TEST RESULTS Date: 12/02/2004

CUSTOMER: TN & Associates, Inc. PROJECT: CANNON AFB ATTN: Richard Baldino

Customer Sample ID: 2002189-0020
 Date Sampled.....: 11/15/2004
 Time Sampled.....: 12:00
 Sample Matrix.....: Soil

Laboratory Sample ID: 232090-20
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	6500			280	450	100.000	mg/Kg	135986		12/02/04 1210	pjg
Method	% Solids Determination	88.3			0.10	0.10	1	%	134999		11/21/04 1259	clb
	% Solids, Solid	11.7			0.10	0.10	1	%	134999		11/21/04 1259	clb

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldino

Customer Sample ID: 2002189-0021
 Date Sampled.....: 11/15/2004
 Time Sampled.....: 12:05
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-1
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	6800		140	230	50.0000	mg/Kg	136166		12/03/04 1706	bdw
Method	% Solids Determination										
	% Solids, Solid	87.6		0.10	0.10	1	%	134998		11/21/04 1114	clb
	% Moisture, Solid	12.4		0.10	0.10	1	%	134998		11/21/04 1114	clb

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldwin

Customer Sample ID: 2002189-0022
 Date Sampled.....: 11/15/2004
 Time Sampled.....: 12:15
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-2
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	52			2.8	4.4	1.00000	mg/Kg	136166		12/02/04 2314	bdw
Method	% Solids Determination											
	% Solids, Solid	89.2			0.10	0.10	1	%	134998		11/21/04 1117	clb
	% Moisture, Solid	10.8			0.10	0.10	1	%	134998		11/21/04 1117	clb

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldino

Customer Sample ID: 2002189-0023
 Date Sampled.....: 11/15/2004
 Time Sampled.....: 14:40
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-3
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	24			2.8	4.5	1.00000	mg/Kg	136166		12/02/04 2351	bdw
Method	% Solids Determination											
	% Solids, Solid	92.3			0.10	0.10	1	%	134998		11/21/04 1120	clb
	% Moisture, Solid	7.7			0.10	0.10	1	%	134998		11/21/04 1120	clb

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldwin

Customer Sample ID: 2002189-0024
 Date Sampled.....: 11/17/2004
 Time Sampled.....: 09:10
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-4
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	17		2.6	4.2	1.00000	mg/Kg	136166		12/03/04 0028	bdw
Method	% Solids Determination										
	% Solids, Solid	94.4		0.10	0.10	1	%	134998		11/21/04 1122	clb
	% Moisture, Solid	5.6		0.10	0.10	1	%	134998		11/21/04 1122	clb

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldino

Customer Sample ID: 2002189-0025
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 11:50
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-5
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	HDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	2300			58	94	20.0000	mg/Kg	136166		12/03/04 1857	bdw
Method	% Solids Determination	87.0			0.10	0.10	1	%	134998		11/21/04 1125	clb
	% Solids, Solid	13.0			0.10	0.10	1	%	134998		11/21/04 1125	clb

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TH & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Beldino

Customer Sample ID: 2002189-0026
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 11:55
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-6
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015& MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	1600			58	93	20.0000	mg/Kg	136166		12/03/04 1934	bdw
Method	% Solids Determination											
	% Solids, Solid	88.8			0.10	0.10	1	%	134998		11/21/04 1128	clb
	% Moisture, Solid	11.2			0.10	0.10	1	%	134998		11/21/04 1128	clb

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldino

Customer Sample ID: 2002189-0027
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 10:35
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-7
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	1100		28	46	10.0000	mg/Kg	136166		12/03/04 0332	bdw
Method	% Solids Determination	90.1		0.10	0.10	1	%	134998		11/21/04 1131	clb
	% Solids, Solid	9.9		0.10	0.10	1	%	134998		11/21/04 1131	clb
	% Moisture, Solid										

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldwin

Customer Sample ID: 2002189-0028
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 10:40
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-8
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	HDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4.6	U		2.8	4.6	1.00000	mg/Kg	136166		12/03/04 0446	bdw
Method	% Solids Determination	89.9			0.10	0.10	1	%	134998		11/21/04 1134	clb
	% Solids, Solid	10.1			0.10	0.10	1	%	134998		11/21/04 1134	clb

* In Description = Dry Wgt.

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Job Number: 232091		LABORATORY TEST RESULTS						Date: 12/06/2004			
CUSTOMER: TH & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino					
Customer Sample ID: 2002189-0029			Laboratory Sample ID: 232091-9								
Date Sampled.....: 11/16/2004			Date Received.....: 11/18/2004								
Time Sampled.....: 11:35			Time Received.....: 09:45								
Sample Matrix.....: Soil											
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q-FLAGS	NDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRD	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	45	U	28	45	10.0000	mg/Kg	136166		12/03/04 0523	bdw
Method	% Solids Determination	92.3		0.10	0.10	1	%	134998		11/21/04 1137	clb
	% Solids, Solid	7.7		0.10	0.10	1	%	134998		11/21/04 1137	clb
	% Moisture, Solid										

* In Description = Dry Wgt.

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Job Number: 232091 LABORATORY TEST RESULTS Date: 12/06/2004

CUSTOMER: TN & Associates, Inc. PROJECT: CANNON AFB ATTN: Richard Baldwin

Customer Sample ID: 2002189-0030
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 11:30
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-10
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	4.8		U	2.9	4.8	1.00000	mg/Kg	136166		12/03/04 0637	bdw
Method	% Solids Determination											
	% Solids, Solid	86.9			0.10	0.10	1	%	134998		11/21/04 1139	clb
	% Moisture, Solid	13.1			0.10	0.10	1	%	134998		11/21/04 1139	clb

* In Description = Dry Wgt.

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Job Number: 232091		LABORATORY TEST RESULTS						Date: 12/06/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino						
Customer Sample ID: 2002189-0031 Date Sampled.....: 11/16/2004 Time Sampled.....: 09:25 Sample Matrix.....: Soil			Laboratory Sample ID: 232091-11 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	HDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	5600			280	460	100.000	mg/Kg	136166		12/03/04 2011	bdw
Method	% Solids Determination	88.5			0.10	0.10	1	%	134998		11/21/04 1142	clb
	% Solids, Solid	11.5			0.10	0.10	1	%	134998		11/21/04 1142	clb
	% Moisture, Solid											

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TR & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldwin

Customer Sample ID: 2002189-0032
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 09:30
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-12
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	2900		55	89	20.0000	mg/Kg	136166		12/03/04 0750	bdw
Method	% Solids Determination										
	% Solids, Solid	91.0		0.10	0.10	1	%	134998		11/21/04 1145	clb
	% Moisture, Solid	9.0		0.10	0.10	1	%	134998		11/21/04 1145	clb

* In Description = Dry Wgt.

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Job Number: 232091		LABORATORY TEST RESULTS					Date: 12/06/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldino					
Customer Sample ID: 2002189-0033 Date Sampled.....: 11/15/2004 Time Sampled.....: 12:00 Sample Matrix.....: Soil			Laboratory Sample ID: 232091-13 Date Received.....: 11/18/2004 Time Received.....: 09:45								
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	9600		280	450	100.000	mg/Kg	136166		12/03/04 2048	bdw
Method	% Solids Determination										
	% Solids, Solid	88.9		0.10	0.10	1	%	134998		11/21/04 1148	clb
	% Moisture, Solid	11.1		0.10	0.10	1	%	134998		11/21/04 1148	clb

* In Description = Dry Wgt.

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Job Number: 232091		LABORATORY TEST RESULTS						Date: 12/06/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB			ATTN: Richard Baldfno						
Customer Sample ID: 2002189-0034 Date Sampled.....: 11/16/2004 Time Sampled.....: 12:00 Sample Matrix.....: Soil			Laboratory Sample ID: 232091-14 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	3.9	J	a	2.9	4.7	1.00000	mg/Kg	136166		12/03/04 1515	bdw
Method	% Solids Determination											
	% Solids, Solid	86.4			0.10	0.10	1	%	134998		11/21/04 1151	clb
	% Moisture, Solid	13.6			0.10	0.10	1	%	134998		11/21/04 1151	clb

* In Description = Dry Wgt.

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Job Number: 232091		LABORATORY TEST RESULTS						Date: 12/06/2004				
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON AFB				ATTN: Richard Baldwin					
Customer Sample ID: 2002189-0035 Date Sampled.....: 11/16/2004 Time Sampled.....: 12:00 Sample Matrix.....: Soil			Laboratory Sample ID: 232091-15 Date Received.....: 11/18/2004 Time Received.....: 09:45									
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	1600			28	46	10.0000	mg/Kg	136166		12/03/04 1552	bdw
Method	% Solids Determination											
	% Solids, Solid	87.7			0.10	0.10	1	%	134998		11/21/04 1153	clb
	% Moisture, Solid	12.3			0.10	0.10	1	%	134998		11/21/04 1153	clb

* In Description = Dry Wgt.

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Job Number: 232091		LABORATORY TEST RESULTS						Date: 12/06/2004			
CUSTOMER: TN & Associates, Inc.			PROJECT: CANNON ARB			ATTN: Richard Baldino					
Customer Sample ID: 2002189-0036 Date Sampled.....: 11/16/2004 Time Sampled.....: 09:10 Sample Matrix.....: Soil			Laboratory Sample ID: 232091-16 Date Received.....: 11/18/2004 Time Received.....: 09:45								
TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q-FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	5000		290	470	100.000	mg/Kg	136166		12/03/04 2125	bdw
Method	% Solids Determination										
	% Solids, Solid	86.4		0.10	0.10	1	%	134998		11/21/04 1156	clb
	% Moisture, Solid	13.6		0.10	0.10	1	%	134998		11/21/04 1156	clb

* In Description = Dry Wgt.

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LABORATORY TEST RESULTS

Job Number: 232091

Date: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldwin

Customer Sample ID: 2002189-0037
 Date Sampled.....: 11/16/2004
 Time Sampled.....: 09:15
 Sample Matrix.....: Soil

Laboratory Sample ID: 232091-17
 Date Received.....: 11/18/2004
 Time Received.....: 09:45

TEST METHOD	PARAMETER/TEST DESCRIPTION	SAMPLE RESULT	Q	FLAGS	MDL	RL	DILUTION	UNITS	BATCH	DT	DATE/TIME	TECH
8015B MDRO	TPH - Diesel Range Organics (DRO) Diesel Range Organics (DRO), 3541 Solid*	16			2.8	4.5	1.00000	mg/Kg	136166		12/03/04 1247	bdw
Method	% Solids Determination	89.6			0.10	0.10	1	%	134998		11/21/04 1159	clb
	% Solids, Solid	10.4			0.10	0.10	1	%	134998		11/21/04 1159	clb

* In Description = Dry Wgt.

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Chain-of-Custody Forms

Appendix B
Data Validation Checklists

**Data Validation Checklists
TPH by GC
SDG 232090**

Validation Summary

Ten of twenty samples analyzed for TPH were diluted due to high analyte concentrations. The dilutions resulted in 0% recoveries for both surrogate compounds (2-fluorobiphenyl and o-terphenyl). No action was taken for surrogate recoveries of 0% in diluted samples. Similarly, MS/MSD recoveries were 0% due to dilutions. LCS recoveries were acceptable. No action was taken.

Qualifiers:

U - Not detected.

R - Unusable.

J - Approximate data due to other quality control criteria.

UJ - Not detected, limit of detection approximate.

VI. FIELD PRECISION RESULTS

Yes No Field duplicate data were included in this data package.

Field Sample ID	Duplicate Sample ID	Matrix

- Qualification of field duplicate data was attempted.
- Relative percent differences (RPDs) between duplicate sample results was less than 25% for liquid (30% for solid samples) when both sample values were $\geq 5 \times$ MDL or the RL.
- When one or both results were $< 5 \times$ MDL or the RL, RPDs between duplicate sample results were less than _____ for water samples (_____ for soil samples).

Note: In the absence of project specified criteria the following guidelines are recommended:

- For sample results $> 5 \times$ MDL or the RL, the RPD between field duplicate samples was $< 40\%$ for water samples (70% for soil samples).
- For sample results $< 5 \times$ MDL or the RL, the RPD between field duplicate samples was less than the MDL or the RL for water samples (less than $2 \times$ the MDA or the RL for soil samples).

The relative percent difference (RPD) is calculated for each positive result identified in either the sample or field duplicate. RPD is calculated using the following equation:

$$RPD = \frac{|A - B|}{(A + B)/2} \times 100$$

Where: A = Sample Result
B = Duplicate Sample Result

Field Precision Evaluation Deficiency Worksheet:

Analyte	MDA/ RL	5 x MDA/ 5 x RL	Sample Result	Duplicate Result	RPD	Action

Remarks:
Field duplicate samples were included with SDG 232091.

VII. INITIAL/CONTINUING CALIBRATIONS

- Yes** **No**
- The initial calibration consisted of 6-point curve bracketing the expected sample concentrations, plus a blank.
 - The correlation coefficient of the initial calibration curve was \geq _____; or the %RSD of the calibration response factors was \leq 25%.
 - Continuing calibration verification (CCV) was performed at the frequency specified by the method and all analyte retention times were within the retention time windows defined during the initial calibration.
 - The %Difference was within \pm 25% (\pm _____% for azeotropic distillation) for all CCVs.

The following deficiencies were found:

Date/ Time	Analyte	I /	Corr Coeff	%RSD	%D	Affected Samples	Action
11/30/04 at 15:12	No deficiencies were noted (DRO)	I					
11/30/04 at 18:54	No deficiencies were noted (DRO)	C					
12/01/04 at 05:23	No deficiencies were noted (DRO)	C					
12/01/04 at 12:08	No deficiencies were noted (DRO)	C					
12/01/04 at 19:00	No deficiencies were noted (DRO)	C					
12/02/04 at 01:46	No deficiencies were noted (DRO)	C					
12/02/04 at 05:27	No deficiencies were noted (DRO)	C					
12/02/04 at 13:24	No deficiencies were noted (DRO)	C					

Remarks:
No calibration deficiencies were noted.

IX. SYSTEM PERFORMANCE

Evaluate the system performance based on the following parameters:

- | | | |
|--------------------------|-------------------------------------|---|
| Yes | No | |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Abrupt baseline shift. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | High background or retention time shifts. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Baseline rise at high temperature. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Extraneous peaks. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Loss of peak resolution. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Peak tailing or splitting. |

Remarks:

No deficiencies were noted.

X. QUANTITATION LIMIT RESULTS

- | | | |
|-------------------------------------|-------------------------------------|--|
| Yes | No | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | No deficiencies were found. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Reported quantitation limits (RQLs) were provided, but contract required quantitation limits (CRQLs) were not met. |

The following deficiencies were found:

Sample ID	Compound(s)	RQL	CRQL	Action

Remarks:

No deficiencies were noted.

XI. SAMPLE RESULT VERIFICATION (LEVEL D ONLY)

- | | | |
|-------------------------------------|--------------------------|---|
| Yes | No | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Calculations for all positive hits were verified <input type="checkbox"/> or spot-checked <input checked="" type="checkbox"/> . |

The following discrepancies were found:

Analyte	Reported Value	Recalculated Value	Samples

Remarks:

No deficiencies were noted.

**Data Validation Checklists
TPH by GC
SDG 232091**

**QUALITY ASSURANCE REVIEW
DATA VALIDATION CHECKLIST
Total Petroleum Hydrocarbons (TPH) by GC**

Project File: Cannon AFB

Sampling Date: 11/15 to 11/17/2004

Laboratory: STL - Chicago

Receipt Date: 11/18/2004

SDG Number: 232091

Matrix: Water Solid Air

Sample Identification numbers:

2002189-0021 (N)	2002189-0026 (N)	2002189-0031 (N)	2002189-0036 (N)
2002189-0022 (N)	2002189-0027 (N)	2002189-0032 (N)	2002189-0037 (N)
2002189-0023 (N)	2002189-0028 (N)	2002189-0033 (FD)	
2002189-0024 (N)	2002189-0029 (N)	2002189-0034 (FD)	
2002189-0025 (N)	2002189-0030 (N)	2002189-0035 (FD)	

N = Normal; FB = Field Blank; EB = Rinsate Blank; FD = Field Duplicate; TB = Trip Blank

The general criteria used to determine the data performance and quality assurance were based on:

- Hazardous Waste Remedial Actions Program (HAZWRAP) Requirements for Quality Control of Analytical Data (HAZWRAP DOE/HWP-65/R2)
- USEPA SW846 (SW-846) Methods
- USEPA Drinking Water (DW) Methods
- Air Force Center for Environmental Excellence (AFCEE) QAPP Version 3.0
- Other: Laboratory established accuracy and precision control limits.

The following parameters were examined: sample preservation and holding time, surrogate spike results, matrix spike / matrix spike duplicate (MS/MSD) results, laboratory control sample (LCS) results, method blank results, field and equipment rinsate blank results, field duplicate, calibrations, and detection limits.

Reviewed by: 

Date: 12/17/2004

QA Concurrence by: _____

Date: _____

Validation Summary

Nine of seventeen samples analyzed for TPH were diluted due to high analyte concentrations. The dilutions resulted in 0% recoveries for both surrogate compounds (2-fluorobiphenyl and o-terphenyl). No action was taken for surrogate recoveries of 0% in diluted samples. Similarly, MS/MSD recoveries were 0% due to dilutions. LCS recoveries were acceptable. No action was taken.

Qualifiers:

U - Not detected.

R - Unusable.

J - Approximate data due to other quality control criteria.

UJ - Not detected, limit of detection approximate.

VI. FIELD PRECISION RESULTS

Yes No Field duplicate data were included in this data package.

Field Sample ID	Duplicate Sample ID	Matrix
2002189-0033	2002189-0020	Soil
2002189-0034	2002189-0018	Soil
2002189-0035	2002189-0026	Soil

Qualification of field duplicate data was attempted.
 Relative percent differences (RPDs) between duplicate sample results was less than 25% for liquid (30% for solid samples) when both sample values were $\geq 5 \times$ MDL or the RL.
 When one or both results were $< 5 \times$ MDL or the RL, RPDs between duplicate sample results were less than _____ for water samples (_____ for soil samples).

Note: In the absence of project specified criteria the following guidelines are recommended:

For sample results $> 5 \times$ MDL or the RL, the RPD between field duplicate samples was $< 40\%$ for water samples (70% for soil samples).
 For sample results $< 5 \times$ MDL or the RL, the RPD between field duplicate samples was less than the MDL or the RL for water samples (less than $2 \times$ the MDA or the RL for soil samples).

The relative percent difference (RPD) is calculated for each positive result identified in either the sample or field duplicate. RPD is calculated using the following equation:

$$RPD = \frac{|A - B|}{(A + B)/2} \times 100$$

Where: A = Sample Result
 B = Duplicate Sample Result

Field Precision Evaluation Deficiency Worksheet:

Analyte	MDA/ RL	5 x MDA/ 5 x RL	Sample Result	Duplicate Result	RPD	Action

Remarks:
No discrepancies were noted.

VII. INITIAL/CONTINUING CALIBRATIONS

- Yes** **No**
 The initial calibration consisted of 6-point curve bracketing the expected sample concentrations, plus a blank.
 The correlation coefficient of the initial calibration curve was \geq _____; or the %RSD of the calibration response factors was \leq 25%.
 Continuing calibration verification (CCV) was performed at the frequency specified by the method and all analyte retention times were within the retention time windows defined during the initial calibration.
 The %Difference was within \pm 25% (\pm _____% for azeotropic distillation) for all CCVs.

The following deficiencies were found:

Date/ Time	Analyte	I /	Corr Coeff	%RSD	%D	Affected Samples	Action
11/30/04 at 15:12	No deficiencies were noted (DRO)	I					
11/30/04 at 18:54	No deficiencies were noted (DRO)	C					
12/02/04 at 19:33	No deficiencies were noted (DRO)	C					
12/03/04 at 02:19	No deficiencies were noted (DRO)	C					
12/03/04 at 10:56	No deficiencies were noted (DRO)	C					
12/03/04 at 16:29	No deficiencies were noted (DRO)	C					
12/03/04 at 22:39	No deficiencies were noted (DRO)	C					
		C					

Remarks:
No calibration deficiencies were noted.

IX. SYSTEM PERFORMANCE

Evaluate the system performance based on the following parameters:

- | | | |
|--------------------------|-------------------------------------|---|
| Yes | No | |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Abrupt baseline shift. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | High background or retention time shifts. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Baseline rise at high temperature. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Extraneous peaks. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Loss of peak resolution. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Peak tailing or splitting. |

Remarks:

No deficiencies were noted.

X. QUANTITATION LIMIT RESULTS

- | | | |
|-------------------------------------|-------------------------------------|--|
| Yes | No | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | No deficiencies were found. |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Reported quantitation limits (RQLs) were provided, but contract required quantitation limits (CRQLs) were not met. |

The following deficiencies were found:

Sample ID	Compound(s)	RQL	CRQL	Action

Remarks:

No deficiencies were noted.

XI. SAMPLE RESULT VERIFICATION (LEVEL D ONLY)

- | | | |
|-------------------------------------|--------------------------|---|
| Yes | No | |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Calculations for all positive hits were verified <input type="checkbox"/> or spot-checked <input checked="" type="checkbox"/> . |

The following discrepancies were found:

Analyte	Reported Value	Recalculated Value	Samples

Remarks:

No deficiencies were noted.

Appendix C
Data Package QA/QC Summary Pages

Job Number.: 232090

QUALITY CONTROL RESULTS

Report Date.: 12/02/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
---------	-------------	------------	--------	-----------------	------	------

Test Method.....: 8015B MDRO

Equipment Code....: INST09

Analyst....: pjg

Method Description.: TPH - Diesel Range Organics (DRO)

Batch.....: 135986

MS	Matrix Spike	004JWLDIEA	232090-10	20.0000	12/02/2004	0929
----	--------------	------------	-----------	---------	------------	------

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	728.938		1413.000	684.702	0	% 70-106	D

QUALITY CONTROL RESULTS

Job Number.: 232090 Report Date.: 12/05/2004

CUSTOMER: IN E Associates, Inc. PROJECT: CANNON AFB ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: 8015B MDRO Equipment Code....: INST09 Analyst...: pjg
 Method Description.: TPH - Diesel Range Organics (DRO) Batch.....: 135986

MS	Matrix Spike	004 JHLDIEA	232090-10	20.0000	12/02/2004	0929
----	--------------	-------------	-----------	---------	------------	------

Parameter/Test Description	Units	QC Result	QC Result \times	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	728.938		1413.000	684.702	0	% 70-106	D

True Value = by DF (20.0)

*PE
12/5/04*

QUALITY CONTROL RESULTS

Job Number.: 232090

Report Date.: 12/05/2004

CUSTOMER: T.H.E. ASSOCIATES, Inc. PROJECT: CANNON AFB ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: 8015B MDRO Equipment Code....: INST09 Analyst...: pjg
 Method Description.: TPH - Diesel Range Organics (DRO) Batch.....: 135986

MSD	Matrix Spike Duplicate	004 JALDTEA	232090-10	20.0000	12/02/2004	1006
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Parameter/Test Description	Units	QC Result	QC Result	* True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli mg/Kg		803.957	728.938	1444.000	684.702	0 0	% 70-106 R 30	D

True Value ÷ by DF (20.0)

PK.

QUALITY CONTROL RESULTS

Job Number.: 232090 Report Date.: 12/02/2004

CUSTOMER: TM & Associates, Inc. PROJECT: CANNON AFB ATTN: Richard Baldino

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: 8015B MDRO Equipment Code....: INST09 Analyst...: pig
 Method Description.: TPH - Diesel Range Organics (DRO) Batch.....: 135986

LGS	Laboratory Control Sample	004JMLD1EA	135519-002		12/01/2004	0637
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Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	53.373		66.670	4.199	U 80	% 70-106	

Job Number.: 232091

QUALITY CONTROL RESULTS

Report Date.: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFB

ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: 8015B MDRO

Equipment Code....: TWST09

Analyst...: bdw

Method Description.: TPH - Diesel Range Organics (DRO)

Batch.....: 136166

MS	Matrix Spike	004 JWL D EA	232091-1	50.0000	12/03/2004	1743
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Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	6707.543		3626.000	6757.097	0	% 70-106	D

Job Number.: 232091 **QUALITY CONTROL RESULTS** Report Date.: 12/06/2004

CUSTOMER: TN & Associates, Inc. PROJECT: CANNON AFB ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: 8015B MDRO Equipment Code.....: INST09 Analyst....: bclw
 Method Description.: TPH - Diesel Range Organics (DRO) Batch.....: 136166

MSD	Matrix Spike Duplicate	004JWLDIEA	232091-1	50.0000	12/03/2004	1820
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Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	7302.184	6707.543	3614.000	6757.097	0 0	% 70-106 R 30	0

Job Number.: 232091

QUALITY CONTROL RESULTS

Report Date.: 12/06/2004

CUSTOMER: TM & Associates, Inc.

PROJECT: CANNON AFB

ATTN: Richard Baldino

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: 8015B MDRO

Equipment Code....: INST09

Analyst....: bdw

Method Description.: TPH - Diesel Range Organics (DRO)

Batch.....: 136166

LCS	Laboratory Control Sample	DD4-WLDIEA	135520-002		12/02/2004	2046
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Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	49.689		66.670	4.199	U 75	% 70-106	

Job Number.: 232091

QUALITY CONTROL RESULTS

Report Date.: 12/06/2004

CUSTOMER: IN & Associates, Inc.

PROJECT: CANNON AFB

ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: 8015B MDRO

Equipment Code....: INST09

Analyst....: bdw

Method Description.: TPH - Diesel Range Organics (DRO)

Batch.....: 136166

MS	Matrix Spike	DDM/ML01EA	232091-T	50.0000	12/03/2004	1743
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Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	6707.543		3626.000	6757.097	0	% 70-106	D

Job Number.: 232091

QUALITY CONTROL RESULTS

Report Date.: 12/06/2004

CUSTOMER: TN & Associates, Inc.

PROJECT: CANNON AFH

ATTN:

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
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Test Method.....: 8015B MDRO

Equipment Code....: INST09

Analyst....: bdw

Method Description.: TPH - Diesel Range Organics (DRD)

Batch.....: 136166

HSD	Matrix Spike Duplicate	004JWLDIEA	232091*1	50.0000	12/03/2004	1820
-----	------------------------	------------	----------	---------	------------	------

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	7302.184	6707.543	3614.000	6757.097	0 0	% 70-106 R 30	D

QUALITY CONTROL RESULTS

Job Number.: 232091 Report Date.: 12/06/2004

CUSTOMER: TM & Associates, Inc. PROJECT: CANNON AFB ATTN: Richard Batdino

QC Type	Description	Reag. Code	Lab ID	Dilution Factor	Date	Time
---------	-------------	------------	--------	-----------------	------	------

Test Method.....: 8015B MDRO	Equipment Code....: INST09	Analyst....: bdw
Method Description.: TPH - Diesel Range Organics (DRO)	Batch.....: 136166	

LCS	Laboratory Control Sample	D04JMLDIEA	135520-002	12/02/2004 2046
-----	---------------------------	------------	------------	-----------------

Parameter/Test Description	Units	QC Result	QC Result	True Value	Orig. Value	QC Calc.	* Limits	F
Diesel Range Organics (DRO), 3541 Soli	mg/Kg	49.689		66.670	4.199	U 75	% 70-106	

APPENDIX D

CANNON AFB

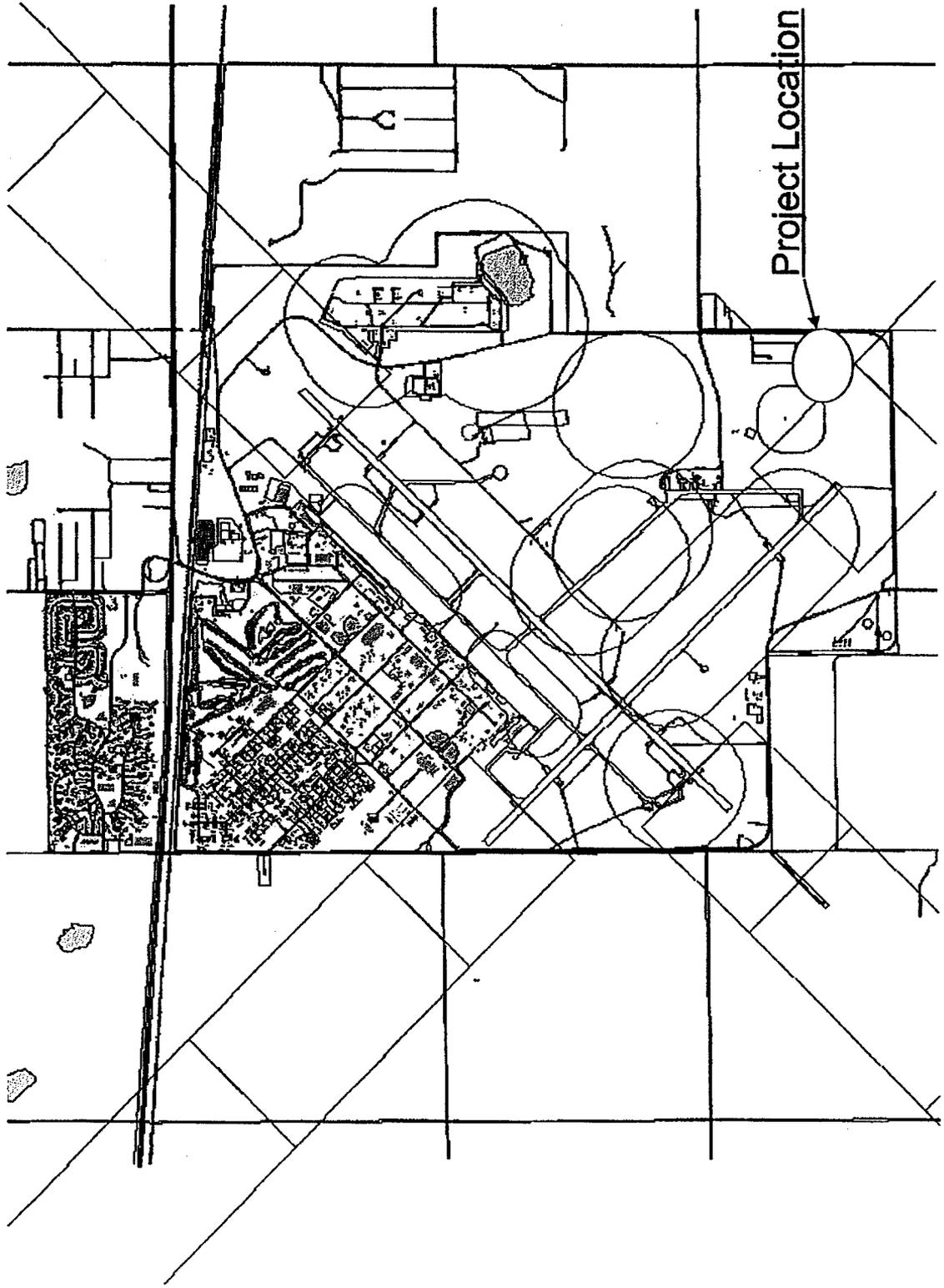
BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST <small>(See Instructions on Reverse)</small>		DATE PREPARED 20041109
1. Clearance is requested to proceed with work at <u>Fire Training Area (FTA)-4</u>		
on Work Order No. _____, Contract No. <u>CZQZ-2002189</u> , involving excavation or utility disturbance per attached sketch. This area <input type="checkbox"/> has <input checked="" type="checkbox"/> has not been staked or clearly marked.		
2. TYPE OF FACILITY/WORK INVOLVED		
<input type="checkbox"/> A. PAVEMENTS	<input type="checkbox"/> D. FIRE DETECTION & PROTECTION SYSTEMS	<input type="checkbox"/> G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW
<input type="checkbox"/> B. DRAINAGE SYSTEMS	<input type="checkbox"/> E. UTILITY <input type="checkbox"/> OVERHEAD <input type="checkbox"/> UNDERGROUND	<input type="checkbox"/> H. SECURITY
<input type="checkbox"/> C. RAILROAD TRACKS	<input type="checkbox"/> F. COMM <input type="checkbox"/> OVERHEAD <input type="checkbox"/> UNDERGROUND	<input checked="" type="checkbox"/> I. OTHER Contaminated soil removal
3. DATE CLEARANCE REQUIRED 20041115		4. DATE OF CLEARANCE
5. SIGNATURE OF REQUESTING OFFICIAL Peter P. Zamir		6. TELEPHONE NO. (505) 784-1092
ORGANIZATION		7. ORGANIZATION 27 CES/CEVC
BASE CIVIL ENGINEERING	REMARKS (Use Reverse for additional comments)	REVIEWER'S NAME AND INITIALS
A. ELECTRICAL DISTRIBUTION	Call 784-4371 48 hours prior to digging 10451	Ronny Kaurst
B. STEAM DISTRIBUTION <u>GAS</u>	Call 784- 4371 48 hours prior to digging 4349	
C. WATER DISTRIBUTION	Call 784- 4371 48 hours prior to digging 4349	
D. WATER DISTRIBUTION <u>SPRINKLERS</u>	Call 784- 4371 48 hours prior to digging 4349	
E. SEWER DISTRIBUTION	Call 784- 4371 48 hours prior to digging 4349	
F. ENVIRONMENTAL	O.K.	John Reisman 12NOV04
G. PAVEMENTS/ GROUNDS	N/A	
H. FIRE PROTECTION	OK	
I. ZONE <u>EMCS</u>	Call 784-4371 48 hours prior to digging N/A	Pat A. Sullivan 11-9-04
J. OTHER (Specify)	N/A	
9. SECURITY POLICE		
10. SAFETY	784-4470	
11. COMMUNICATIONS	Call 784-6622 48 hours prior to digging or Red River Service Corp. 784-4775	T. Smith
12. BASE OPERATIONS	N/A	
13. CABLE TV	Call 1-8001-321-2537 48 hours prior to digging	
14. COMMERCIAL UTILITY COMPANY	Call 1-8001-321-2537 48 hours prior to digging	
<input checked="" type="checkbox"/> TELEPHONE	Ref # 2004461858 10 NOV 04 / make good by 0900, 15 NOV MENT AT SITE	
<input type="checkbox"/> GAS		
<input type="checkbox"/> ELECTRIC		
15. OTHER (Specify)		
16. REQUESTED CLEARANCE <input type="checkbox"/> APPROVED <input type="checkbox"/> DISAPPROVED		
17. TYPED NAME AND SIGNATURE OF APPROVING OFFICER (Chief of Operations Flight or Chief of Engineering Flight) <u>ALEXANDRA L. NEIMAN</u>		17a. DATE SIGNED 10NOV04

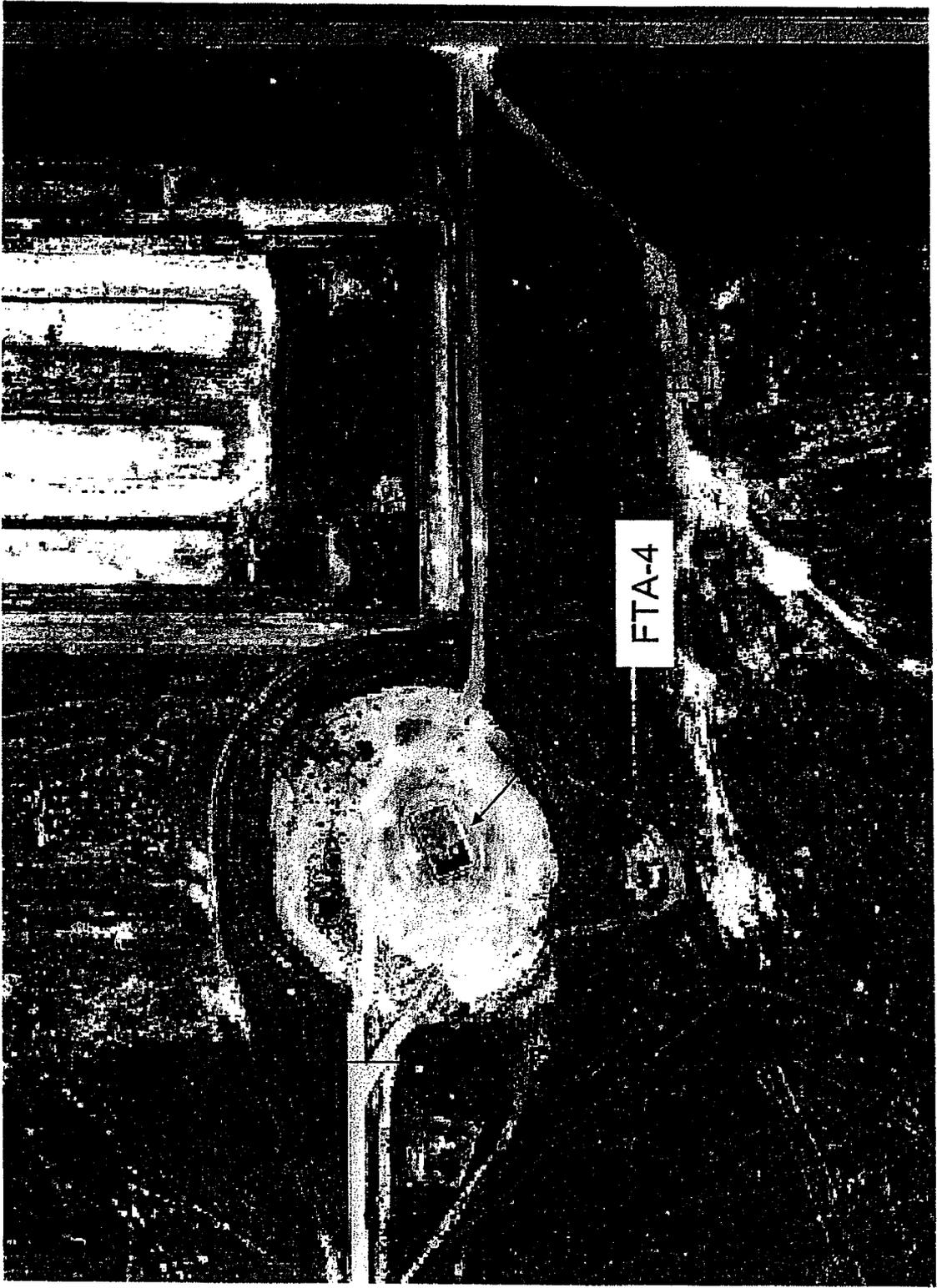
INSTRUCTIONS

The BCE work clearance request is used for any work (contract or in-house) that may disrupt aircraft or vehicular traffic flow, base utility services, protection provided by fire and intrusion alarm system, or routine activities of the installation. This form is used to coordinate the required work with key base activities and keep customer inconvenience to a minimum. It is also used to identify potentially hazardous work conditions in an attempt to prevent accidents. The work clearance request is processed just prior to the start of work. If delays are encountered and the conditions at the job site change (or may have changed) this work clearance request must be reprocessed.

18. REMARKS. *(This section must describe specific precautionary measure to be taken before and during work accomplishment. Specific comments concerning the approved method of excavation, hand or powered equipment, should be included.)*

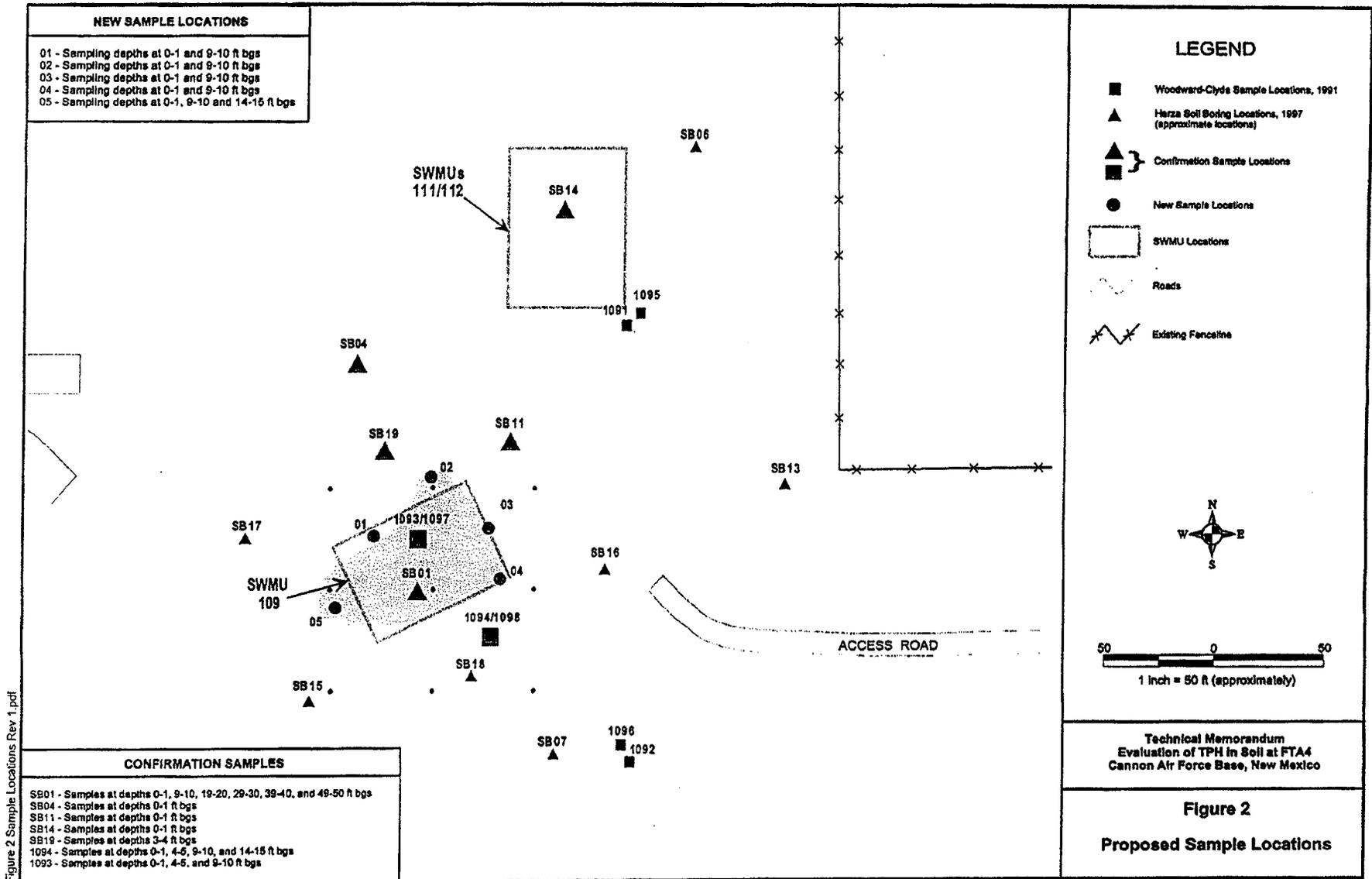


Project Location



FTA-4





APPENDIX E
NOVEMBER 15 - 18, 2004
DAILY QUALITY CONTROL REPORTS

Daily Quality Control Report

		Date 11/15/04				Report No. 1		
		S	M	T	W	Th	F	S
Site QC Manager: John Bruskewitz, TN&A-Milw Project Manager: Nova Clite, TN&A-Milw		Clear	Cloudy	Overcast	Rain	Snow		
Project: FTA-04 Cannon AFB, Clovis NM		Temp	To 32	32:50	50:70	70:85	85:up	
Job No.: 2002189		Wind	Still	Moderate	High			
Contract No.: DACA45-00-D-0006/0006		Humidity	Dry	Moderate	High			
TN&A Personnel On Site: John Bruskewitz								
USACE Personnel On-Site:								
Sub-Contractors On Site: ESN Southwest, Dustin McNeil, Chad Grubb								
Equipment on Site: AMS PowerProbe 9600 Pro								
Work Performed (Including Sampling):								
Daily safety tailgate meeting: TN&A and ESN								
Completed boring 1094 (4 samples), 1093 (3 samples)								
Started boring SB-01 to 40 feet (5 samples)								
Quality Control Activities (including field calibrations):								
Duplicate (2002189-0033) collected on 2002189-0020 at SB-01, 9-10 feet								
Health and Safety Levels and Activities:								
Level D (hard-hats, eye protection, steel-toes, gloves, work clothes).								
Problems Encountered/Corrective Action Taken:								
Rig auger drive broke with 25 feet of auger in hole, Drillers will repair. Will continue probe sampling.								
Special Notes: Carol Bieniulis (TtFW) laid out all sampling locations using GPS.								
Tomorrow's Expectations:								
Continue sampling on shallow holes.								

By: John Bruskewitz PG Title: Site Manager

Daily Quality Control Report

		Date 11/16/04			Report No. 2			
		S	M	T	W	Th	F	S
Site QC Manager: John Bruskewitz, TN&A-Milw Project Manager: Nova Clite, TN&A-Milw		Clear	Cloudy	Overcast ✓	Rain	Snow		
Project: FTA-04 Cannon AFB, Clovis NM		Temp	To 32	32:50 ✓	50:70	70:85	85:up	
Job No.: 2002189		Wind	Still	Moderate ✓	High			
Contract No.: DACA45-00-D-0006/0006		Humidity	Dry	Moderate ✓	High			
TN&A Personnel On Site: <i>John Bruskewitz</i>								
USACE Personnel On-Site:								
Sub-Contractors On Site: <i>ESN Southwest, Dustin McNeil, Chad Grubb</i>								
Equipment on Site: <i>AMS PowerProbe 9600 Pro</i>								
Work Performed (Including Sampling):								
<i>Daily safety tailgate meeting: TN&A and ESN</i>								
<i>Completed borings 2004-01, 2004-02, 2004-03, 2004-04, 2004-05, 2004-06, SB01, 04, SB11, SB14 and SB19.</i>								
Quality Control Activities (including field calibrations):								
<i>Two duplicate samples were collected (2002189-0034 and 2002189-035. The MS/MSD was collected on 2002189-0011.</i>								
Health and Safety Levels and Activities:								
<i>Level D (hard-hats, eye protection, steel-toes, gloves, work clothes).</i>								
Problems Encountered/Corrective Action Taken:								
<i>No problems encountered</i>								
Special Notes: Located all borings with GPS								
Tomorrow's Expectations:								
<i>Remove augers from SB01.</i>								

By: John Bruskewitz PG Title: Site Manager

Daily Quality Control Report

		Date 11/17/04				Report No. 3		
		S	M	T	W	Th	F	S
Site QC Manager: John Bruskewitz, TN&A-Milw Project Manager: Nova Clite, TN&A-Milw		Clear	Cloudy	Overcast	Rain	Snow		
Project: FTA-04 Cannon AFB, Clovis NM		Temp	To 32	32:50	50:70	70:85	85:up	
Job No.: 2002189		Wind	Still	Moderate	High			
Contract No.: DACA45-00-D-0006/0006		Humidity	Dry	Moderate	High			
TN&A Personnel On Site: John Bruskewitz								
USACE Personnel On-Site:								
Sub-Contractors On Site: ESN Southwest, Dustin McNeil, Chad Grubb								
Equipment on Site: AMS PowerProbe 9600 Pro								
Work Performed (Including Sampling):								
Daily safety tailgate meeting: TN&A and ESN								
Subcontractor removed augers from boring and completed borings SB01 collected last sample at 49-50 feet								
Shipped two coolers of samples to laboratory								
Quality Control Activities (including field calibrations):								
Health and Safety Levels and Activities:								
Level D (hard-hats, eye protection, steel-toes, gloves, work clothes).								
Problems Encountered/Corrective Action Taken:								
No problems encountered								
Special Notes: Placed nails with flaging at each boring location except SB14 (has existing nail).								
Tomorrow's Expectations:								
Demob								

By: John Bruskewitz PG Title: Site Manager

APPENDIX F

**NOVEMBER 15 - 18, 2004
PHOTODOCUMENTATION**



LEGEND

Photo # → Direction Taken

Source: Tetra Tech FW

NOT TO SCALE



Figure F-1
Cannon Air Force Base Site
Photo # and Direction Map

FTA4 Phase I Soil Investigation, November 15 - 18, 2004
SITE PHOTOS



567. View of core from shallow depths in SB01



568. View SSW of drilling at SB01

FTA4 Phase I Soil Investigation, November 15 - 18, 2004
SITE PHOTOS



569. View SSW of drilling at SB01



570. View SSE; four cones around auger stuck in SB01

FTA4 Phase I Soil Investigation, November 15 - 18, 2004
SITE PHOTOS



571. View East



572. View East-Northeast

FTA4 Phase I Soil Investigation, November 15 - 18, 2004
SITE PHOTOS



573. View Northeast, SB04 drilling location is near vegetation next to puddle



574. View East

FTA4 Phase I Soil Investigation, November 15 - 18, 2004
SITE PHOTOS



575. View Northeast



576. View North-Northeast

FTA4 Phase I Soil Investigation, November 15 - 18, 2004
SITE PHOTOS



577. View North