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WORK PLAN ADDENDUM FOR SITE ASSESSMENT AND INVESTIGATION OF RAILROAD
RIGHT OF WAY NAS FORT WORTH TX
9/1/1997
THE ENVIRONMENTAL COMPANY



**NAVAL AIR STATION
FORT WORTH JRB
CARSWELL FIELD
TEXAS**

**ADMINISTRATIVE RECORD
COVER SHEET**

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WORK PLAN ADDENDUM

**SITE ASSESSMENT AND INVESTIGATION
OF THE
RAILROAD RIGHT-OF-WAY**

**NAVAL AIR STATION (NAS) FORT WORTH
JOINT RESERVE BASE
CARSWELL FIELD, TEXAS**

Contract No. F41624-95-D-8002
Delivery Order 0003
Modification 001

September 1997

Prepared for:

Department of the Air Force
Headquarters (HQ) Human Systems Center (HSC) PKVCC
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Prepared by:

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PREFACE

A site assessment/investigation (SA/SI) of the area in the vicinity of the railroad right-of-way (RRRW) at Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas (identified as Project No. 98-8126) will be conducted to determine the presence or absence of contamination within the study area.

This Work Plan (WP) Addendum was prepared by The Environmental Company, Inc. (TEC) as a modification to the WP prepared under contract No. F41624-95-D-8002, Delivery Order 0003. This WP Addendum is a project scoping document for Project No. 98-8126.

This WP Addendum provides a summary of existing information, presents an overview of project organization, and describes the methods to be utilized in completing the SA/SI.

This WP Addendum was written under the direction of Mr. Bob Duffner, P.E., TEC Project Manager. The Contracting Officer's Representative for this project is Mr. Charles Rice, Air Force Center for Environmental Excellence (AFCEE), Environmental Restoration Branch (ERB), Brooks Air Force Base (AFB), Texas.

Approved By:



Bob Duffner, P.E.
Project Manager
The Environmental Company, Inc.

Date:

9/30/97

NOTICE

This report has been prepared for the United States Air Force by The Environmental Company, Inc. (TEC) for the purpose of aiding in the implementation of a final remedial action plan under the Air Force Installation Restoration Program (IRP).

Although the area of study is being investigated in accordance with IRP guidance, the area has not been identified as an IRP site. NAS Fort Worth (formerly Carswell Air Force Base) is undergoing property disposal/reuse pursuant to the Defense Base Closure and Realignment Act of 1990 and Round II of the Base Closure Commission deliberations. The area of study is being considered for property disposal or reuse and the Air Force Base Conversion Agency (AFBCA) desires to investigate the area to confirm or deny the presence of contamination.

As the report relates to actual or possible releases of potentially hazardous substances, its release prior to a United States Air Force final decision on remedial action may be in the public's interest. The limited objectives of this report and the ongoing nature of the IRP, along with the evolving knowledge of site conditions and chemical effects on the environment and health, must be considered when evaluating this report since subsequent facts may become known that may make this report premature or inaccurate.

Acceptance of this report in performance of the contract under which it is prepared does not mean that the Air Force adopts the conclusions, recommendations, or other views expressed herein, which are those of the contractor only and do not necessarily reflect the official position of the United States Air Force.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACC	Air Combat Command
AFB	Air Force Base
AFP4	Air Force Plant 4
AFBCA	Air Force Base Conversion Agency
AFCEE	Air Force Center for Environmental Excellence
ARAR	Applicable or Relevant and Appropriate Requirements
BHB	Baird, Hampton, & Brown, Inc.
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSM	Conceptual Site Model
COR	Contracting Officers Representative
DO	Delivery Order
DoD	Department of Defense
DQO	Data Quality Objectives
DTIC	Defense Technical Information Center
ERB	Environmental Restoration Branch
Fam Camp	Family Camping
FS	Feasibility Study
FSP	Field Sampling Plan
HSP	Health and Safety Plan
HQ	Headquarters
IDW	Investigative Derived Waste
IRP	Installation Restoration Program
IRPIMS	Installation Restoration Program Information Management System
LPST	Leaking Petroleum Storage Tank
MSL	Mean Sea Level

LIST OF ACRONYMS AND ABBREVIATIONS (CONT.)

NAS	Naval Air Station
Pest/PCB	Pesticides/Polychlorinated Biphenols
PID	Photoionization Detector
POLs	Petroleum, Oils, and Lubricants
POC	Point of Contact
PPE	Personal Protective Equipment
PVC	Poly-Vinyl Chloride
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QPP	Quality Project Plan
RI	Remedial Investigation
RLS	Registered Land Surveyor
RRRW	Railroad Right of Way
RV	Recreational Vehicle
SA/SI	Site Assessment/Site Investigation
SAP	Sampling and Analysis Plan
SI	Site Investigation
SOW	Statement of Work
SVOC	Semi-Volatile Organic Compound
TAC	Texas Administrative Code
TBC	To Be Considered
TEC	The Environmental Company, Inc.
TNRCC	Texas Natural Resources Conservation Commission

1.0 INTRODUCTION

This Work Plan (WP) Addendum was prepared by The Environmental Company, Inc. (TEC) as a modification to the WP prepared under contract No. F41624-95-D-8002, Delivery Order (DO) 0003. This WP Addendum defines the scope of services for the Site Assessment and Site Investigation (SA/SI) of the Railroad Right-Of-Way (RRRW) for the Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas (Project No. 98-8126). The Statement of Work (SOW) for Project No. 98-8126 is included with this WP Addendum as Appendix A.

This WP Addendum was prepared in accordance with guidelines provided in the Headquarters (HQ) Air Force Center for Environmental Excellence (AFCEE) *Handbook for the Installation Restoration Program (IRP) Remedial Investigations and Feasibility Studies (RI/FS)*, dated September 1993 (hereafter referred to as the Handbook). The Handbook presents standard outlines and information requirements for IRP scoping documents. The outlines presented in the Handbook are required to be used in the preparation of IRP scoping documents. This WP Addendum is consistent with the WP outline and section numbering scheme presented in the Handbook. All components of the standard outline are addressed in this WP Addendum. It should be noted that, where appropriate, the section numbering system presented in the Handbook was expanded to accommodate further levels of detail.

Although the area is being investigated in accordance with IRP guidance, the area has not been identified as a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) site. NAS Fort Worth (formerly Carswell Air Force Base) is undergoing property disposal/reuse pursuant to the Defense Base Closure and Realignment Act of 1990 and Round II of the Base Closure Commission deliberations. The area of study is being considered for property disposal or reuse. There have been no previous investigative activities in the area of study and there is no documentation regarding existing or potential contamination. The Air Force Base Conversion Agency (AFBCA) desires to investigate this area to confirm or deny the presence of contamination.

A description of the Air Force Installation Restoration Program (IRP) and a history of IRP activities at NAS Fort Worth are provided in the WP for the DO, *Work Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas* (TEC, 1996a). Included is a description of NAS Fort Worth, a NAS Fort Worth Location Map, a history of NAS Fort Worth, and a description of previous investigative activities and documentation. There are no known remedial actions associated with the RRRW.

1.1 DESCRIPTION OF CURRENT STUDY

In the 1950s, railroad tracks were installed from the main railroad line along Vickery Boulevard to Air Force Plant 4 (AFP4) and Carswell Field for the delivery of bulk materials. The exact installation date is unknown. The railroad tracks run from a switching point on the south side of Vickery Boulevard, paralleling Route 183 north to Carswell Field. There is a Y in the railroad tracks, near the juncture of Spur 341 and

Route 183 north of Highway 30, where the tracks split, one continuing to Carswell Field along Route 183 and the other proceeding to AFP4 along Spur 341 (Figure 1-1). USAF System Command controls the section of railroad tracks that run from Vickery Boulevard to AFP4. Carswell 7th Wing (currently controlled by AFBCA for Air Combat Command (ACC)) controls portion of the track east of Spur 341 which lies within the boundaries of Carswell AFB as shown in Figure 1-1. This SA/SI involves the section of RRRW from Vickery Boulevard to AFP4; it does not include the section of RRRW from the Y to Carswell Field.

Figure 1-1 identifies the overall area of study along the RRRW and identifies the segments where the SA/SI will concentrate activities based on interviews, documents reviewed, and data gathered for this SA/SI.

At the time the railroad between Vickery and AFP4 was active, approximately 1950s to 1988, Southern Pacific (currently Union Pacific) managed and maintained the railroad under contract to Carswell AFB. Materials carried by railcar from Vickery Boulevard to AFP4 reportedly included jet fuel, diesel fuel, cleaning fluids, metal parts and raw materials, and some acids used for plating and anodizing (Long, 1997; Rainwater, 1997). Materials carried to Carswell Field along the stretch of track from Vickery Boulevard to the Y include mainly petroleum, oils, and lubricants (POLs) (Long, 1997).

Based on file reviews and personal interviews as well as site reconnaissance, four main areas of concern were identified. These four areas include the following:

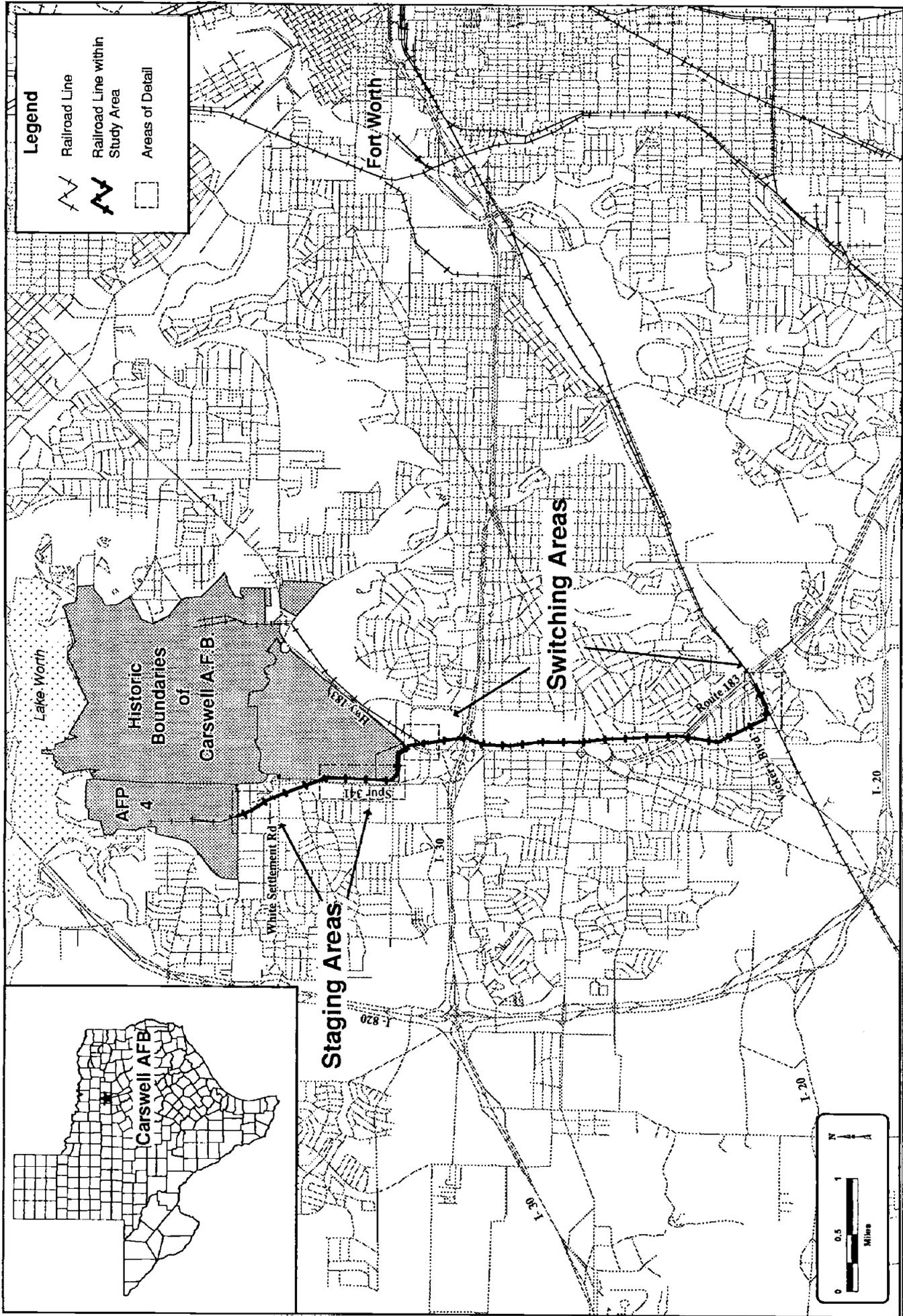
- a staging/switching area south of AFP4;
- a staging area along the west side of the Carswell Field runway;
- a switching area between Route 183 and the north side of Highway 30; and,
- a switching area along Vickery Boulevard.

1.1.1 Project Objectives

The objectives of this SA/SI are to determine the presence or absence of contamination in the area of study. The area of study includes the RRRW extending from Vickery Boulevard north to AFP4.

1.1.2 Project Scoping Documents

This WP Addendum constitutes one of the scoping documents required by the SOW for this contract and delivery order and is a modification to the *Work Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas* (TEC, 1996a). Other scoping documents prepared by TEC for this contract and delivery order, and referenced by this WP Addendum, include a Quality Project Plan (QPP) (TEC, 1996b), consisting of a Health and Safety Plan (HSP) (TEC, 1996c), a Field Sampling Plan (FSP) (TEC, 1996d), and a Quality Assurance Project Plan (QAPP) (TEC, 1996e). These scoping documents should be referenced as necessary and appropriate. As part of this Addendum, changes to the HSP, FSP, and QAPP specific to this modification are provided in Appendices B, C, and D, respectively.



Date: September 1997
 Project Manager: B. Duffner
 Prepared By: D. Bedarf
 Project No: P-3103-021

Figure 1-1 -- Railroad Right of Way Site Map



1.1.3 Summary of Project Activities

SA Activities. A visual observation of site conditions was made to note areas of discolored soils, stressed vegetation, and/or other indicators of potential contamination. Selected surface soils were screened with a photoionization detector (PID) for volatile organic compounds (VOCs). SA activities include:

- file reviews and interviews;
- a reconnaissance of the entire 7 mile study area noting visual observations and screening surface soils; and
- a soil gas study.

File reviews were performed and interviews were conducted to determine past activities of the railroad and materials that may have been carried by railcar into Carswell AFB and AFP4. Those who were interviewed include: Mr. Olen Long, Installation Management Officer with AFBCA; Travis Rainwater, longtime Lockheed employee; Gerald Cumby, Lockheed Director of Transportation; and Ed Daniels, Lockheed Environmental/Spill Coordinator.

A reconnaissance of the entire 7 mile study area was performed. Visual observations were noted and surface soils were screened using a PID. General refuse was noted in several areas; however, the refuse was not attributed to USAF operation, nor was it associated with potential contamination.

Based on file reviews, personal interviews, and site reconnaissance, four main areas of concern were identified within the 7 mile study area. Soil gas surveys will be conducted at 50 points within these areas of concern along the RRRW. GORE-SORBER[®] Passive Sorbent Collection Devices (sorbents) will be placed immediately adjacent to the RRRW. Soil gas sample analyses will target volatile organic compounds (VOCs), and select semi-volatile organic compounds (SVOCs).

SI Activities. Based on SA data/findings, up to 8 subsurface soil sample locations will be identified in the areas of concern as deemed appropriate and necessary.

A utilities location survey, will be conducted to identify the location and orientation of all underground utilities in areas where soil samples will be collected.

Soil samples will be collected by split-spoon using direct push techniques. Soil samples will be collected to a depth not to exceed 20 feet below ground surface, 5 feet below encountered groundwater, or refusal. Soil samples will be collected continuously for lithologic characterization and VOC screening; however, one or two samples from each location will be submitted for laboratory analysis. All soil samples submitted to the laboratory will be analyzed for VOCs, SVOCs, metals, pesticides/PCBs, and total TPH.

Reporting of Findings. One Technical Report (TR) will be prepared. The TR to be prepared is a SA/SI Report.

All data generated during SA/SI will be delivered in an Installation Restoration Program Information Management System (IRPIMS) format.

1.2 PROJECT ORGANIZATION AND RESPONSIBILITIES

TEC has assembled a team of highly qualified professionals to both manage and execute the range of tasks required for the successful completion of this project. Figure 1-3, in the *Work Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas* (TEC, 1996a), is a project organizational chart that identifies key project personnel. Table 1-1 in the WP (TEC, 1996a) presents point-of-contact information for key project personnel. Exceptions to Table 1-1 include the following: the AFCEE Contracting Officer is Ms. Jill Benefield and the TEC Project Manager is Mr. Bob Duffner.

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2.0 SUMMARY OF EXISTING INFORMATION

This section provides a summary of existing information associated with the areas of concern. Where applicable and appropriate, sources of the information are referenced.

2.1 NAS FORT WORTH ENVIRONMENTAL SETTING

NAS Fort Worth is located within the Grand Prairie section of the Central Lowlands Physiographic Province. The land area is characterized by broad terrace surfaces sloping gently eastward, interrupted by westward-facing escarpments. The topography of the station is fairly flat, except for areas near Farmers Branch Creek and the Trinity River. Elevations average 650 feet above mean sea level (MSL) and range from a low of 550 feet above MSL in the east to a high of 690 feet above MSL in the southwest.

The climate in the region is sub-humid with mild winters and hot humid summers. The average annual precipitation is 31.5 inches with the majority of precipitation falling between the months of April and October. The average annual air temperature is 66 degrees Fahrenheit (°F). August is the hottest month with an average monthly air temperature of 92 °F and January is the coldest month with an average monthly air temperature of 45 °F. Temperature changes may be rapid in the region and often change 20 °F to 30 °F in a matter of hours. The average annual relative humidity is 63 percent.

Prevailing winds are primarily southerly from March through November and northerly from December through February. The average wind speed is 8 knots. Thunderstorms with wind speeds in excess of 65 knots as well as hail storms are common in the region. Climate conditions in summer make tornado formations possible.

The principal hydrogeologic units underlying NAS Fort Worth include the Terrace Alluvium Aquifer, and the Upper, Middle, and Lower Paluxy Aquifers. The Paluxy Aquifers are bedrock hosted. The Terrace Alluvium Aquifer is the uppermost aquifer and occurs in unconsolidated material and in the Goodland Formation. The unconsolidated material constituting the Terrace Alluvium is predominantly alluvial and fluvial deposits of clay, silt, sand, and gravel. The Goodland Formation is a thinly to massively bedded fossiliferous limestone. The Terrace Alluvium Aquifer is only partially saturated and is not used as a source of drinking water. Recharge of the aquifer is from precipitation and leaking water supply lines, sewer lines, and storm drains. Discharge seeps into unnamed small streams and the Trinity River.

The Paluxy Aquifers are hosted by fine-to medium-grained sandstone separated by clays and shales of the Paluxy Formation. The Middle Paluxy Aquifer serves as a water supply source for the community of White Settlement. The Paluxy Aquifers are hydraulically separated from the Terrace Alluvium Aquifer by the Walnut Formation, a limestone coquina. The Walnut Formation has been subjected to subaerial erosion and this suggests the possibility of local hydraulic communication between the Terrace Formation Aquifer and the deeper Paluxy Aquifers.

2.2 SITE-SPECIFIC ENVIRONMENTAL SETTING

The following subsections provide a brief summary of available information on the areas of concern.

2.2.1 Contaminant Sources and Contamination

As previously noted, at the time the railroad between Vickery and AFP4 was active, approximately 1950s to 1988, Southern Pacific (currently Union Pacific) managed and maintained the railroad under contract to Carswell AFB. Materials carried by railcar from Vickery Boulevard to AFP4 reportedly included jet fuel, diesel fuel, cleaning fluids, metal parts and raw materials, and some acids used for plating and anodizing. Materials carried to Carswell Field along the stretch of track from Vickery Boulevard to the Y at I-30 and Route 183 include mainly petroleum, oils, and lubricants (POLs).

TEC conducted file reviews, personal interviews, and a site reconnaissance of the RRRW which identified four main areas of concern. These four areas include the following:

- a staging/switching area south of AFP4;
- a staging area along the west side of the Carswell Field runway;
- a switching area between Route 183 and the north side of Highway 30; and,
- a switching area along Vickery Boulevard.

Although the site reconnaissance did not identify any obvious stained surfaces or stressed vegetation that could be an indication of potential contamination, these areas are identified as having a higher frequency of longterm railcar storage and railcar activity (staging or switching) than the areas of the railroad tracks where the railcars were in constant motion. At these identified areas, railcars may have been jarred from other railcars loading, unloading, or reconnecting to the train. For this reason, these four areas of concern are suspect of being contaminated as a result of leaks from railcars; and therefore, soil gas surveys will be conducted at these areas.

2.2.2 Geology

Site-specific geologic data is not available. Reference Section 2.1 for a general discussion on the NAS Fort Worth environmental setting and geologic features.

2.2.3 Groundwater

Site-specific groundwater data is not available. Reference Section 2.1 for a general discussion on the NAS Fort Worth environmental setting and hydrogeologic features.

2.2.4 Surface Water

Site-specific surface water data is not available. Reference Section 2.1 for a general discussion on the NAS Fort Worth environmental setting.

2.2.5 Air

Site-specific air data is not available. Reference Section 2.1 for a general discussion on the NAS Fort Worth environmental setting and meteorological data.

2.2.6 Biology

Site-specific data regarding the ecological environment is not available. Reference Section 2.1 for a general discussion on the NAS Fort Worth environmental setting.

2.2.7 Demographics

Site-specific demographic data is not available. Reference Section 2.1 for a general discussion on the NAS Fort Worth environmental setting and demographic features.

2.3 CONCEPTUAL SITE MODEL

Table 2-1 provides a summary of the existing information on the natural conditions and contamination at the site in a conceptual site model (CSM) format.

Since there have been no previous investigative activities in the area of study and since there is no documentation regarding existing or potential contamination, the information presented in the CSM summary is very limited. A plan view and cross-section drawing of the CSM are not included with this WP.

2.4 REMEDIAL ACTION

Not applicable.

2.5 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Applicable or relevant and appropriate requirements (ARARs) were determined based on the CSM. Since there have been no previous investigative activities in the area of study and since there is no documentation regarding existing or potential contamination, the ARARs presented in this subsection should be viewed as preliminary. Appendix E presents a summary of standards, target concentrations, and screening levels for residential soils based on preliminary project ARARs and other requirements to be considered (TBCs), which were determined based on the CSM.

Hazardous Waste

The TNRCC regulation for industrial solid waste and municipal hazardous waste includes media-specific risk reduction standards (30 TAC 333.559). These risk reduction standards are defined in Section 335.8 of the regulations and summarized below:

- *Risk Reduction Standard 1:* Closure/remediation to background. To remove and/or decontaminate all waste, waste residues, leachate, and contaminated media to background levels unaffected by waste management or industrial activities; or,
- *Risk Reduction Standard 2:* Closure/remediation to health-based standards and criteria. To remove and/or decontaminate all waste, waste residues, leachate, and contaminated media to standards and criteria such that any substantial present or future threat to human health or the environment is eliminated.
- *Risk Reduction Standard 3:* Closure/remediation with controls. To remove, decontaminate, or control all waste, waste residues, leachate, and contaminated media to standards and criteria in a manner such that any substantial present or future threat to human health or the environment is eliminated.

These regulations, combined in Subchapter S (*Risk Reduction Standards*), specify requirements that can define or modify numeric cleanup levels (such as Medium Specific

Table 2-1 Conceptual Site Model (CSM) Summary

Site Identification	Visual Observations Regarding Pathways	Background Concentrations	Contaminants and Contaminated Media	Migration Pathway(s)	Exposed Population	Risk Estimate
Project No. 98-8126	Depth to groundwater in the area typically does not exceed 30 feet from the surface elevation; and groundwater will not always be reached prior to bedrock. Numerous drainageways exist leading from the RRRW to surface waters. The RRRW crosses surface waters, including Farmers Branch Creek.	Environmental sampling has been conducted to identify background concentrations in the vicinity of Carswell AFB for a broad range of analytics (Jacobs, 1997). These established conditions will be used for this project.	Prior environmental sampling has not been conducted to identify contaminants and/or contaminated media.	Potential pathways for contaminant migration at the site include groundwater and surface water. ¹	Site specific data is required to estimate the exposed population for each exposure pathway. ¹	Site-specific data is required to estimate risk numerically. ¹

¹ As per the Statement of Work, this SAVSI only includes identification of the presence or absence of contamination. The study will not include an analysis of contamination migration or an estimate of exposed populations at risk.

Concentrations (MSCs)) or require that non-health based criteria be addressed. For residential soil, determination of cleanup levels consider protection of groundwater and direct contact with soil (e.g. ingestion and inhalation). A preliminary listing of all MSCs is provided in Appendix E.

Petroleum

Texas regulations regarding petroleum and USTs may be found in the TNRCC regulations entitled Underground and Above ground Storage Tanks (30 TAC 334). Guidance on implementing these regulations is provided in the TNRCC, Petroleum Storage Tank (PST) Divisions Guidance for Risk-based Assessments at LPST Sites in Texas and Risk-Based Corrective action for LPST Sites(TNRCC, 1994, 1995). The 1994 guidance provides target concentrations for both residential and industrial soils based on groundwater protection and direct contact. TNRCC Plan A targets are provided in Appendix E.

Risk-based Guidance

EPA Region 6 Human Health Media-Specific Screening Levels (EPA 1996), summarized in Appendix E for residential soil, are to be considered as relevant and appropriate guidance for this project. The soil screening levels provided in the guidance are risk-based concentrations for both residential and industrial exposures. These values are appropriate for preliminary screening of constituents of concern for human health risk assessment purposes. The methodology used to derive the screening levels is relevant guidance for developing site-specific cleanup levels.

Transfer of Real Property

Data collected during the RRRW investigation may be used to support the transfer of property from the U.S. Air Force to the public. The requirements of the CERFA, *Public Law 102-425, October 19,1992*, as it amends *Section 120(h) of CERCLA*, and the *DoD Policy on Implementation of the CERFA (May 1996)* are therefore applicable.

CERFA addresses the identification and documentation of all uncontaminated real property, or parcels thereof, at installations undergoing closure or realignment. "Uncontaminated" property is defined as any real property on which no hazardous substances and no petroleum products or their derivatives, including aviation fuel and motor oil, were known to have been released or disposed. CERFA requires a site to be assessed in order to determine and document its uncontaminated status. The Act specifically requires a study to be conducted, including sampling and analysis when required to support a determination of uncontaminated.

2.6 DATA NEEDS

The objectives of the SA/SI activities are to determine the presence or absence of contamination. Data necessary to accomplish this objective includes:

- **Land Survey Data.** Land survey data is necessary to accurately locate property boundaries, easements, and soil boring and sample locations.

- **Soil Screening Data.** Soil screening data is necessary to identify areas of potential contamination within the area of study. GORE-SORBER[®] sorbers will be used to generate soil gas data. Analysis of soil gas will target select VOCs and SVOCs.
- **Soil Characteristics Data.** Soil characteristics data is necessary to understand the geologic conditions in areas of potential contamination. Lithologic data will be recorded during soil boring activities.
- **Soil Contamination Data.** Soil contamination data is necessary in areas of potential contamination to identify the types and concentration of contaminants present in subsurface soils. Soil samples are to be collected and analyzed for VOCs, SVOCs, TPH, and inorganic analytes.
- **Demographic Data.** Demographic data is necessary to determine population densities and land use surrounding areas of potential contamination. This data will be obtained during SA/SI activities.

3.0 STUDY TASKS

Study tasks include all SA/SI activities. These activities are described in general terms in this section. Details regarding field activities, sampling methods, laboratory analytical methods, and quality assurance procedures are provided in the SAP (i.e., in the FSP [TEC, 1996d] and the QAPP [TEC, 1996e]) in addition to the FSP Addendum and the QAPP Addendum provided in Appendix C and D, respectively. Health and safety procedures are also separately provided in the HSP (TEC, 1996b) with a HSP Addendum provided as Appendix B. Reference should be made to these scoping documents as necessary and appropriate.

3.1 SITE OBJECTIVES

The site objectives of this SA/SI are to collect sufficient data to determine the presence or absence of contamination in the area of study. Data needs are identified in Section 2.6 of this WP Addendum.

3.2 FIELD INVESTIGATION

As per the Work Breakdown Structure (WBS) presented in the SOW for Project No. 98-8126, Section 3.5 (see Appendix A), included in SA/SI activities.

3.2.1 Site Assessment (SA)

An SA will be conducted in the area of study to define the area environmental setting, to identify sites that are potentially contaminated, and to assess potential sources of contamination. Preliminary SA tasks include a literature search and records review (see Section 3.3 for complete detail). SA field tasks include a visual observation of site conditions, PID screening of selected surface soils, and the placement/retrieval of sorbers.

3.2.1.1 SA Field Tasks

Visual Observation. A reconnaissance was performed on the entire 7 mile rail line within the RRRW study area on 4 September 1997. A visual observation of site conditions was made to note areas of discolored soils, stressed vegetation, and/or other indicators of potential contamination. An evaluation of site accessibility and security was also be made.

PID Soil Screening. During the reconnaissance of the study area, any discolored soils, areas with stressed vegetation, and/or other areas where potential contamination was noted were screened with a PID for VOCs. Soil screening results did not indicate the potential presence of contamination.

Soil Gas Sorber Placement. A soil gas survey will be conducted using methods described in the WP (TEC, 1996a) and FSP (TEC, 1996d) along the RRRW. Additional RRRW specific methods and procedures are provided in the FSP Addendum (Appendix C). TEC will use GORE-SORBER® Passive Sorbent Collection Devices (sorbers) to conduct the soil gas survey.

3.2.1.1.1 SA Aquifer Testing

Not applicable.

3.2.1.1.2 SA Geophysical Surveys

Not applicable.

3.2.1.2 SA Sampling and Analysis Activities

SA/SI sampling activities consist of completing the soil gas surveys along the RRRW. This will include the installation/retrieval of 50 sorbers (see Section 3.2.1.1). Figures 3-1, 3-2, and 3-3 identify the placement of the 50 sorbers within the four main areas of concern. Soil gas analyses will target select VOCs and SVOCs. SA results will be used to define areas of concern for Site Investigation efforts.

3.2.2 Site Investigation (SI)

An SI will be conducted following the SA. The SI will be conducted in areas of potential contamination to confirm the presence or absence of contamination.

SI field tasks include a utilities location survey and soil sampling. Figures 3-1, 3-2, and 3-3 also identify the expected locations for the eight soil sampling sites; however, these sites will be modified based on results from the soil gas analyses are reviewed.

Investigative derived wastes (IDW) will be generated during these activities. IDW will be properly managed and disposed. IDW will be containerized, labeled, stored in the designated secure area provided by AFBCA, and subsequently disposed of off site by a qualified waste transporter at a licensed disposal facility.

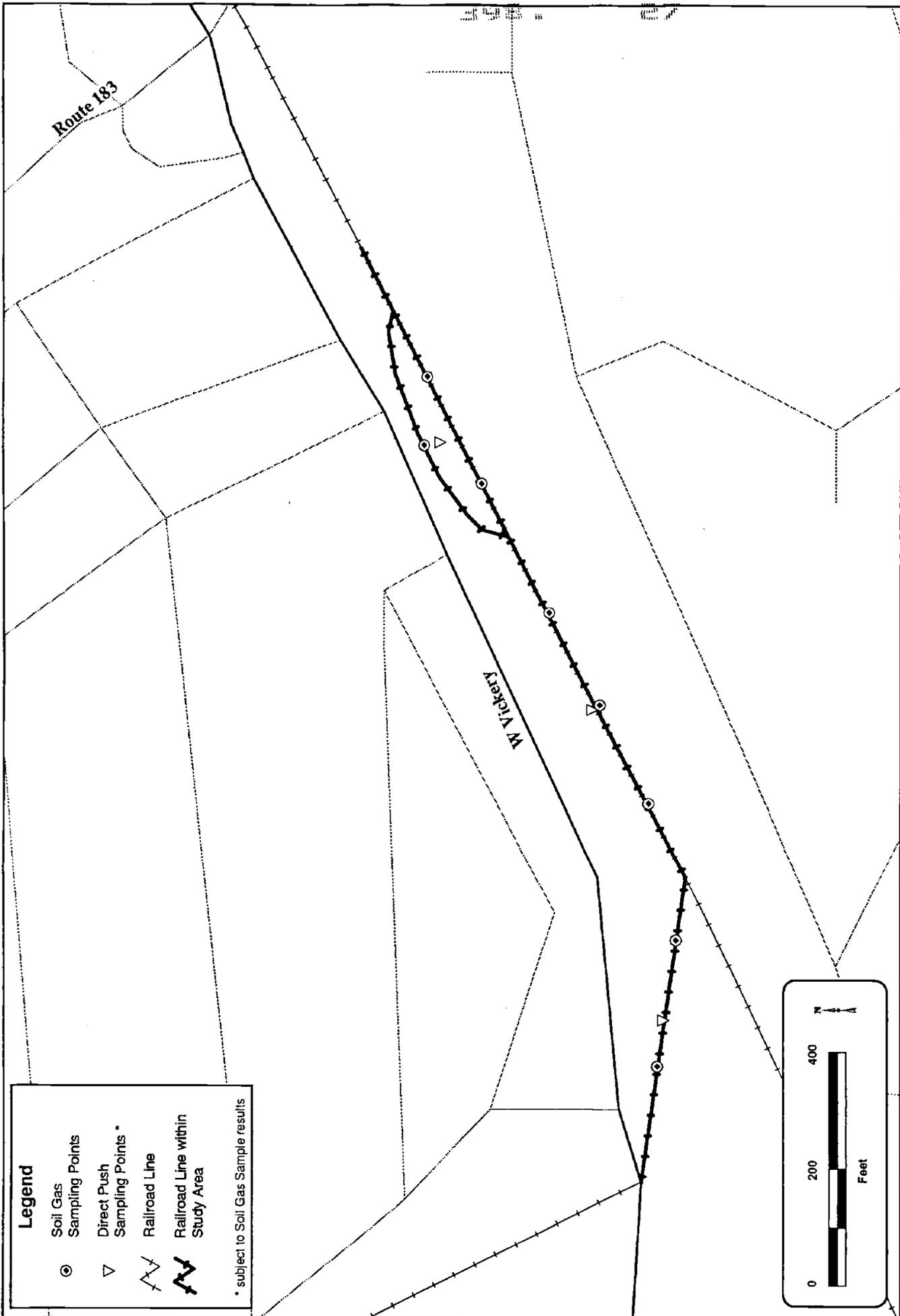
3.2.2.1 SI Field Tasks

Utilities Location Survey. A utilities location survey, utilizing a professional geophysical service provider, will be conducted to identify the location and orientation of all underground utilities in areas where soil borings will be advanced.

Direct Push Sampling. Based on prior SA findings, up to 8 direct push sample locations will be identified as appropriate and necessary. Soil samples will be collected to a depth not to exceed 20 feet below ground surface, 5 feet below encountered groundwater, or refusal, whichever comes first.

Soil Screening. Soil samples will be collected continuously during direct push sampling operations for screening purposes. Soils will be screened with PID for VOCs. Soil screening results will be used as an indicator of potential contamination.

Soil Sampling. One to two soil samples will be collected from each direct push location and submitted for laboratory analysis. Soil samples will be collected by split-spoon sampling techniques.



Legend

Soil Gas Sampling Points

Direct Push Sampling Points *

Railroad Line

Railroad Line within Study Area

* subject to Soil Gas Sample results

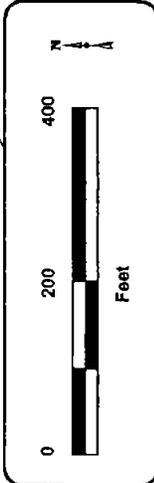
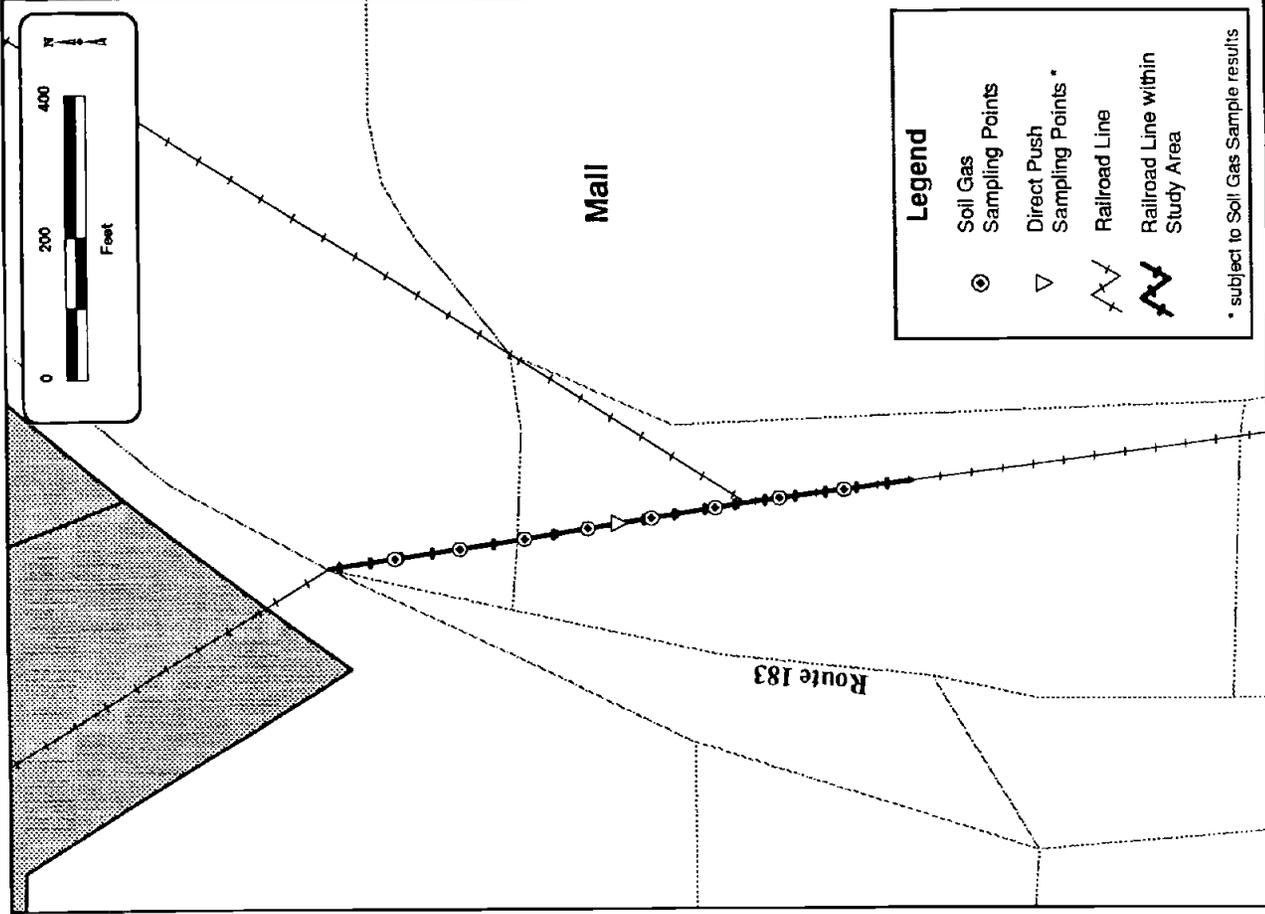


Figure 3-1 -- Railroad Right of Way Staging Area Near Vickery Boulevard

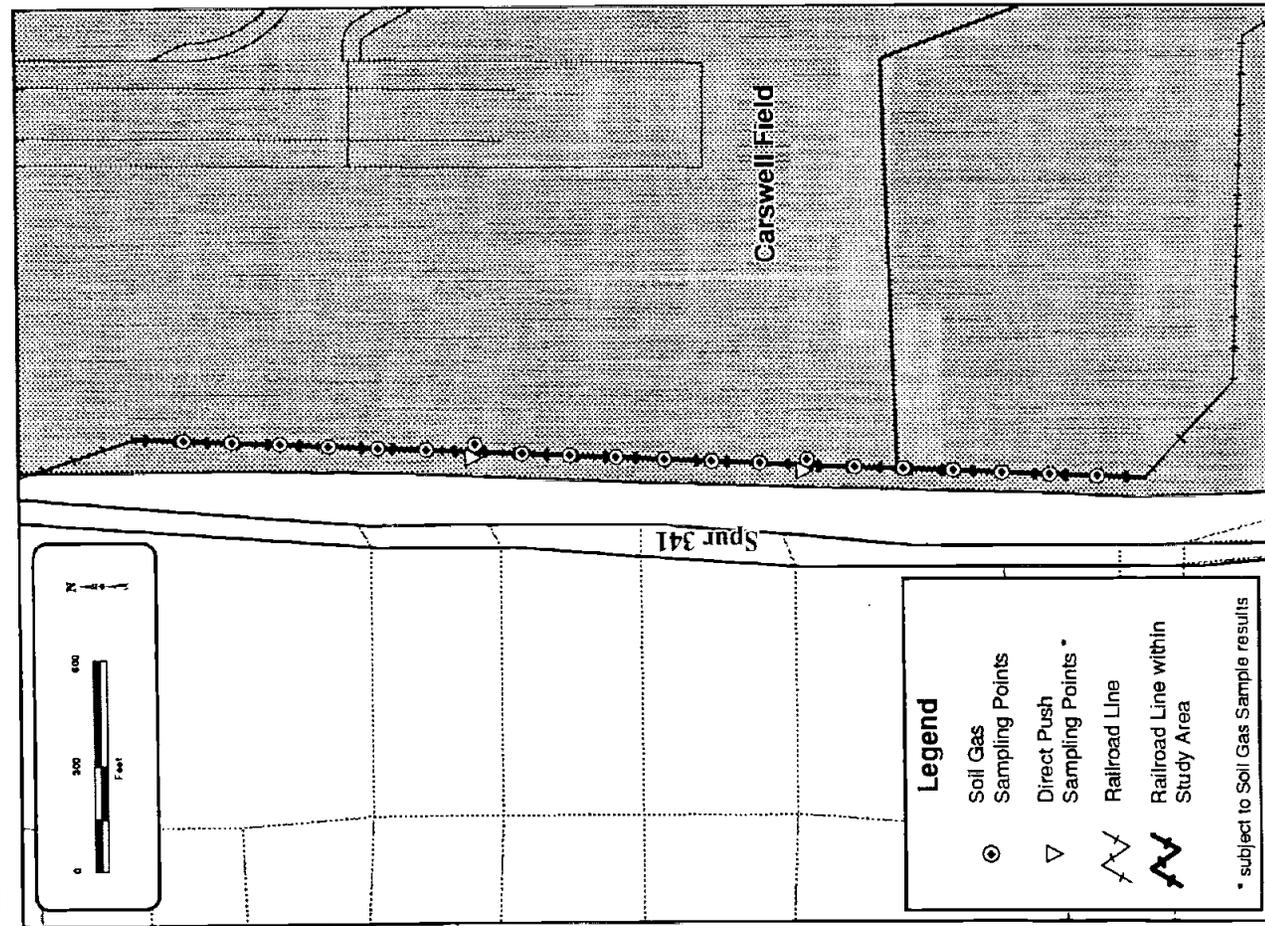
Date: September 1997
 Project Manager: B. Duffner
 Prepared By: D. Bedart
 Project No: P-3109-021



Legend

- ⊙ Soil Gas Sampling Points
- ▽ Direct Push Sampling Points *
- Railroad Line
- Railroad Line within Study Area

* subject to Soil Gas Sample results



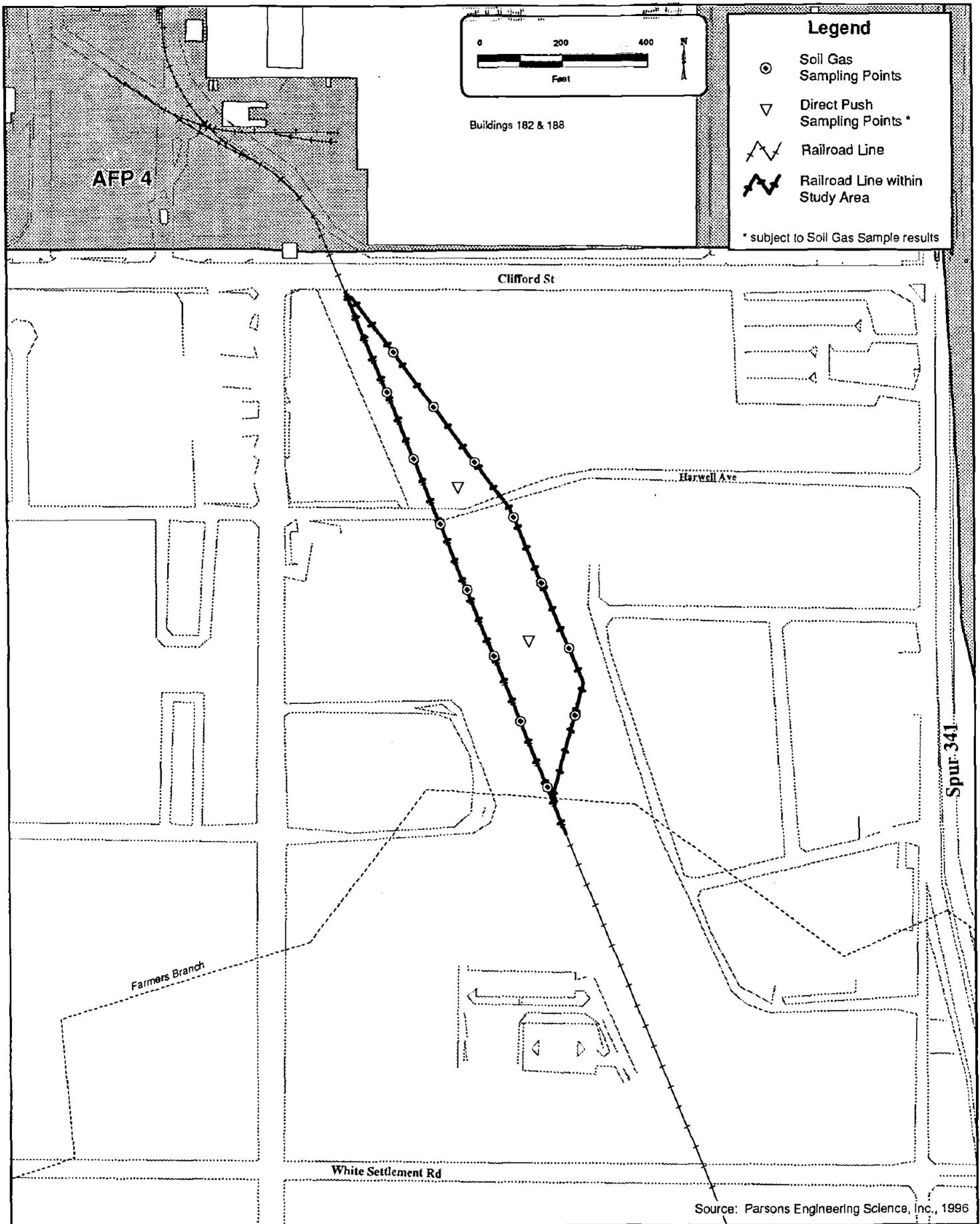
Legend

- ⊙ Soil Gas Sampling Points
- ▽ Direct Push Sampling Points *
- Railroad Line
- Railroad Line within Study Area

* subject to Soil Gas Sample results

Date: September 1997
 Project Manager: B. Duffner
 Prepared By: D. Bedard
 Project No: P-3103-021

Figure 3-2 -- Railroad Right of Way South of Carswell Field



IDW Disposal. Should significant quantities of IDW be generated through site activities, TEC will retain a qualified waste transporter to remove IDW from the site for disposal at a licensed facility. TEC has identified several local area transporters with the capability of handling non-hazardous and hazardous wastes. All IDW will be properly containerized and stored during field activities.

Site Restoration. Should site conditions following SI activities necessitate significant site restoration, TEC will retain a qualified subcontractor to restore site conditions to pre-investigation conditions. Activities which may necessitate site restoration include heavy equipment usage and/or drilling operations. Site restoration activities, if needed, will be coordinated with NAS Fort Worth representatives.

3.2.2.1.1 SC Aquifer Testing

Not applicable.

3.2.2.1.2 SC Geophysical Surveys

Not applicable.

3.2.2.2 SI Sampling and Analysis Activities

Soil sampling will be conducted during soil boring activities. A total of 12 soil samples will be collected (1 to 2 samples per location, 8 locations total). All soil samples will be analyzed for VOCs, SVOCs, metals, pesticides/PCBs, and TPH. Additional quality control samples will also be collected to support review of the field data.

3.3 LITERATURE SEARCH

A literature search was conducted as part of the SA in order to identify existing records, data, and other information associated with the area of study. All relevant documents have been reviewed by TEC project team personnel, and will be incorporated into the technical report.

3.4 RECORD KEEPING

TEC field personnel will maintain field data log books. In addition to the log books, TEC field personnel will complete and maintain standard field data forms for all field activities. Example field data forms are collectively presented in the FSP. These field data forms include:

- Field Sampling Reports;
- Chain-of-Custody Documentation;
- Soil Gas Survey Data Sheets;
- Soil Gas Survey Sample Data Sheets;
- Boring Logs;
- Instrument Calibration Log Sheets; and
- Instrument Maintenance Records.

3.5 DATA QUALITY ASSESSMENT

A data quality assessment will be conducted following the completion of all SA/SI activities. The assessment will include a review and evaluation of all data generated.

A review of field records will be conducted to determine completeness, validity of samples collected, and the correlation of field data. Any anomalies in data will be identified and evaluated. A discussion regarding field data quality and sample validity will be provided in the technical report (TR) (see Section 4.10).

An independent review of laboratory data will be conducted to determine the validity of all analyses provided. This review will focus on:

- chain-of-custody documentation;
- holding times;
- method calibration limits;
- method blanks;
- laboratory verification of quantitation limits;
- preparatory batch control records;
- corrective actions;
- formulas used for analyte quantitation;
- examples of analyte quantitation; and
- completeness of data.

This review of laboratory data will also ensure that all samples and analyses required by the SAP have been processed, complete records exist for each analysis and any associated QC measures, and procedures specified in this WP Addendum and the SAP have been implemented. A complete discussion regarding analytical data validity will be provided in the TR.

An evaluation of valid environmental data will be conducted. Based on the data reviews, data generated through poor field or laboratory practices will not be considered in the evaluation. Historical data that is not supported by proper documentation will also not be considered in the evaluation. Field duplicate, field blank, and laboratory blank analytical results as well as sample matrix effects will be reviewed and a complete discussion regarding data evaluation and findings will be provided in the TR.

3.6 CHARACTERIZATION OF BACKGROUND CONDITIONS

There have been no prior investigative activities in the area of study and there is no documentation regarding background conditions. The potential for contamination does exist in the areas of concern (see Section 2.2.1 for a discussion of potential contaminant sources and potential contamination).

Due to the limited scope of this investigation, project specific background conditions will not be determined. The study will rely upon background conditions previously established from the Carswell AFB investigations under a previous investigation (Jacobs, 1997).

3.7 RISK ASSESSMENT

Not applicable.

3.8 BENCH SCALE/TREATABILITY STUDIES

Not applicable.

3.9 DETAILED ANALYSIS OF ALTERNATIVES

Not applicable.

4.0 REPORTING REQUIREMENTS

This section details project reporting requirements. All deliverable products/reports will be prepared and submitted in accordance with the SOW and the applicable Contracts Data Requirements Lists (CDRLs) (see Appendix A). CDRL Data Item Numbers are indicated in brackets following each subsection to facilitate reference with Appendix A.

4.1 PROJECT SCOPING DOCUMENTS

This WP Addendum constitutes one of the project scoping documents required by the SOW for this contract and delivery order. Other scoping documents required by the SOW include a QPP consisting of an HSP and an SAP, with the latter consisting of an FSP and a QAPP. [A002, A003, A004]

4.2 MONTHLY STATUS REPORTS

TEC will complete and submit monthly financial and management reports. These Monthly Status Reports will be organized according to the standardized Work Breakdown Structure (WBS) to describe the status of expenditure of funds correlated with the progress of the work completed. [A001AB, B006, B007]

4.3 CHANGE OF CONTRACTOR PERSONNEL

TEC has provide an organizational chart displaying key personnel involved in this project and their respective labor categories with the first Monthly Status Report. TEC will notify the Contracting Officers Representative (COR) of any significant changes in project personnel and provide an updated organization chart as necessary and appropriate. [A001AA]

4.4 PROJECT MEETING MINUTES

TEC will complete and submit project meeting minutes to document all items discussed at project meetings. All project meeting attendees will be listed in the minutes. [B005]

4.5 PROJECT SCHEDULES

TEC has prepared a computer-generated network analysis that is a detailed task plan for all WBS tasks (see Section 5.0). The network analysis will be in the form of a Gantt chart to indicate appropriately the percentage of work scheduled for completion by any given date during the period of the delivery order. The Gantt chart will show both serial and parallel subtasks leading to a deliverable. [B001]

4.6 PRESENTATION MATERIALS

TEC will prepare and present briefing packages for project meetings coordinated by the U.S. Air Force. TEC will provide hardcopies of all slides and overheads as a hand-out during these project meetings. [B004]

4.7 PHOTO DOCUMENTATION

TEC will provide color photo documentation as deemed necessary and appropriate, including documentation of site features, sample locations, and SA/SI and SC field activities. Color photographs will be included with technical reports. Photographic negatives will also be provided with final submittals. [A031]

4.8 PRELIMINARY LABORATORY REVIEW PACKAGES

Not applicable.

4.9 INFORMAL TECHNICAL INFORMATION REPORTS (ITIRS)

Not applicable.

4.10 TECHNICAL REPORT

One Technical Report (TR) will be submitted. As required by the SOW (see Appendix A), an SA/SI Report is relevant to this project. The SA/SI Report will describe the environmental setting of the areas of concern, identify potential sources of contamination, and present the findings of all SA/SI activities. [A007] The SA/SI Report will be submitted as one comprehensive TR.

4.10.1 Conceptual Site Model (CSM)

TEC personnel will develop a limited CSM(s) for the RRRW Area based on the data collected during the assessment and investigation. The CSM(s) will not define the nature and extent of contamination, the hydrogeologic regime, and the transport and fate of contaminants. The complexity and detail of the CSM(s) will be consistent with the nature of the site and the data available. The CSM(s) will be submitted as a component of the TR. [A025]

4.10.2 Ecological/Baseline Risk Assessment

Not applicable.

4.11 IRPIMS DATA

TEC personnel will prepare all data to meet IRPIMS data requirements. TEC will record field and analytical laboratory data into an electronic format as required by the most current version of the *IRPIMS Data Loading Handbook*. Individual IRPIMS data files (analytical results, groundwater level data), including re-submissions, will be delivered with a transmittal letter to AFCEE in sequence with associated hard copy error reports. Data entered into IRPIMS data files will correspond exactly with the data contained in original laboratory reports and other documentation associated with field sampling and laboratory activities. [B003]

5.0 PROJECT SCHEDULE

A project schedule to complete the SA/SI activities is provided in Appendix F. The project schedule is presented in the form of a color Gantt Chart.

Project milestones and document submittal dates are indicated on the project schedule. Serial and parallel subtasks leading to a deliverable are also indicated on the project schedule.

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6 0 REFERENCES

- Cumby, Gerald. 1997 (September). Personal Communication. Director of Transportation, Lockheed (AFP4), Fort Worth, Texas.
- Daniels, Ed. 1997 (September). Personal Communication. Environmental/Spill Coordinator, Lockheed (AFP4), Fort Worth, Texas.
- GMI. 1995 (February). *Phase I & II Report, Groundwater Survey & Subsurface Soil Delineation, Hydrant Fueling System, Carswell Air Force Base, Fort Worth, Texas.*
- Jacobs Engineering Group, Inc. 1997 (January). *Basewide Background Study, Vol. 1. NAS Fort Worth JRB, Texas.*
- Long, Olen. 1997 (September). Personal Communication. Installation Management Officer, Air Force Base Conversion Agency, NAS Fort Worth JRB, Texas.
- Rainwater, Travis. 1997 (September). Personal Communication. Lockheed (AFP4), Fort Worth, Texas.
- The Environmental Company, Inc. 1996a. *Work Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas.*
- The Environmental Company, Inc. 1996b. *Quality Project Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas.*
- The Environmental Company, Inc. 1996c. *Health and Safety Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas.*
- The Environmental Company, Inc. 1996d. *Field Sampling and Analysis Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas.*
- The Environmental Company, Inc. 1996e. *Quality Assurance Project Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas.*

APPENDIX A

STATEMENT OF WORK

**SITE ASSESSMENT AND INVESTIGATION
OF THE RAILROAD RIGHT-OF-WAY**

**NAVAL AIR STATION (NAS) FORT WORTH
JOINT RESERVE BASE
CARSWELL FIELD, TEXAS**

PROJECT NO. 98-8126

STATEMENT OF WORK

**SITE ASSESSMENT, INVESTIGATION, AND CHARACTERIZATION OF THE
RECREATIONAL VEHICLE (RV) FAMILY CAMPING (FAM CAMP) AREA
AND SITE ASSESSMENT AND INVESTIGATION OF THE RAILROAD RIGHT-OF-
WAY**

**NAVAL AIR STATION (NAS) FORT WORTH
JOINT RESERVE BASE
CARSWELL FIELD, TEXAS**

**Project No. 95-8021 (Fam Camp)
Project 98-8126 (Rail Right of Way)**

Contract Number: F41624-95-D-8002

**Delivery Order 3
Modification 01**

**January 26, 1996
June 9, 1997**

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SITE ASSESSMENT AND INVESTIGATION OF THE RAILROAD RIGHT-OF-WAY**
AT
NAVAL AIR STATION (NAS) FORT WORTH, TEXAS

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SITE ASSESSMENT, INVESTIGATION, AND CHARACTERIZATION OF THE RECREATIONAL VEHICLE (RV) FAMILY CAMPING (FAM CAMP) AREA AND SITE ASSESSMENT AND INVESTIGATION OF THE RAILROAD RIGHT-OF-WAY AT NAVAL AIR STATION (NAS) FORT WORTH, TEXAS

1.0 INTRODUCTION

The purpose of this statement of work (SOW) is to provide services, technical man-hours, and materials for the site assessment, investigation and characterization of the area in the vicinity of the RV Fam Camp Area and for the site assessment and investigation of the railroad right-of-way (ROW) at NAS Fort Worth, Texas (TX). The Contractor shall report on the presence or absence and nature and extent of contamination in this area. Additional services include the collection, testing, analysis, and reporting of contaminants present in soil, water, and wastewater samples.

1.1 SCOPE

1.1.1 In carrying out any work assignment issued, the Contractor shall furnish the necessary personnel, services, equipment, materials, and facilities and otherwise do everything necessary for or incidental to the performance of work set forth herein.

1.1.2 Primary services shall include services to perform a Site Assessment/Site Investigation (SA/SI) and a Site Characterization (SC) of the RV Fam Camp Area adjacent to the JP-4 distribution line and a SA/SI of the railroad ROW for the railroad spur which served NAS Fort Worth and Air Force Plant 4 (AFP4). The area of study for the RV Fam Camp Area shall be parallel to the JP-4 distribution line, beginning at Highway 183 and extending north to the Bulk Fuel Storage Area (approximately 3,000 linear feet). The area of study for the railroad ROW shall be within the property boundaries of the ROW which is approximately 40,282 feet in length and typically 75 to 200 feet in width.

1.1.3 Secondary services incidental to these services include topographical and geophysical surveys and sampling of soil, groundwater, and pipeline contents.

1.2 BACKGROUND

1.2.1 Base Background. Not applicable to this Delivery Order (DO).

1.2.2 Site Descriptions. NAS Fort Worth is supplied with jet fuel through a privately owned JP-4 distribution line which comes from Aledo, Texas. The distribution line runs parallel with Highway 183 to the intersection of Roaring Springs. It then cuts across the base's golf course in the vicinity of the RV Fam Camp Area until it gets to Rogner Drive. The line then turns north to parallel Rogner Drive as it approaches the Main Entrance to the base. It crosses the Farmers

Branch Creek at the vicinity of Ascol Drive. According to a blueline print of the Comprehensive Plan of the Liquid Fuel System, dated May 1986, the pipeline owner's responsibility for maintaining this distribution line ceases at a meter box at the vicinity of Ascol Drive. The distribution line continues north until it enters the main base and stops at the Bulk Fuel Storage Area.

Supposedly, sometime in 1990, the City of Fort Worth was performing boring operations in Farmers Branch Creek near the main entrance to the base. They reported strong odors of fuel as they collected their samples. The base reported these odors to the pipeline owner. The pipeline owner supposedly conducted pressure tests and found the distribution line to be tight. Currently, there are no records of the borings nor the pressure tests to confirm these findings. The Air Force Base Conversion Agency (AFBCA) wishes to investigate this area to confirm the presence or absence and nature and extent of contamination. AFBCA has labeled this site on the DD Form 1391 as being the "RV parking area (Fam Camp)."

The railroad ROW has primarily been used for the transportation of materials to AFP 4 for the production of aircraft over a period of 50 years. The railroad ROW has also been used for the transportation of unknown materials to the warehouse area on the base. Materials suspected to have been transported along the railroad line include solvents, metals, paints, oils, greases, fuels, and any other materials that may have been used in operations at the base or AFP 4.

2.0 APPLICABLE DOCUMENTS

2.1 HANDBOOK

The "HQ AFCEE Handbook for the Installation Restoration Program (IRP) Remedial Investigations and Feasibility Studies (RI/FS)," September 1993, hereafter referred to as the "Handbook", provides guidelines for laboratory and field activities and applicable formats for project documents. Additional Guidance is provided by the draft Model Quality Assurance Project Plan. Where there is a conflict in guidance, the Model Quality Assurance Project Plan takes precedence.

2.2 COMPLIANCE DOCUMENTS

The Contractor shall comply with all federal, state, and local regulatory agency requirements and applicable statutes, policies, and regulations, including the most current version of the applicable portions of the documents listed in paragraph 2.2 of the basic contract SOW.

2.3 GUIDANCE DOCUMENTS

The documents listed in paragraph 2.3 of the basic contract SOW are incorporated by reference herein as guidance. More specifically, the Contractor shall utilize the most current and applicable

Model Quality Assurance Project Plan (boilerplate to be provide in magnetic media under separate cover).

2.4 BASE-SPECIFIC DOCUMENTS

The Contractor shall be responsible for obtaining any base-specific documents through the base POC that may assist the Contractor in accomplishing the scope of work. The following base/site-specific documents have been specifically identified as applicable to this SOW.

- a. The Comprehensive Plan of the Liquid Fuel System at NAS Fort Worth, dated May 1986 (blueprint).

3.0 GENERAL REQUIREMENTS

3.1 MEETINGS, CONFERENCES, AND SITE VISITS

3.1.1 Postaward Meeting. After the issuance of this DO, the Contractor shall attend a postaward meeting at the base or other location specified by the Contracting Officer's Representative (COR). The purpose of the meeting shall be to familiarize the Contractor with the work and/or hazardous waste sites addressed under this DO.

3.1.2 Progress Meetings. The Contractor shall attend approximately three progress meetings with the base and the Air Force Center for Environmental Excellence (AFCEE). No more than two Contractor personnel are required to attend each meeting. The meetings shall occur through the completion of this DO.

3.1.3 Design Integration Meetings. Not applicable to this DO.

3.1.4 Public Meetings. Not applicable to this DO.

3.2 SPECIAL NOTIFICATION

3.2.1 Health Risks. The Contractor shall immediately report to the COR, via telephone, any data or results generated during investigations pursuant to this DO that might indicate any potential imminent health risk to contracted or federal personnel, or the public at large. Following this telephone notification, a written notice with supporting documentation shall be prepared and delivered within three (3) working days. Upon request of the Air Force, the Contractor shall provide pertinent raw laboratory data (e.g., chromatograms) within three (3) weeks of the telephone notification.

3.2.2 Change of Contractor Personnel. An organizational chart displaying key personnel involved in the effort and their respective labor categories shall be submitted with the first monthly Status Report. The Contractor shall notify the COR of all professional personnel to work on specific tasks under this DO. The Contractor shall notify the COR of any significant changes

in project personnel, along with the steps that the Contractor is taking to ensure there are no impacts to the schedule or costs associated with individual tasks. The Contractor shall also identify to the COR all subcontractors to be used under this DO prior to work being initiated. The Contractor shall provide information about the qualifications of the subcontractors to the COR prior to utilization. (A001AA)

3.3 LABORATORIES

3.3.1 General. Laboratories used by the Contractor may be subject to on-site audits by AFCEE. All laboratories shall be capable of meeting Data Quality Objectives (DQOs) specified in the approved project-specific Sampling and Analysis Plans (SAPs). The laboratories shall screen for analytes and perform Quality Assurance/Quality Control (QA/QC) requirements as specified in the SAPs. All analyses shall be reported on a dry weight basis to facilitate comparison with the off-site laboratory data. The analytical capabilities of the laboratory shall be sufficient for the methods specified in the SAP, and the laboratory shall have sufficient throughput capacity to handle the necessary analytical load during all field activities.

3.3.2 On-Site Laboratories. Not applicable to this DO.

3.3.3 Preliminary Laboratory Review Packages. For laboratories that have not been previously endorsed by AFCEE, the Contractor shall submit a preliminary laboratory review package to AFCEE/ERC describing the information listed below for each laboratory to be used. This information will facilitate future laboratory review by the government. Prior approval of the laboratory is not a prerequisite to its use. (A035)

- a. Laboratory-derived method detection limits, including data used for the calculations. One data set shall be sent for each applicable method (not each instrument, if more than one instrument is being used per method).
- b. A full set of acceptance criteria for recovery of surrogate standards and spikes, including the data used to make the calculations. One data set shall be sent for each applicable method (not each instrument, if more than one instrument is being used for a particular type of analysis).
- c. Instrument calibration curves for each applicable analytical method.
- d. A copy of the laboratory's Quality Assurance Manual.
- e. Performance evaluation results for the past two years.

3.4 WORKSITE REQUIREMENTS

3.4.1 Safety Requirements. The Contractor shall provide for protecting the lives and health of employees and other persons; preventing damage to property, materials, supplies, and equipment;

and avoiding work interruptions. For these purposes, the Contractor shall comply with Occupational Safety and Health Administration (OSHA) safety and health regulations.

3.4.2 Worksite Maintenance. The worksite shall be maintained as recommended in the Handbook so as to 1) prevent the spread of contamination, 2) provide for the integrity of the samples obtained, and 3) provide for the safety of federal workers, contracted personnel, and/or other individuals in the vicinity of the project areas.

The worksite shall be well marked to prevent inadvertent entry into all work areas. Access to work areas shall be monitored and thoroughly controlled. Standard work zones and access points for hazardous waste operations shall be established and maintained as the site conditions warrant. The Contractor shall, at all times, keep the work area free from accumulation of waste materials. The Contractor shall remove nonessential equipment from the worksite when not in use. The worksite shall be maintained to present an orderly appearance and to maximize work efficiency.

Before completing the work at each sampling site, the Contractor shall remove from the work premises any rubbish, tools, equipment, and materials that are not property of the government. Upon completing the work, the Contractor shall leave the area clean, neat, and orderly and return worksites to the original condition. The Contractor shall also ensure compliance with any federal and state regulations for decontaminating tools, equipment, or other materials as required.

The Contractor shall be responsible for the handling, temporary storage, characterization, permitting, manifesting, transportation, and disposal of all investigation-derived wastes, including drilling fluids and cuttings, excavation material, storage containers, well development and purge water, personal protective equipment and decontamination-related solids and liquids.

3.4.3 Operations Impact Minimization. The Contractor shall mark the field locations of all points of ground penetration during the planning/mobilization phase of the field investigation. The base Point of Contact (POC) shall be consulted to properly position sampling locations (wells, borings, soil gas probes, etc.) with respect to site locations, to minimize the disruption of base activities, and to avoid penetrating underground utilities. Additionally, the Contractor may be required to coordinate with other base personnel to attain these objectives. The Contractor shall be required to coordinate with all applicable base and civilian personnel for access and sampling activities in the railroad ROW. The Contractor shall provide for the detection of underground utilities independent of base Civil Engineering services utilizing geophysical or other techniques. All necessary permits shall be obtained, and necessary coordination shall be completed, prior to commencement of individual sampling operations. Frequent communication and coordination with base and other applicable personnel shall be necessary to accomplish these goals.

3.4.4 Storage. The Contractor shall be responsible for the security of his equipment. Equipment or materials that require storage on base shall be placed at sites as designated by the base POC. The Contractor shall be responsible for security and weatherproofing of any stored material and equipment. Missing or damaged material shall be replaced at no additional cost to the

government. At the completion of the work, all temporary fences and structures that the Contractor used to protect materials and equipment shall be removed from the base. The Contractor shall clean the storage area of all debris and material and perform all repairs as required to return the site to its original condition.

3.4.5 Security. The Contractor is responsible for obtaining and monitoring Contractor security badges for all areas for the duration of this contract. All security badges or passes shall be returned to the base POC upon expiration of the badge, upon completion of the project, or when possession of the badge is no longer necessary (e.g., upon removal of contracted personnel from specific projects). Photography of any kind must be coordinated through the base POC or Base Conversion Agency representative.

3.5 WORK BREAKDOWN STRUCTURE

The Contractor shall prepare proposals, project schedules, and monthly financial reports organized according to the following work breakdown structure (WBS):

5 SITE ASSESSMENT/SITE INVESTIGATION (SA/SI)

- 5.01 SA/SI Scoping
- 5.02 Site Assessment
- 5.03 Soil Borings
- 5.04 Groundwater Monitoring Wells
- 5.05 Sampling and Analysis
- 5.06 Recommendations

10 SITE CHARACTERIZATION (SC)

- 10.01 SC Scoping
- 10.02 Not applicable to this DO
- 10.03 Site Characterization
- 10.04 Not applicable to this DO
- 10.05 Not applicable to this DO
- 10.06 Not applicable to this DO
- 10.07 Not applicable to this DO
- 10.08 Groundwater Monitoring Wells
- 10.09 Sampling and Analysis
- 10.10 Site Work and Utilities

4.0 WORK TASKS

4.1 DELIVERY ORDER SCOPING AND PLAN DEVELOPMENT

4.1.1 Presurvey. The Contractor shall conduct presurveys to enable preliminary scoping of environmental issues. The Contractor shall visit the assigned site(s) and make all preliminary studies of monitoring or sampling locations and accessibility, number of sampling locations, number and type of personnel required, number and type of tests or samples desired, special or modified sampling equipment and procedures required, personal protective equipment required, and type of analytical protocol or procedures to ensure that the survey activities shall comply with applicable regulations, laws, or standards.

4.1.2 Premobilization Survey. The Contractor shall determine, by registered land surveyor, any locations of off-base drilling easements. Prior to performing any off-base fieldwork or drilling any off-base wells, the Contractor shall conduct a survey to determine the closest property line. After wells have been installed, the Contractor shall locate easements from the closest property line and establish permanent easement boundaries. The Contractor shall provide a metes and bounds description and plot plan for each easement site.

4.1.3 Plan Development. The Contractor shall prepare a project/site-specific Work Plan (WP) and a Quality Program Plan (QPP) that includes a Health and Safety Plan (HSP) and a SAP. The SAP shall consist of a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP). In the development of these plans, the Contractor shall make practical use of the Model Quality Assurance Project Plan and previously approved plans. The Model Quality Assurance Project Plan is a boilerplate document available on magnetic media (3.5" diskette) and will be supplied under separate cover or upon request. The CO, AFCEE COR, and base POC shall be notified in writing of any proposed modification or deviation of any activity described in these documents.

4.1.3.1 Quality Program Plans. The Contractor shall develop a QPP which will consist of the following:

4.1.3.1.1 Health and Safety Plan. The Contractor shall prepare and deliver a HSP to comply with Air Force, OSHA, EPA, state, and local health and safety regulations regarding the proposed work effort. The Contractor shall utilize to the fullest extent possible existing corporate HSPs, tailoring them to the current effort. The Contractor shall use EPA guidelines for designating the appropriate levels of protection needed at the study sites. The Contractor shall coordinate the HSP directly with applicable regulatory agencies prior to submittal to AFCEE and provide the COR with evidence of HSP coordination prior to the start of fieldwork. The Contractor shall certify to AFCEE that it has reviewed the approved HSP with each employee and subcontractor's employees prior to the time each employee engages in field activities. In the development of these plans, the Contractor shall make practical use of the Model Quality Assurance Project Plan and previously approved plans. The Model Quality Assurance Project Plan is a boilerplate document available on magnetic media (3.5" diskette) and will be supplied under separate cover or upon request. (A002)

4.1.3.1.2 Sampling and Analysis Plan. The SAP shall consist of addendum's to the previously approved SAP for NAS Fort Worth (provided under separate cover) using the Handbook as guidance. Addendum's shall address both the FSP and the QAPP. In the development of these

plans, the Contractor shall make practical use of the Model Quality Assurance Project Plan and previously approved plans. The Model Quality Assurance Project Plan is a boilerplate document available on magnetic media (3.5" diskette) and will be supplied under separate cover or upon request.. (A003)

4.1.3.2 Work Plans. The Contractor shall deliver a Work Plan for all phases of work specified in this DO to include plans for disposing of the investigative-derived waste. The Contractor shall use the Handbook as Guidance. (A004)

4.1.3.3 Management Action Plan. Not applicable to this DO.

4.1.3.4 Community Relations Plan. Not applicable to this DO.

4.1.3.5 Environmental and Land Use Plan. Not applicable to this DO.

4.2 SITE ASSESSMENT/SITE INVESTIGATION

The Contractor shall conduct a SA/SI to define the environmental setting of NAS Fort Worth, TX, to identify preliminary sites that might potentially be contaminated, and to develop a site assessment of the potential sources of contamination. The Contractor shall be required to travel to NAS Fort Worth, TX, and make all preliminary studies of monitoring or sampling locations and accessibility, number of sampling locations, number and type of personnel required, number and type of tests or samples desired, special or modified sampling equipment and procedures required, personnel protective equipment required, and type of analytical protocol or procedures to ensure that activities shall comply with EPA or state National Pollutant Discharge Elimination System (NPDES) regulations or other laws, regulations, and standards that are applicable.

4.2.1 Site Assessment. The Contractor shall conduct a SA to define the environmental setting of the Fam Camp Area and the railroad ROW (as defined in the scope) and to identify potentially contaminated areas and potential sources of contaminants. The ultimate goals of the SA are to 1) identify all potentially contaminated areas, 2) compile information necessary to develop preliminary site investigation requirements, 3) conduct limited physical investigations, 4) identify areas that require emergency response, and 5) develop a conceptual site model for the Fam Camp Area and the railroad ROW presenting hypotheses regarding the contaminants present, their potential migration pathways, and their potential impact on sensitive receptors. Guidelines for the conceptual site model are given in the Handbook. Sources of information include federal, state, and local agencies, AFP4, base personnel and former employees, aerial photographs, academic institutions, and reports of previous investigations. The Contractor shall document the findings and recommendations in a SA report using the guidance in OSWER directive 9345.0-01 and the outline in the Handbook. All references, personal communications, and so forth shall be cited in an appendix to the report.

4.2.2 Site Investigation. The Contractor shall visit the Fam Camp Area and the railroad ROW to ensure a complete understanding of site conditions, and shall coordinate this visit with the COR.

The Contractor shall visit and inspect the site identified in the SA report and the railroad ROW. The Contractor shall look for evidence of contamination at this site (leaking drums, vegetative stress, leachate seeps, etc.). The Contractor shall observe the physical setting of this site to formulate specific recommendations concerning well and boring placement, use of geophysical techniques, and other aspects of the proposed field investigation. Limited physical investigations shall be conducted to collect environmental data from suspected impacted areas. If no suspected impacted areas exist, limited physical data shall be collected along the railroad ROW to document existing conditions. The Contractor shall document the findings in a SI Report using the outline in the Handbook. The findings of the presurvey shall be used to prepare the work plan and SAP required for the follow-up effort.

4.2.3 Site Assessment/Site Investigation Report. The Contractor shall deliver a report documenting the results of the SA/SI. This report shall include the results of the literature search, describing the environmental setting of the base and identifying potential sources of contamination. The report shall also document the results of all site investigations conducted. (A007)

4.3 SITE CHARACTERIZATION

4.3.1 Site Characterization. The Contractor shall conduct a SC to characterize environmental conditions, define the nature and extent of contamination, and quantitatively estimate the risk to human health and the environment at various sites through the collection of geologic, geophysical, hydrogeological, ecological, chemical, physical, and hydrologic data, and environmental samples; the laboratory analysis of those samples for potential contaminants; the evaluation of the analytical results and field measurements with respect to quality control data; and the interpretation and analysis of validated data. The purpose of data collection, sample collection, and laboratory analysis is to determine whether any contaminants generated from installation activities have entered the environment and pose a risk to human health or the environment. The samples obtained from the SA/SI effort shall be utilized for the SC effort.

The field investigation is used to determine the source of any identified contaminants, the magnitude of contamination relative to Applicable or Relevant and Appropriate Requirements (ARARs), and any naturally occurring or background concentrations for specific compounds. The SC shall comply with the specifications, procedures, and methodologies presented in the approved project-specific SAP.

4.3.1.1 Site Characterization Report. The Contractor shall prepare the Site Characterization Report in accordance with OSWER 9355.3-01, "Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA," October 1988. The reports shall include conceptual site models and results of the baseline risk assessment, and shall reflect regulatory agency comments to the corresponding Site Characterization Summaries (SCSs). (A008)

4.3.1.2 Informal Technical Information Reports (ITIRs)

4.3.1.2.1 Analytical Data ITIR. The Contractor shall submit all analytical data, including QC results and cross-reference tables, in a hard and/or electronic copy ITIR, using the format in Section 3 of the Handbook. (A009)

4.3.1.2.2 Accelerated Remediation Project Definition ITIR. If contamination is discovered, the Contractor shall request CO approval to deliver a Project Definition ITIR on a case by case basis. Prior to preparation of this document, the Contractor shall submit an annotated outline for content and format approval by the AFCEE CO. This document shall contain at a minimum a SCS and all available qualitative and quantitative information necessary to define requirements for site remediation (construction and linear footage of piping associated with storage tanks, volume of contaminated soil, etc.). (A010)

4.3.1.2.3 Site Characterization Summary-ITIR. Guidance for the contents and objectives of a SCS-ITIR may be found in the Handbook. The SCS-ITIRs shall serve as core documents for the SC reports. The Contractor shall submit an annotated outline of each section of the ITIRs, prior to preparation. The Contractor shall prepare the reports as specified in the accepted annotated outlines. The Contractor shall submit newly revised portions of the working copy ITIR in order to make available current site characterization data. A prime objective shall be to incorporate any comments into the report in an ongoing fashion in coordination with the COR and the base POC in order to minimize the volume of comments on the working copy and final submittals. The final summary shall contain all sites included in the effort. The Contractor shall prepare the reports to include the following components: (A011)

- a. Source identification and contaminant delineation
- b. Identification and ranking of appropriate treatability studies for listed sites
- c. Data and interpretations integrating the findings of the current study and all previous SC efforts at the sites
- d. Current iso-concentration plots of contaminants detected at each site, lithographs of each boring showing contaminants detected and relationship to other borings in the site, and cross-sections of the site showing contaminant distribution.

4.3.2 Feasibility Study. Not applicable to this DO.

4.4 REMEDIAL DESIGN. Not applicable to this DO.

4.5 TREATABILITY STUDIES, PILOT TESTS, AND BENCH-SCALE TESTS. Not applicable to this DO.

4.6 SUBTASKS

Subtasks shall include the following:

4.6.1 Conceptual Site Model (CSM). For the Fam Camp Area and the railroad ROW, the Contractor shall use validated data supported by acceptable QA/QC results (as measured against QAPP requirements) and site characterization information to develop or refine, based on newly collected data, the CSM. The model shall define the nature and extent of contamination, the hydrogeologic regime, and the transport and fate of those contaminants. The Handbook provides guidance in completing CSMs. The complexity and detail of the site model shall be consistent with the nature of the site and site problems and the amount of data available. The CSM shall be used in the baseline risk assessment. (A025)

4.6.2 Ecological/Baseline Risk Assessment. For the Fam Camp Area, the Contractor shall use validated data supported by acceptable QA/QC results (as measured against QAPP requirements) and the CSM to estimate numerically the risk posed by site contaminants to public health and the environment. The Handbook provides guidance in completing conceptual risk assessments. The Contractor shall identify all ARARs that were not identified in previous reports for those contaminants detected in environmental samples at each site. The Contractor shall provide the results of the baseline and/or ecological risk assessment in the SC using the Handbook as guidance. (A026)

The Contractor shall identify those sites posing minimal or no threat to human health, welfare, or the environment and for which no further action is appropriate.

4.6.3 Alternatives Development. Not applicable to this DO.

4.6.4 Alternatives Analysis. Not applicable to this DO.

4.6.5 Evaluation of Remedial Systems and Environmental Equipment. Not applicable to this DO.

4.6.6 Administrative Record. Not applicable to this DO.

4.7 OTHER ENVIRONMENTAL ACTIVITIES. Not applicable to this DO.

4.8 MISCELLANEOUS DELIVERABLES

4.8.1 Monthly Financial and Management Reports. The Contractor shall submit financial and management reports utilizing the standardized WBS to describe the status of expenditure of funds correlated with the progress of the work completed. Reports shall provide current status and projected requirements of funds, man-hours, and work completion; indicate the progress of work and the status of the program and assigned tasks; and inform of existing or potential problem areas. (B006, B007, A001AB)

4.8.2 Project Schedules. The Contractor shall deliver a computer-generated network analysis that is a detailed task plan for all WBS tasks for approval by the COR. The Network Analysis (e.g., Gantt, PERT, CPM) shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period of the DO. The Network Analysis shall show both serial and parallel subtasks leading to a deliverable product/report, and shall show early and late start and completion date with float. (B001)

4.8.3 Installation Restoration Program Information Management System (IRPIMS) Data Management. The Contractor shall meet the data deliverable requirements of the IRPIMS. The Contractor shall be responsible for recording field and laboratory data into a computerized format as required by the most current version of the IRPIMS Data Loading Handbook (mailed under separate cover). To perform this task, the Contractor shall use the latest version of the IRPIMS QC Tool, a PC software utility (mailed under separate cover with software manual), to quality check ASCII data files and to check all data files for compliance with requirements in the IRPIMS Data Loading Handbook. The IRPIMS Contractor Data Loading Tool (CDLT) is available on request. This PC software is designed to assist the Contractor in preparing the various ASCII data files.

Individual IRPIMS data files (analytical results, groundwater level data, etc.), including resubmissions, shall be delivered with a transmittal letter by the Contractor to AFCEE in sequence according to a controlled time schedule as identified in the current version of the IRPIMS Data Loading Handbook. The Contractor shall include a copy of the QC Tool error report (i.e., output from the QC Tool) for each IRPIMS file submission. The error report shall be submitted as hard copy with the transmittal letter. (B003)

All Contractor data deliverables shall be sent to:
AFCEE/MSC BLDG 532
Environmental Systems Support Team
ATTN: IRPIMS Data Management
3207 North Road
Brooks AFB, TX 78235-5363

In addition, the Contractor shall provide a copy of the transmittal letter to HSC/PKVCC. This letter shall identify the files included or otherwise omitted (with an appropriate explanation), the government contract and DO number. The Contractor shall be responsible for the accuracy and completeness of all data submitted. All data entered into the IRPIMS data files and submitted by the Contractor shall correspond exactly with the data contained in the original laboratory reports and other documents associated with sampling and laboratory contractual tasks. Each file delivered by the Contractor will be electronically evaluated by AFCEE/MSC for format compliance and data integrity in order to verify acceptance. All files delivered by the Contractor are required to be in compliance with the IRPIMS Data Loading Handbook. Any errors identified by AFCEE/MSC in the submission shall be corrected by the Contractor.

4.8.4 Presentation Materials. The Contractor shall prepare and present briefing packages at meetings coordinated by the Air Force. As part of the presentation materials, the Contractor shall deliver paper copies of all slides and overheads. (B004)

4.8.5 Photo Documentation. The Contractor shall deliver photo documentation as necessary to support other deliverables. Documentation should include photos of sites under investigation, field activities, and sample locations. (A031)

4.8.6 Meeting Minutes. The Contractor shall be responsible for generating meeting minutes documenting all items discussed at the meetings, and shall include a list of meeting attendees. (B005)

5.0 DATA MANAGEMENT

The Contractor shall collect, prepare, publish, and distribute the data in the quantities and types designated on the Contract Data Requirements List (CDRL). The Contractor shall designate a focal point who shall integrate the total data management effort and manage changes, additions, or deletions of data items. In addition, the Contractor shall identify items to be added, recommend revisions or deletion of items already listed on the CDRL as appropriate, and maintain the status of all data deliverables.

6.0 GOVERNMENT-FURNISHED PROPERTY

Provided under separate cover.

7.0 GOVERNMENT POINTS OF CONTACT

AFCEE/ERB
Team Chief (TC)
Mr. Charles Rice
AFCEE/ERB
3207 North Road, Bldg 532
Brooks AFB, TX 78235-5363
Office Phone # (210) 536-6452
Fax Phone # (210) 536-3609

Base POC
AFBCA Site Manager
Mr. Olen Long, P.E.
AFBCA/OL-H
6550 White Settlement Road
Fort Worth, Texas 76114-3520
Office Phone # (817) 731-8284
Fax Phone # (817) 731-8137

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APPENDIX B

HEALTH AND SAFETY PLAN ADDENDUM

SITE ASSESSMENT AND INVESTIGATION
OF THE
RAILROAD RIGHT-OF-WAY

NAVAL AIR STATION (NAS) FORT WORTH
JOINT RESERVE BASE
CARSWELL FIELD, TEXAS

Contract No, F41624-95-D-8002
Delivery Order 0003
Modification 001

September 1997

Prepared for:

Department of the Air Force
Headquarters (HQ) Human Systems Center (HSC) PKVCC
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1.0 INTRODUCTION

This section describes an addendum to the Health and Safety Plan (HSP) for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (FAM CAMP) Area at the Naval Air Station (NAS) Fort Worth. The additional work will take place as part of the Railroad Right-Of-Way (RRRW) project. This addendum provides procedures to assist in reducing the potential for injury of workers present at the site. The existing HSP (TEC, 1996c) will serve as the guidance document that identifies, evaluates, controls, and attempts to reduce health and safety hazards.

1.1 PROJECT OBJECTIVES AND FIELD ACTIVITIES

The project objectives and field activities are described in the existing HSP (TEC, 1996c). The area of investigation for this SA/SI is defined in Section 1.3 of this RRRW Work Plan Addendum. Field activities will remain the same with the exception that soil boreholes will not be installed nor will groundwater sampling be conducted. The soil sampling events that will occur include direct-push sampling and a soil gas survey.

1.2 PROJECT ORGANIZATION AND RESPONSIBILITY

Project personnel and their responsibilities are outlined in Section 2.0 of the HSP (TEC, 1996c). This section provides an organizational structure for TEC's Health and Safety Program including a description of TEC's hazardous waste health and safety training program. Principle project personnel and corresponding phone numbers are provided in this section. Guidelines for the determination of necessary prerequisites of those subcontractors hired by TEC have been established and are described in the HSP as well.

Intentionally blank.

2.0 GENERAL HEALTH AND SAFETY RISKS

Section 3.0 of the HSP (TEC, 1996c) describes procedures that will be taken each day in order to ensure safe working conditions. Personal protective equipment (PPE) is discussed and will be on site and available for use at all times when workers are present. For this project, modified level D PPE is expected to be sufficient protection from any potential contamination.

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3.0 SITE CONTROL

Site control responsibilities have been established in the existing HSP in Section 5.0. This section explains guidelines for proper decontamination procedures, potential spill sources and containment procedures, and site access restrictions.

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4.0 EMERGENCY RESPONSE PLAN

In case any type of emergency situation arises at the RRRW site, team members will refer to Section 6.0 in the existing HSP (TEC, 1996c) for proper emergency response procedures. Table 6-1 provides a listing of pertinent phone numbers of emergency contacts.

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5.0 HEALTH AND SAFETY PLAN QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) procedures are established in order to ensure healthy and safe working conditions. These procedures are explained in Section 7.0 in the existing HSP (TEC, 1996c).

Intentionally blank.

6.0 REFERENCES

The Environmental Company, Inc. 1996c. *Health and Safety Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas.*

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APPENDIX C

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FIELD SAMPLING PLAN ADDENDUM
SITE ASSESSMENT AND INVESTIGATION
OF THE
RAIL ROAD RIGHT-OF-WAY
NAVAL AIR STATION (NAS) FORT WORTH
JOINT RESERVE BASE (JRB)
CARSWELL FIELD, TEXAS

Contract No. F41624-95-D-8002
Delivery Order 0003
Modification 01

September 1997

Prepared for:

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Headquarters (HQ) Human Systems Center (HSC) PKVCC
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1.0 INTRODUCTION

The Field Sampling Plan (FSP) presents, in specific terms, the requirements and procedures for conducting field operations and investigations. This project-specific document has been prepared as an addendum to the initial *Field Sampling Plan for Site Assessment, Investigation and Characterization of the Recreational Vehicle (RV) Family Camping (FAM CAMP) Area* (TEC 1996c) to ensure that the data quality objectives specified for this project are met, the field sampling protocols are documented and reviewed in a consistent manner, and the data collected are scientifically valid and defensible. This addendum includes only those additions to or modifications of the initial FSP (TEC 1996d) which are specific to the Railroad Right-of-Way (RRRW). The requirements and procedures identified in the initial FSP (TEC 1996d) are relevant to this RRRW project and are included by reference. This site-specific FSP addendum in conjunction with the initial FSP (TEC 1996d) and the Air Force Center for Environmental Excellence (AFCEE) Quality Assurance Project Plan (QAPP), shall constitute, by definition, an AFCEE Sampling and Analysis Plan (SAP).

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2.0 PROJECT BACKGROUND

This FSP Addendum for NAS Fort Worth (AFCEE Contract No. F41624-95-D-8002/0003-01) has been prepared according to the Statement of Work (SOW) Delivery Order 0003, Modification 01. Delivery Order 0003/01 requests environmental services for the site assessment and site investigation (SA/SI) of the Railroad Right-of-Way (RRRW) which extends south from Air Force Plant 4 (AFP4) to a rail line along the Vickery Boulevard

A discussion of the project background including descriptions of:

- The Air Force Installation Restoration Program;
- Project Site Description;
- Purpose and Scope; and
- Project Site Contamination History

are provided in the initial FSP (TEC 1996d) with additional site-specific details provided in the Work Plan Addendum for the RRRW project.

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3.0 PROJECT DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) are evaluation tools for sampling and analysis activities. They specify data type, quality, quantity, and uses needed to make decisions and serve as the basis for designing data collection activities. DQOs are site-specific, developed during the planning phase, and are documented in the QAPP. They are expressed in terms of precision, accuracy, completeness, representativeness, and comparability. Data collected during the investigation of the RRRW will be used for the following purposes:

- Health and safety monitoring;
- Field screening to assess the potential presence and source of organic contaminants and identify those samples requiring further analysis; and
- Site investigation to determine the presence or absence of contamination.

The DQOs identified in the initial FSP (TEC 1996d) are relevant and directly applicable to the RRRW project.

3.1 SAMPLE ANALYSIS SUMMARY

A summary of the required number of samples, types of samples, and types of analytical analyses is presented in Table 3-1. Soil samples will be obtained from direct push sampling locations along the RRRW.

3.2 FIELD ACTIVITIES

The project objectives of Delivery Order No. 0003/001 will be to conduct SA/SI of the RRRW area to confirm the presence or absence of contamination. As indicated in the initial FSP (1996d), the field activities included in this project will not be used to define the nature and extent of contamination if determined to be present.

As part of the initial project scoping effort, TEC conducted an initial SA field survey of the RRRW, reviewed available records and conducted background interviews. The objective of this initial survey was to identify areas of concern and identify areas that may require emergency response. As part of the survey, TEC personnel performed site walks to observe areas of discolored soils, stressed vegetation, and other indicators of potential contamination that may be encountered. The results of this survey are provided in Section 2.0 of the WP Addendum.

Following approval of the planning documents, TEC will complete the RRRW Site Assessment (SA). The SA will consist of completing comprehensive soil gas surveys along the RRRW at four areas of concern identified during the initial survey. A total of 50 passive soil gas monitors will be placed directly along the centerline of the rail line at intervals of approximately 100 feet. Soil gas analyses will target a broad range of VOCs and SVOCs. The results of the soil gas survey will be used to identify the potential presence of contamination.

Table 3-1 Sample Analysis Summary

SAMPLE ELEMENT	No. of Samples	Number of Analyses						
		VOCs	SVOCs	Inorganics	TPH	Pest./PCBs	TCLP Metals/ Organics	
RRRW Direct Push Soil Samples				6010/7470				
Field Samples	12	12	12	12	12	12	12	12
Duplicate Samples	2	2	2	2	2	2	2	2
Trip Blanks	2	2						
Ambient Blanks	2	2						
Equipment Blanks	1	1	1	1	1	1	1	1
Investigation Derived Waste								
Decontamination Water	1	1	1	1	1	1	1	1
Soil	1							
TOTALS	21	21	16	16	17	15	1	1

Following a review of SA field data, TEC will initiate the SI field investigation. The purpose of SI data collection, sample collection, and laboratory analysis will be to confirm the presence or absence of contamination in areas of concern. Twelve direct push subsurface soil sample locations will be identified based on soil gas survey results and other areas deemed appropriate and necessary. Soil samples will be collected continuously to the encountered groundwater table, refusal or, if there is no indication of contamination, a depth not to exceed 20 feet below ground surface

During direct push effort, soil samples will be collected continuously using a split-spoon sampler. Continuous soil sampling will allow TEC field personnel to evaluate the vertical distribution of contaminants, if encountered. Vertical profiling of contamination will be performed by screening soil samples in the field with an HNU Systems Photo Ionizing Detector (PID).

The results of field headspace screening will also be used to select one to two soil samples from each boring for laboratory analysis. All soil samples will be analyzed for inorganic metals, volatile organic compound (VOCs), semivolatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (Pest/PCBs) and total petroleum hydrocarbons (TPHs). Following sample collection, sampling holes will be properly abandoned according to the procedures described in Section 5.0.

Table 3-2 summarizes field activities that will be initiated in the RRRW study area.

Table 3-2 Field Activities Summary

Phase	Activity	Number of Tests
SA	Soil gas survey	50
SI	Direct push soil sampling	12

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4.0 PROJECT ORGANIZATION AND RESPONSIBILITY

The TEC project team consists of highly qualified professionals with expertise in project management, QA/QC, environmental engineering, field investigations, and other technical/engineering skills. Table 4-1 presents point-of-contact information for key project personnel. Responsibilities for key TEC project team and AFCEE/AFBCA POCs are described in the initial FSP (TEC 1996d).

Table 4-1. Key Personnel Point-of-Contact Listing

Ms. Jill Benefield AFCEE Contracting Officer	HSC/PKVCC 3207 North Road Brooks AFB, TX 78235-5353 (210) 536-4410 (210) 536-6003 (FAX)
Mr. Charles Rice AFCEE COR/TC	AFCEE/ERB 3207 North Road, Bldg. 532 Brooks AFB, TX 78235-5363 (210) 536-6452 (210) 536-3609 (FAX)
Ms. Randi Audello AFBCA Contracting Officer	AFBCA/OL-H (Contracting Officer) 6550 White Settlement Road Fort Worth, TX 76114-3520 (817) 731-8284 (817) 731-8137 (FAX)
Mr. Olen Long, P.E. AFBCA Site Manager/Base POC	AFBCA/OL-H 6550 White Settlement Road Fort Worth, TX 76114-8137 (817) 731-8284 (817) 731-8137 (FAX)
Mr. Jack E. Wilson, P.E. TEC Project Director	The Environmental Company, Inc. 1230 Cedars Court, Suite 100 Post Office Box 5127 Charlottesville, VA 22905 (804) 295-4446 (804) 295-5535 (FAX) JEWILSON@tecinc.com (electronic)
Mr. Bob Duffner, P.E. TEC Project Manager	The Environmental Company, Inc. 710 NW Juniper Street, Suite 208 Issaquah, WA 98027 (425) 557-7899 (425) 557-7878 (FAX) RMDUFFNER@tecinc.com (electronic)

4.1 SUBCONTRACTORS

A number of project subcontractors will assist TEC in completing the SA/SI of the RRRW. Project subcontractors will include the following:

- Drillers (Direct Push Sampling);
- Land surveyors;
- Utility locator;
- Off-site analytical laboratory; and
- Investigative-derived waste transporter/disposal contractors.

Prior to initiating field activities, TEC will prepare technical SOWs for project subcontractors so that SA/SI activities can be effectively coordinated. Responsibilities for each of the project team subcontractors are below.

4.1.1 Drilling Services

As part of the SI field investigation, TEC will retain a qualified subcontractor to collect subsurface soil samples using direct push techniques from 8 locations. During direct push effort, the subcontractor will collect soil samples continuously from the ground surface using a 2-inch outside diameter (OD) split-spoon sampler. Direct push sampling will continue at each location to encountered groundwater table, refusal, or 20 feet below ground surface, whichever occurs first. The driller will observe all health and safety and equipment decontamination procedures that are described in the HSP Addendum and this FSP Addendum.

4.1.2 Surveying Services

Land surveying services will be performed by Baird, Hampton, & Brown, Inc. (BHB) of Fort Worth, Texas. A registered land surveyor (RLS) from BHB will locate all soil gas and direct push sample locations. This information will be plotted on updated site maps and project plans. All surveying will be performed according to general requirements described in the AFCEE Handbook and Section 5.11 of the FSP (TEC 1996d). Mr. Daniel Joslin of BHB will oversee surveying activities at NAS Fort Worth.

4.1.3 Analytical Laboratory Services

TEC has selected Inchcape Testing Services (Inchcape) of Richardson, Texas to perform analytical laboratory services. As an AFCEE-qualified laboratory, Inchcape will perform laboratory analyses and QA/QC procedures according to AFCEE and IRPIMS program protocols.

TEC field personnel will submit soil samples to Inchcape for laboratory analyses of VOCs (Method 8240), SVOCs (Method 8270), pesticides and polychlorinated biphenyls (Pest/PCBs) (Method 8080), inorganic metals (Methods 6010 and 7000 series), and TPH (Method 418.5).

A detailed discussion of laboratory procedures, QA/QC, calibration methods and protocols, and data validation and auditing is presented in the QAPP.

4.1.4 Utility Locator

During the SA/SI, the location of all underground utilities in the direct push sampling areas will be identified. TEC will use base personnel and existing site plans. Before direct push sampling, a qualified subcontractor will locate and identify buried site utilities.

4.1.5 Investigative-Derived Waste Transporter

If significant quantities of investigative-derived waste (IDW) (i.e. contaminated soil and groundwater) are generated during the SI field identification, TEC will retain a qualified disposal contractor to remove IDW from the site for disposal at a state-licensed facility. TEC has identified several local area firms who have the capability of handling nonhazardous and hazardous waste. IDW handling procedures are described in Section 5.13 of the FSP (TEC 1996d)

4.1.6 Site Restoration

Because of the limited scope of this investigation and the proposed use of direct push sampling techniques site restoration is not anticipated. However, if appropriate, TEC will retain a qualified subcontractor to restore field sites to pre-field investigation conditions. Site restoration, if required, will be coordinated with the AFBCA Site Manager/Base POC to ensure that restoration is conducted according to facility requirements.

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5.0 FIELD OPERATIONS

TEC will perform or oversee the following field activities:

- Site reconnaissance, preparation, and restoration;
- Installation of passive soil gas screening modules directly above the centerline of the rail lines in the RRRW to evaluate subsurface soils for the presence or absence of selected VOCs and SVOCs;
- Collection of soil samples using direct push sampling techniques; and
- Laboratory analysis of 12 representative soil samples for selected analytical constituents.

Associated field activities include lithologic logging and field headspace screening of soil samples, hole abandonment, equipment calibration, decontamination, maintenance, and handling IDW. Detailed procedures to be used while conducting these field activities are described in the FSP (TEC 1996d). Procedures described in the Section 5.0 of FSP (TEC 1996d) which are relevant to the RRRW project include those provided for:

- Geologic Standards;
- Site Reconnaissance, Preparation, And Restoration Procedures;
- Soil Gas Surveys;
- Lithology sampling, logging and abandonment;
- Surveying;
- Equipment Decontamination; and
- Waste Handling.

The soil gas survey will be performed using those procedures described in the FSP (TEC 1996d). Surveys will be performed over four areas of concern as described in the WP Addendum. The soil gas collection devices (sorbent), as described in the FSP (TEC 1996d), will be installed along the center of the rail lines. The soil gas analyses will target a broad range of VOCs and SVOCs.

Lithology sampling, logging and abandonment will also be performed as described in the FSP (TEC 1996d) with the following exceptions. Samples will be collected using direct push sampling techniques, as opposed to borehole drilling as indicated in the FSP (TEC 1996d).

Unconsolidated samples for lithologic description shall be obtained continuously using a 2-inch OD split-spoon sampler driven by direct push techniques. Continuous split-spoon soil sampling will be performed so that the vertical distribution of contaminants, if encountered, can be accurately profiled using field headspace screening methods.

Borehole abandonment will be completed in accordance with Texas Water Well Drillers Rules (30 Texas Administrative Code Chapter 338.48-338.50) and AFCEE requirements. Each hole will be plugged using granular bentonite as opposed to the grouting methods described in the FSP (1996d). The holes will be initially filled with granular chips immediately after sample collection. Bentonite with in each hole will be

6.0 ENVIRONMENTAL SAMPLING

Methods and procedures that TEC field personnel will sample collection, sample handling, sample custody, and field quality control samples described in Section 6.0 of the FSP (1996d). Additions and/or modification to those procedures are described below.

6.1 SAMPLING PROCEDURES

Sampling procedures described in the FSP (1996d) which are relevant to the RRRW project includes subsurface soil sampling. Soil samples shall be collected based on odors, discoloration, organic vapor meter readings, and other field observations. Based on the results of these screening parameters, one to two soil samples will be collected from each hole and submitted to the laboratory for analysis of selected analytical constituents. These analytical constituents are specified in Table 3-1. If split-spoon sample recovery is insufficient to meet minimum sample volume requirements, the sample will be recollected at the same interval in an adjacent hole. If field headspace screening results do not elicit PID readings above background, TEC field personnel will collect soil samples immediately below the ground surface and/or directly above the encountered groundwater table.

6.1.1 Field Headspace Screening

Following collection of split-spoon soil samples, headspace screening will be performed in the field using a portable PID on the remaining portions of samples selected on the basis of initial screening. Soil samples collected from the borings will be field screened by filling a precleaned glass jar approximately half full with a soil sample, quickly covering the jar top with aluminum foil, and securing the foil seal with the screw cap. The soil samples will then be vigorously shaken for approximately 30 seconds and allowed to equilibrate a minimum of 15 minutes and a maximum of 2 hours (120 minutes) to a temperature of approximately 25 °C. The jar headspace will then be screened for organic vapors by puncturing the foil seal with the PID probe, inserting the tip to a distance approximately one-half the headspace depth, and recording the highest reading displayed on the instrument meter. The results of field headspace screening will be used to select samples from each hole for laboratory analysis of selected analytical constituents (see Table 3-1).

All information regarding field headspace screening results, soil texture, density, consistency, and color shall be recorded on soil boring logs.

6.1.2 Direct Push Sampling

Direct push sampling involves advancing a sampling probe from by direct hydraulic pressure or by using a slide or rotary hammer. Samples will be collected continuously. The samples are collected in brass/stainless steel sleeves. The sleeve shall be capped with Teflon™ tape and end caps. The ends of the capped sleeve shall then also be wrapped with Teflon™ tape. Care shall be taken not to touch the ends of the sleeves prior to capping. Custody seals shall be placed across the capped ends of the sleeve. Once the container has been filled, the appropriate information shall be recorded in the field logbook.

6.1.3 Soil Gas Sampling

TEC field personnel will conduct a soil gas survey during the SI to identify areas of potential soil contamination along the RRRW. Passive soil gas monitors will be placed directly above the centerline of the rail line at 100-foot intervals within each of four areas of concern as identified in the WP Addendum. Procedures to implement the soil gas survey are discussed in Section 5.4 of the FSP (1996d).

6.2 SAMPLE HANDLING

6.2.1 Sample Containers

Sample containers will be purchased precleaned and treated according to EPA specifications for the methods. If sampling containers are reused, they will be decontaminated between uses by EPA-recommended procedures (i.e., EPA 540/R-93/051). Containers shall be stored in clean areas to prevent exposure to fuels, solvents, and other contaminants. Amber glass bottles will be used where glass containers are specified in Table 6-1.

6.2.2 Sample Volumes, Container Types, and Preservation Requirements

Sample volumes, container types, and preservation requirements for the analytical methods performed on AFCEE samples are listed in Table 6-1.

Sample holding time tracking begins with the collection of samples and continues until the analysis is complete. Holding times for methods required routinely for AFCEE work are specified in Table 6-1. **Samples not preserved or analyzed in accordance with these requirements shall be resampled and analyzed, at no additional cost to AFCEE.**

6.2.3 Sample Identification

Samples collected during the SA/SI field investigations will be identified using a coding system to identify each sample collected during the field investigation. This coding system will allow quick and easy retrieval of information concerning a particular sample. Field identifiers will appear on sample labels, COC forms, field sampling forms, and in any field log books used by TEC site geologists. Because samples collected from this project will be put into the IRPIMS database, IRPIMS-compatible identification numbers will be required.

A list of predetermined field identifiers, numbers, locations, dates, and times will be maintained by TEC and made available to Air Force project personnel upon request. Each field identifier will be composed of several components which are described below:

Site ID: A two-letter designation (RR) will be used to identify the RRRW area.

Sample Matrix: A two-letter designation will be used to identify the specific type of sample being taken. The following IRPIMS sampling matrix will be used:

LF	Floating Product	WW	Wastewater
WG	Groundwater	WQ	Water QC Matrix
SO	Soil	GS	Soil Gas

Sample Location: A unique identifier will be used to identify sample station location. This designation may include direct push (DP02), soil gas survey station (SG04), or field QC sample which can be an ambient blank (AB), equipment blank (EB), or trip blank (TB).

Sample Number: A two-digit designation will identify the sequential number of the sample collected at a particular station (e.g., 02 would indicate the second sample collected).

Examples of field identifiers include the following:

- RR-SO-DP02-01 - Railroad Right-of Way site - the first or uppermost soil sample collected from direct push sampling location DP02.
- RR-GS-SG07-01 - Railroad Right-of Way site - the seventh soil gas survey station.
- RR-WQ-EB-01 - The first water quality equipment blank sample collected from the Railroad Right-of Way site.

6.3 SAMPLE CUSTODY

Procedures to ensure the custody and integrity of the samples will conform to those described in the FSP (1996d).

6.4 FIELD QUALITY CONTROL SAMPLES

During each sampling effort, a number of field QC samples will be collected and submitted for laboratory analyses. The number of QC samples are presented in Table 3-1. QC samples that will be collected include:

- Ambient Blank
- Equipment Blank
- Trip Blank
- Field Duplicates

Descriptions of these field quality control samples are provided in the FSP (1996d).

Table 6-1. Requirements for Containers, Preservation Techniques, Sample Volumes, and Holding Times

Name	Analytical Methods	Cntr ^a	Preserv. ^{b,c}	Minimum Sample Amount	Maximum Holding Time
Hydrogen ion (pH) (W, S)	SW9040/ SW9045	P, G	None required	N/A	Analyze immediately
Conductance	SW9050	P, G	None required	N/A	Analyze immediately
Temperature	E170.1	P, G	None required	N/A	Analyze immediately
Turbidity	E180.1	P, G	4°C	N/A	48 hours
Mercury	SW7470 SW7471	P, G, T	HNO ₃ to pH < 2, 4°C	500 mL or 8 ounces	28 days (water and soil)
Metals (except chromium (VI) and mercury)	SW6010A SW6020 and SW-846 AA methods	P, G, T	HNO ₃ to pH < 2, 4°C	500 mL or 8 ounces	180 days (water and soil)
Total petroleum hydrocarbons (TPH)	SW418.1	G, amber, T	4°C	1 liter or 8 ounces	7 days until extraction and 40 days after extraction (water); 14 days until extraction and 40 days after extraction (soil)
Volatile aromatics	SW8020A	G, Teflon-lined septum, T	4°C, HCl to pH < 2, 0.008% Na ₂ S ₂ O ₃	2 x 40 mL or 4 ounces	14 days (water and soil); 7 days if unpreserved by acid
Organochlorine pesticides and polychlorinated biphenyls (PCBs)	SW8080A, SW8081,	G, Teflon-lined cap, T	4°C, pH 5-9	1 liter or 8 ounces	7 days until extraction and 40 days after extraction (water); 14 days until extraction and 40 days after extraction (soil)

Name	Analytical Methods	Cntr ^a	Preserv. ^{b,c}	Minimum Sample Amount	Maximum Holding Time
Volatile organics	SW8240B, SW8010B, SW8260A	G, Teflon-lined septum, T	4°C, 0.008% Na ₂ S ₂ O ₃ (HCl to pH < 2 for volatile aromatics by SW8240 and SW8260) ^c	2 x 40 m L or 4 ounces	14 days (water and soil), 7 days if unpreserved by acid
Semivolatile organics	SW8270B	G, Teflon-lined cap, T	4°C, 0.008% Na ₂ S ₂ O ₃	1 liter or 8 ounces	7 days until extraction and 40 days after extraction (water); 14 days until extraction and 40 days after extraction (soil)

- a. Polyethylene (P); glass (G); brass sleeves in the sample barrel, sometimes called California brass (T).
- b. No pH adjustment for soil.
- c. Preservation with 0.008 percent Na₂S₂O₃ is only required when residual chlorine is present.

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7.0 FIELD MEASUREMENTS

Field measurements, equipment calibration requirements, and maintenance procedures to be used during the RRRW project are described in the Section 7.0 of the FSP (1996d). All field measurements will follow procedures in the AFCEE Handbook (Air Force, 1993) and equipment operating manuals. Additions and/or modification to those procedures are described below.

7.1 PARAMETERS

Field measurements that will be performed by TEC personnel during RRRW project which are described in the FSP (TEC 1996d) include organic vapor analysis. Organic vapor analysis procedures as described in the FSP (TEC 1996d) will be followed.

7.2 EQUIPMENT CALIBRATION AND QUALITY CONTROL

Field equipment to be used in the RRRW project will include a photo ionizing detector (PID). The PID will be calibrated according to manufacturer's instrument manuals and the AFCEE IRP Handbook (1993).

Calibration frequencies and calibration procedures for the PID are described in the FSP (TEC 1996d).

7.2.1 Field Quality Assurance/Quality Control Program

To ensure that sampling and monitoring activities will meet DQOs, QC checks will be implemented for PID measurements in the field. All QC control check information will be recorded in project-specific field log books and/or forms. Control parameters, control units, and corrective actions for the field investigation are described in the FSP (TEC 1996d).

7.3 EQUIPMENT MAINTENANCE AND DECONTAMINATION

7.3.1 Equipment Maintenance

Preventative maintenance procedures will be established so that field instrumentation can perform their intended functions. Field instrument maintenance records (Appendix L) will be kept in individual instrument files assigned to each individual instrument.

7.3.2 Maintenance Schedules

Preventative maintenance for field equipment will be performed by manufacturers and TEC field personnel. Maintenance routinely precedes each sampling event. However, some field instrumentation will require scheduled and periodic maintenance and calibration. More extensive maintenance will be performed according to the manufacturer's instructions on the basis of use. To minimize the occurrence of instrument failure or malfunction, preventative maintenance will be scheduled. Examples of the preventative maintenance procedures and schedules for field instruments are described below.

Photo Ionizing Detector (HNU DL-101). Field maintenance procedures are limited to keeping the HNU probe tip and exterior shell clean and the battery charged.

Office maintenance includes cleaning the ultraviolet (UV) lamp window with appropriate lens paper, charging the battery overnight, and wiping the exterior of the unit with a damp cloth and mild detergent. At least one backup UV lamp shall be kept in stock along with lamp filters. For continuous trouble-free operation of the HNU PID, annual factory maintenance will be scheduled.

7.3.3 Equipment Decontamination

Decontamination procedures for field and sampling equipment are discussed in detail in Section 5.12 of the FSP (TEC 1996d). TEC will track decontamination of field equipment with an Equipment Decontamination Log Sheet (Appendix M).

7.4 FIELD MONITORING MEASUREMENTS

Field monitoring measurements will be limited to those taken from the PID meter. Readings will be obtained directly from the meter in parts per million.

7.5 FIELD PERFORMANCE AND SYSTEM AUDITS

Field performance and system audits are not scheduled for the RRRW project.

9.0 SITE MANAGEMENT

As indicated in Section 4.0, Mr. Charles Rice will serve as the AFCEE COR while Mr. Olen Long, P.E., will be the AFBCA POC. The following support activities will be provided by AFBCA:

- Issuing digging or appropriate permits before initiating intrusive activities;
- Assisting TEC with obtaining existing engineering plans, drawings, diagrams, aerial photographs, and digitized map files, to facilitate the investigation;
- Arranging for personnel identification badges, vehicle passes, or entry permits;
- Arranging for staging areas for storing equipment and supplies, and providing a large supply of potable water;
- Providing the necessary keys to locks;
- Providing a secure storage area; and
- Providing field office space, as available.

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10.0 VARIANCES

TEC may conclude that a particular field procedure will not provide the required results because of site conditions. If so, the TEC Project Manager will notify the AFCEE TC, Mr. Charles Rice, in writing of the situation and the proposed deviation needed to circumvent the problem and obtain useful data. TEC will not proceed until approval is obtained either verbally or in writing from Mr. Rice or his designee. Verbal approvals will be confirmed in writing and placed in the project file.

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11.0 REFERENCES

Headquarters (HQ) Air Force Center for Environmental Excellence (AFCEE) *Handbook for the Installation Restoration Program (IRP) Remedial Investigations and Feasibility Studies (RI/FS)* September 1993.

The Environmental Company, Inc. 1996d. *Field Sampling and Analysis Plan for the Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (Fam Camp) Area for Naval Air Station (NAS) Fort Worth, Joint Reserve Base, Carswell Field, Texas.*

U.S. EPA. 1993. *Data Quality Objectives for the Superfund.* PB94-963203.

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APPENDIX D

QUALITY ASSURANCE PROJECT PLAN ADDENDUM

**SITE ASSESSMENT AND INVESTIGATION
OF THE
RAILROAD RIGHT-OF-WAY**

**NAVAL AIR STATION (NAS) FORT WORTH
JOINT RESERVE BASE
CARSWELL FIELD, TEXAS**

Contract No, F41624-95-D-8002
Delivery Order 0003
Modification 001

September 1997

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1.0 INTRODUCTION

This section describes an addendum to the Quality Assurance Project Plan for Site Assessment, Investigation, and Characterization of the Recreational Vehicle (RV) Family Camping (FAM CAMP) Area at the Naval Air Station (NAS) Fort Worth. The additional work will take place as part of the railroad right-of-way project. This addendum presents in specific terms, policies, and QA/QC activities under which the laboratory analyses and data validation process will function for this project. These procedures and processes are designed to achieve the project Data Quality Objectives (DQOs) as specified by the project team.

The existing QAPP will direct the analyses required for this project. The only additional analysis not originally listed in the QAPP is for total petroleum hydrocarbons (TPH). The specific analyses for this portion of the project are listed below:

Parameter	EPA SW-846 Method
Volatile Organic Compounds	8260
Semi-volatile Organic Compounds	8270
Metals	6010/7470
Pesticides/PCBs	8080
Total Petroleum Hydrocarbons	EPA 418.1

The existing QAPP dictates the analyses, QA/QC requirements, and data review process for all of the above analyses except Total Petroleum Hydrocarbons (TPH) by EPA 418.1. The requirements for TPH analysis are described in Table C-1.

1.1 PROJECT PURPOSE AND SCOPE

The purpose and scope of this project is discussed in Section 2.2 of the Field Sampling Plan (TEC, 1996d). A project background summary is discussed in Section 2.2 and 2.3 of the Work Plan (TEC, 1996a).

1.2 PROJECT ORGANIZATION AND RESPONSIBILITY

Section 4.0 of the Field Sampling Plan (TEC, 1996d) describes the project organization and responsibilities which includes a description of all key team members and their responsibilities.

1.3 DATA QUALITY OBJECTIVES

The intended use of the data acquired during this project and a discussion of the DQOs are described in Section 4.1 of the existing project QAPP (TEC, 1996e). The data will be definitive data.

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2.0 VARIANCES TO THE EXISTING QAPP

The only current variance to the existing QAPP is the addition of TPH analysis. Table 2-1 contains the necessary elements for sample analysis, data review, and data qualification.

Table 2-1. Summary of Calibration and Internal Quality Control Procedures for Total Petroleum Hydrocarbon Analyses using Method 418.1.

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action ^a	Flagging Criteria ^b
Five-point calibration for TPH	Initial calibration prior to sample analysis	Coefficient of Correlation >0.995	Correct problem then repeat initial calibration	Apply R to all results for specific analyte(s) for all samples associated with the calibration
Initial calibration verification	After initial calibration and before sample analysis	Analyzed result within 90 - 110% of the true value concentration	Correct problem, then repeat initial calibration	Apply R to all results for specific analyte(s) for all samples associated with the calibration
Demonstrate ability to generate acceptable accuracy and precision using four replicate analyses of a QC check sample.	Once per analyst	QC acceptance criteria	Recalculate results; locate and fix problem with system and then rerun demonstration for those analytes that did not meet criteria	Apply R to all results for all samples analyzed by the analyst.
Method Blank	One per analytical batch	No TPH detected > PQL	Correct problem then reprep and analyze method blank and all samples in the affected AFCEE analytical batch	Apply B to all results for specific analyte(s) for all samples in the associated batch

^a All corrective actions associated with AFCEE project work shall be documented and all records shall be maintained by the laboratory.

^b Flagging criteria are applied when acceptance criteria were not met and corrective actions were not successful or corrective actions were not performed.

Table 2-1. Summary of Calibration and Internal Quality Control Procedures for Total Petroleum Hydrocarbon Analyses using Method 418.1 (cont.).

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action ^a	Flagging Criteria ^b
LCS for TPH	One LCS per analytical batch	QC acceptance criteria	Correct problem then reprep and analyze the LCS and all samples in the affected AFCEE analytical batch	For all samples in the associated batch: if the $LCS \%R > UCL$, apply to all positive results if the $LCS \%R < LCL$, apply J to all positive results, apply R to all non-detects
MS/MSD	One MS/MSD per every 20 Air Force project samples per matrix	QC acceptance criteria	None	For specific analyte(s) in all samples collected from the same style matrix as the parent, apply M if: (1) $\%R$ for MS or MSD $> UCL$ or (2) $\%R$ for MS or MSD $< LCL$ or (3) MS/MSD RPD $> CL$
MDL study	Once per year	Detection Limits established shall be $<$ the PQL	None	Apply R to all results for the specific analyte(s) in all samples analyzed
Results reported between MDL and PQL	None	None	None	Apply F to all results between MDL and PQL

^a All corrective actions associated with AFCEE project work shall be documented and all records shall be maintained by the laboratory.

^b Flagging criteria are applied when acceptance criteria were not met and corrective actions were not successful or corrective actions were not performed.

Table 2-1. Summary of Calibration and Internal Quality Control Procedures for Total Petroleum Hydrocarbon Analyses using Method 418.1 (cont.).

PQLs - Water (RL)	PQLs - Soil (RL)	Accuracy (% R)	Water/Soil	Precision Water (%RPD)	Precision Soil (%RPD)
100 mg/L	500 mg/Kg	30 - 150	+/-	50	+/- 50

333 444

3.0 DATA QUALITY OBJECTIVES

3.1 EPA METHOD 418.1 MODIFIED

This method is used to measure freon extractable petroleum hydrocarbons. This analysis will only quantify not identify the petroleum hydrocarbons.

3.2 SAMPLING/PRESERVATION REQUIREMENTS

The samples require collection in a glass container. The minimum sample collection weight is 100 grams. Samples are to be cooled to 4 degrees Celsius upon collection until confirmed receipt in the laboratory. The sample must be analyzed by the laboratory within 28 days.

3.3 REPORTING LIMITS

The TPH reporting limits for water and soil are 100 mg/L and 500 mg/Kg, respectively.

APPENDIX E

**Standards, Target Concentrations, and Screening Levels
For Residential Soils Based on Preliminary Project
Applicable or Relevant and Appropriate Requirements (ARARs)
and Other Requirements
To Be Considered (TBCS)**

APPENDIX E: ARARS OR TBCS FOR RESIDENTIAL SOIL

Constituent	TNRCC Risk Reduction Standards		TNRCC Plan A Target Concs.		EPA Region 6 Media-Specific Screening Levels ^d	
	For Residential Soil ^a (mg/kg)		For Residential Soil ^b (mg/kg)		Protection	
	Protection of GW	Inhalation	Protection of GW ^c	Inhalation	of GW	and Dermal
Acenaphthene	2.19E+02	1.34E+04	3.14E+02	3.14E+02	2.00E+02	3.60E+02
Acetone	3.65E+02	3.82E+03	2.20E+01	3.39E+03	8.00E+00	2.00E+03
Acetonitrile	2.19E+01	1.65E+03	NA	NA	NA	3.90E+02
Acetophenone	3.65E+02	2.26E+04	NA	NA	NA	5.60E+03
Acrolein	7.30E+01	1.56E+03	NA	NA	NA	1.30E+03
Acrylamide	1.89E-03	1.42E-01	NA	NA	NA	9.80E-02
Acrylonitrile	1.58E-02	1.15E-01	NA	NA	NA	1.30E-01
Alachlor	2.00E-01	7.95E+00	NA	NA	NA	5.50E+00
Aldicarb	3.00E-01	5.49E+01	NA	NA	3.60E-02	6.50E+01
Aldicarb Sulfone	2.00E-01	8.23E+01	NA	NA	NA	6.50E+01
Aldicarb Sulfoxide	4.00E-01	5.49E+01	NA	NA	NA	NA
Aldrin	5.01E-04	3.77E-02	NA	NA	5.00E-03	2.60E-02
Aluminum Phosphide	1.46E+00	1.10E+02	NA	NA	NA	3.10E+01
Aniline	1.49E+00	4.18E-02	NA	NA	3.10E-02	1.90E+01
Anthracene	1.10E+03	5.91E+04	1.30E+01	1.30E+01	4.30E+03	1.90E+01
Antimony	6.00E-01	1.10E+02	NA	NA	NA	3.10E+01
Arsenic	5.00E+00	3.66E-01	NA	NA	1.50E+01	3.20E-01
Atrazine	3.00E-01	2.88E+01	NA	NA	NA	2.00E+00
Barium (ionic)	2.00E+02	1.91E+04	NA	NA	3.20E+01	5.30E+03
Benzene	5.00E-01	1.33E+00	1.30E-01	6.30E+00	2.00E-02	1.40E+00
Benzidine	3.70E-05	2.78E-03	NA	NA	1.10E-06	2.00E-03
Benzo(a)anthracene	NA	NA	3.20E+00	8.77E-01	7.00E-01	6.00E-01
Benzo(b)fluoranthene	NA	NA	1.30E+01	8.77E-01	4.00E+00	6.00E-01
Benzo(k)fluoranthene	NA	NA	4.70E+01	8.77E+00	4.00E+00	6.10E+00
Benzo(a)pyrene	NA	NA	2.20E+02	8.77E-02	4.00E+00	6.00E-02
Beryllium	4.00E-01	1.49E-01	NA	NA	1.80E+02	1.40E-01
Biphenyl	1.83E+02	6.68E+03	NA	NA	1.10E+02	3.30E+03

Constituent	TNRCC Risk Reduction Standards For Residential Soil ^a (mg/kg)		TNRCC Plan A Target Concs. For Residential Soil ^b (mg/kg)		EPA Region 6 Media- Specific Screening Levels ^d	
	Protection of GW	Ingestion and Inhalation	Protection of GW ^c	Ingestion and Inhalation	Protection of GW	Ingestion, Inhalation, and Dermal
Bis (2-chloro-ethyl) ether	7.74E-03	2.20E-01	NA	NA	3.00E-04	7.00E-02
Bis (2-chloroisopropyl) ether	1.22E+00	4.50E+01	NA	NA	NA	3.90E+00
Bis (2-ethyl-hexyl) phthalate	6.08E-01	4.57E+01	NA	NA	1.10E+01	3.20E+01
Bromodichloromethane	1.00E+01	7.19E-01	NA	NA	3.00E-01	1.40E+00
Bromoform	1.00E+01	8.11E+01	NA	NA	5.00E-01	5.60E+01
Bromomethane	5.11E+00	2.44E+01	NA	NA	1.00E-01	1.50E+01
Butyl-4,6-dinitrophenol, 2-sec-	3.65E+00	2.74E+02	NA	NA	NA	NA
Cadmium	5.00E-01	1.37E+02	NA	NA	6.00E+00	3.80E+01
Carbofuran	4.00E+00	1.37E+03	NA	NA	NA	3.30E+02
Carbon Disulfide	3.65E+02	2.45E+01	NA	NA	1.40E+01	1.60E+01
Carbon Tetrachloride	5.00E-01	4.14E-01	NA	NA	3.00E-02	4.70E-01
Chlordane	2.00E-01	4.93E-01	NA	NA	2.00E+00	3.40E-01
Chloroaniline, p-	1.46E+01	1.10E+03	NA	NA	3.00E-01	2.60E+02
Chlorobenzene	1.00E+01	2.56E+02	NA	NA	6.00E-01	1.60E+02
Chlorobenzilate	7.30E+01	5.49E+03	NA	NA	NA	1.60E+00
Chloroethane (Ethylchloride)	7.30E+01	4.99E+03	NA	NA	3.30E+01	3.10E+04
Chloroform	1.00E+01	4.37E-01	NA	NA	3.00E-01	5.30E-01
Chloronaphthalene, 2-	2.92E+02	2.20E+04	NA	NA	1.40E+02	5.20E+03
2-Chlorophenol	1.83E+01	1.37E+03	NA	NA	2.00E+00	3.30E+02
Chromium (total)	1.00E+01	3.91E+02	NA	NA	NA	2.10E+02
Chromium (VI)	1.00E+01	3.91E+02	NA	NA	1.90E+01	3.10E+01
Chrysene	NA	NA	7.20E+00	7.20E+00	1.00E+00	2.40E+01
Copper	NA	NA	NA	NA	NA	2.80E+03
Cresol, m-	1.83E+02	3.91E+03	NA	NA	NA	3.30E+03
Cresol, o-	1.83E+02	3.91E+03	NA	NA	6.00E+00	3.30E+03
Cresol, p-	1.83E+02	3.91E+03	NA	NA	NA	3.30E+02
Cyanide	2.00E+01	5.49E+03	NA	NA	NA	1.30E+03
DDD	3.55E-02	2.67E+00	NA	NA	7.00E-01	1.90E+00
DDE	2.50E-02	1.88E+00	NA	NA	5.00E-01	1.30E+00

Constituent	TNRCC Risk Reduction Standards		TNRCC Plan A Target Concns.		EPA Region 6 Media-	
	For Residential Soil ^a (mg/kg)		For Residential Soil ^b (mg/kg)		Specific Screening Levels ^d	
	Protection of GW	Inhalation	Protection of GW ^c	Inhalation	Protection of GW	Ingestion, Inhalation, and Dermal
DDT	2.50E-02	1.88E+00	NA	NA	1.00E+00	1.30E+00
Di-n-butyl phthalate	3.65E+02	2.74E+04	NA	NA	1.20E+02	6.50E+03
Di-n-octyl phthalate	7.30E+01	5.49E+03	NA	NA	NA	1.30E+03
Dibenz(a,h)anthracene	NA	NA	7.70E+00	8.77E-02	1.10E+01	6.00E-02
Dibromo-3-chloropropane, 1,2-	2.00E-02	4.57E-01	NA	NA	6.10E-04	3.20E-01
Dibromochloromethane	1.00E+01	7.62E+01	NA	NA	NA	NA
Dichlorobenzene, 1,2-	6.00E+01	6.69E+03	2.08E+02	3.41E+03	6.00E+00	2.30E+03
Dichlorobenzene, 1,3-	6.00E+01	7.61E+03	2.08E+02	4.19E+03	NA	2.80E+03
Dichlorobenzene, 1,4-	7.50E+00	8.64E+01	2.60E+01	2.00E+02	1.00E+00	7.40E+00
Dichlorodifluoromethane	7.30E+02	5.00E+01	NA	NA	7.50E+00	1.10E+02
Dichloroethane, 1,1-	3.65E+02	7.30E+03	NA	NA	1.10E+01	8.40E+02
Dichloroethane, 1,2-	5.00E-01	4.17E-01	NA	NA	1.00E-02	4.40E-01
Dichloroethylene, 1,1-	7.00E-01	7.15E-01	NA	NA	3.00E-02	4.00E-01
Dichloroethylene, cis-1,2-	7.00E+00	1.08E+02	NA	NA	2.00E-01	5.90E+01
Dichloroethylene, trans-1,2-	1.00E+01	2.56E+02	NA	NA	3.00E-01	1.70E+02
Dichlorophenol, 2,4-	1.10E+01	8.23E+02	NA	NA	5.00E-01	2.00E+02
Dichlorophenoxyacetic acid, 2,4-	7.00E+00	2.74E+03	NA	NA	1.70E+00	6.50E+02
Dichloropropane, 1,2-	5.00E-01	6.88E-01	NA	NA	2.00E-02	7.00E-01
Dieldrin	5.32E-04	4.00E-02	NA	NA	3.00E-02	1.00E-03
Diethyl phthalate	2.92E+03	2.20E+05	NA	NA	1.10E+02	5.20E+04
Diethylhexyl adipate	5.00E+01	5.34E+03	NA	NA	NA	3.70E+02
Dimethoate	7.30E-01	5.49E+01	NA	NA	NA	1.30E+01
Dimethyl phenol, 2,4-	7.30E+01	5.49E+03	NA	NA	3.00E+00	1.30E+03
Dinitrobenzene, 1,3-	3.65E-01	2.74E+01	NA	NA	NA	6.50E+00
Dinitrophenol, 2,4-	7.30E+00	5.49E+02	NA	NA	1.00E-01	1.30E+02
Dioxane, 1,4-	7.74E-01	1.55E+01	NA	NA	NA	1.40E+01
Diphenylamine	9.13E+01	6.86E+03	NA	NA	NA	1.60E+03
Diphenylhydrazine, 1,2-	1.06E-02	8.00E-01	NA	NA	NA	6.00E-01
Disulfoton	1.46E-01	1.10E+01	NA	NA	NA	2.60E+00

Constituent	TNRCC Risk Reduction Standards		TNRCC Plan A Target Concs.		EPA Region 6 Media-	
	For Residential Soil ^a (mg/kg)		For Residential Soil ^b (mg/kg)		Specific Screening Levels ^d	
	Protection of GW	Ingestion and Inhalation	Protection of GW ^c	Ingestion and Inhalation	Protection of GW	Ingestion, Inhalation, and Dermal
Endosulfan	1.83E-01	1.37E+01	NA	NA	3.00E+00	3.30E+00
Endothall	1.00E+01	5.49E+03	NA	NA	NA	1.30E+03
Endrin	2.00E-01	8.23E+01	NA	NA	4.00E-01	2.10E+01
Ethoxy ethanol, 2-	1.46E+03	1.10E+05	NA	NA	NA	2.60E+04
Ethoxyethanol acetate, 2-	1.10E+03	8.23E+04	NA	NA	NA	2.00E+04
Ethyl benzene	7.00E+01	1.14E+04	1.60E+02	3.36E+03	5.00E+00	2.90E+03
Ethylene dibromide	5.00E-03	7.09E-03	NA	NA	NA	NA
Ethylene glycol	7.30E+03	5.49E+05	NA	NA	NA	1.30E+05
Ethylene oxide	8.35E-03	1.11E-01	NA	NA	NA	1.20E-01
Fluoranthene	1.46E+02	1.10E+04	1.56E+02	1.56E+02	9.80E+02	2.60E+03
Fluorene	1.46E+02	9.60E+03	2.47E+02	2.47E+02	1.60E+02	3.00E+02
Fluorides	4.00E+02	1.65E+04	NA	NA	NA	3.90E+03
Formaldehyde	7.30E+02	1.56E+04	4.60E+01	1.56E+04	NA	9.80E+03
Heptachlor	4.00E-02	1.42E-01	NA	NA	6.00E-02	1.00E-01
Heptachlor epoxide	2.00E-02	7.04E-02	NA	NA	3.00E-02	5.00E-02
Hexachlorobenzene	1.00E-01	4.00E-01	NA	NA	8.00E-01	3.00E-01
Hexachlorobutadiene	1.09E+00	8.21E+01	NA	NA	1.00E-01	5.70E+01
Hexachlorocyclohexane, alpha	1.35E-03	1.02E-01	NA	NA	4.00E-04	7.00E-02
Hexachlorocyclohexane, beta	4.73E-02	3.56E+00	NA	NA	2.00E-03	3.00E+00
Hexachlorocyclohexane, gamma	2.00E-02	8.23E+01	NA	NA	6.00E-03	3.40E-01
Hexachloroethane	6.08E+00	4.57E+02	NA	NA	2.00E-01	3.20E+02
Indeno(1,2,3-c,d)pyrene	NA	NA	1.70E+01	8.77E-01	3.50E+01	6.00E-01
Iron	NA	NA	NA	NA	NA	2.30E+04
Isobutyl alcohol	1.10E+03	8.23E+04	NA	NA	NA	2.00E+04
Lead (inorganic)	1.50E+00	5.00E+02	NA	NA	NA	4.00E+02
Manganese	NA	NA	NA	NA	NA	3.80E+02
Mercury	2.00E-01	8.23E+01	NA	NA	3.00E+00	2.30E+01
Methomyl	9.13E+01	6.86E+03	NA	NA	NA	1.60E+03
Methoxy ethanol	1.46E+01	1.10E+03	NA	NA	NA	6.50E+01

Constituent	TNRCC Risk Reduction Standards For Residential Soil ^a (mg/kg)		TNRCC Plan A Target Concs. For Residential Soil ^b (mg/kg)		EPA Region 6 Media- Specific Screening Levels ^d	
	Protection of GW	Ingestion and Inhalation	Protection of GW ^c	Ingestion and Inhalation	Protection of GW	Ingestion, Inhalation, and Dermal
Methoxychlor	4.00E+00	1.37E+03	NA	NA	6.20E+01	3.30E+02
Methoxyethanol acetate	7.30E+00	5.49E+02	NA	NA	NA	1.30E+02
Methyl ethyl ketone	1.83E+02	7.58E+03	1.42E+02	2.96E+04	NA	8.70E+03
Methyl isobutyl ketone	1.83E+02	1.37E+04	NA	NA	NA	5.20E+03
Methyl methacrylate	2.92E+02	6.74E+02	NA	NA	NA	5.20E+03
Methylene Chloride	5.00E-01	1.07E+01	NA	NA	1.00E-02	1.10E+01
Molybdenum	NA	NA	NA	NA	NA	3.80E+02
Naphthalene	1.46E+02	4.91E+03	3.89E+02	7.82E+02	3.00E+01	8.00E+02
Nickel	1.00E+01	1.56E+03	NA	NA	2.10E+01	1.50E+03
Nitrate	1.00E+03	4.39E+05	NA	NA	NA	NA
Nitrite	1.00E+02	2.74E+04	NA	NA	NA	6.50E+03
Nitrobenzene	1.83E+00	6.48E+01	NA	NA	9.00E-02	3.30E+01
Nitroso-methyl-ethyl-amine, n-	3.87E-04	2.91E-02	NA	NA	NA	2.00E-02
Nitrosodi-n-propylamine, n-	1.22E-03	9.15E-02	NA	NA	2.00E-05	6.00E-02
Nitrosodiethylamine, n-	5.68E-05	4.27E-03	NA	NA	NA	3.00E-03
Nitrosodimethylamine, n-	1.67E-04	1.26E-02	NA	NA	NA	9.00E-03
Nitrosopyrrolidine, n-	4.06E-03	3.05E-01	NA	NA	NA	2.00E-01
Pentachloronitrobenzene	3.28E-01	2.46E+01	NA	NA	NA	1.70E+00
Pentachlorophenol	1.00E-01	5.34E+00	NA	NA	2.00E-01	2.50E+00
Phenol	2.19E+03	1.65E+05	NA	NA	4.90E+01	3.90E+04
Phthalic anhydride	7.30E+03	5.49E+05	NA	NA	NA	NA
Polychlorinated biphenyls	5.00E-02	1.00E+01	NA	NA	NA	7.00E-02
Pronamide	2.74E+02	2.06E+04	NA	NA	NA	4.90E+03
Pyrene	1.10E+02	8.20E+03	9.90E+01	9.90E+01	1.40E+03	2.00E+03
Pyridine	3.65E+00	2.74E+02	NA	NA	NA	6.50E+01
Selenium	5.00E+00	1.37E+03	NA	NA	3.00E+00	3.80E+02
Silver	1.83E+01	1.37E+03	NA	NA	NA	3.80E+02
Strychnine	1.10E+00	8.23E+01	NA	NA	NA	2.00E+01
Styrene	1.00E+01	2.13E+01	NA	NA	2.00E+00	2.20E+03

Constituent	TNRCC Risk Reduction Standards		TNRCC Plan A Target Concs.		EPA Region 6 Media-	
	For Residential Soil ^a (mg/kg)		For Residential Soil ^b (mg/kg)		Specific Screening Levels ^d	
	Protection of GW	Ingestion and Inhalation	Protection of GW ^c	Ingestion and Inhalation	Protection of GW	Ingestion, Inhalation, and Dermal
Tetrachlorobenzene, 1,2,4,5-	1.10E+00	8.23E+01	NA	NA	6.90E-01	2.00E+01
Tetrachloroethane, 1,1,1,2-	3.28E+00	4.59E+01	NA	NA	NA	4.80E+01
Tetrachloroethane, 1,1,2,2-	4.26E-01	8.00E+00	NA	NA	1.00E-03	9.00E+00
Tetrachloroethylene	5.00E-01	7.93E+01	NA	NA	4.00E-02	7.00E+00
Tetrachlorophenol, 2,3,4,6-	1.10E+02	8.23E+03	NA	NA	NA	2.00E+03
Tetraethyl dithiopyrophosphate	1.83E+00	1.37E+02	NA	NA	NA	3.30E+01
Thallium	NA	NA	NA	NA	4.00E-01	NA
Toluene	1.00E+02	3.58E+03	6.90E+01	3.26E+03	5.00E+00	1.90E+03
Toxaphene	3.00E-01	5.82E-01	NA	NA	4.00E-02	4.00E-01
TP Silvex, 2,4,5-	5.00E+00	2.20E+03	NA	NA	NA	NA
Trichlorobenzene, 1,2,4-	7.00E+00	6.78E+02	NA	NA	2.00E+00	6.20E+02
Trichloroethane, 1,1,1-	2.00E+01	9.63E+03	NA	NA	9.00E-01	3.20E+03
Trichloroethane, 1,1,2-	5.00E-01	1.27E+01	NA	NA	1.00E-02	1.40E+00
Trichloroethylene	5.00E-01	2.40E+00	NA	NA	2.00E-02	7.10E+00
Trichlorofluoromethane	1.10E+03	8.73E+00	NA	NA	1.30E+01	7.10E+02
Trichlorophenol, 2,4,5-	3.65E+02	8.08E+03	NA	NA	1.20E+02	6.50E+03
Trichlorophenol, 2,4,6-	7.74E-01	5.82E+01	NA	NA	6.00E-02	4.00E+01
Trichlorophenoxyacetic acid, 2,4,5-	3.65E+01	2.74E+03	NA	NA	NA	6.50E+02
Trichloropropane, 1,1,2-	1.83E+01	1.37E+03	NA	NA	1.40E-01	5.10E+01
Trichloropropane, 1,2,3-	2.19E+01	1.65E+03	NA	NA	6.00E-06	7.00E-03
Trinitrobenzene, 1,3,5-	1.83E-01	1.37E+01	NA	NA	NA	3.30E+00
Vanadium	NA	NA	NA	NA	NA	5.40E+02
Vinyl acetate	3.65E+03	2.74E+05	NA	NA	8.40E+01	6.50E+04
Vinyl Chloride	2.00E-01	1.99E-02	NA	NA	1.00E-02	5.00E-03
Xylene	1.00E+03	5.47E+03	5.68E+02	9.68E+02	7.40E+01	9.80E+02
Zinc	NA	NA	NA	NA	4.20E+04	2.30E+04

^a Source: TNRCC 1996 (December). Subchapter S: Risk Reduction Standards, TNRCC Chapter 335, Industrial Solid Waste and Municipal Hazardous Waste.

^b Source: TNRCC 1994 (January). *Leaking Storage Tank Program, Risk-Based Corrective Action for Leaking Storage Tank Sites*.

^c Based on beneficial groundwater use Category I, as defined in TNRCC (1994).

ARAR - applicable or relevant and appropriate requirement

EPA - Environmental Protection Agency

GW - groundwater

NA - not available or not determined

TBC - to be considered

TNRCC - Texas Natural Resource Conservation Commission

^d Source: U.S. EPA 1996 (October). EPA Region 6 Human Health Media - Specific Screening Levels

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APPENDIX F

Project Schedule

MASTER INTERATED PROGRAM SCHEDULE FOR THE NAS FORT WORTH RAILROAD RIGHT OF WAY SITE ASSESSMENT AND INVESTIGATION
 DELIVERY ORDER 003/01

Mon 9/29/97

TASK	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
RAILROAD RIGHT OF WAY SA/SI	[Solid bar from Aug to Nov]															
NOTICE TO PROCEED	[Diamond symbol in Aug]															
SA/SI SCOPING	[Solid bar from Sep to Nov]															
Pre-survey and Records Search	[Small shaded bar in Sep]															
Draft WP Development	[Shaded bar from Sep to Oct]															
Draft WP Submittal	[Arrow pointing to start of Draft WP Development in Sep]															
Progress Review Meeting	[Arrow pointing to end of Draft WP Development in Oct]															
Draft WP Review Period	[Shaded bar from Oct to Nov]															
Receipt of Draft WP Review Corr	[Arrow pointing to end of Draft WP Review Period in Nov]															
Final WP Development	[Shaded bar from Nov to Dec]															
Final WP Submittal	[Arrow pointing to end of Final WP Development in Dec]															
SA FIELD ACTIVITIES	[Solid bar from Dec to Feb]															
Passive Soil Gas Monitoring	[Shaded bar from Dec to Jan]															
SI FIELD ACTIVITIES	[Solid bar from Jan to Apr]															
SI Soil Borings	[Shaded bar from Jan to Feb]															
SASI REPORT PREPARATION	[Solid bar from Feb to May]															
Draft SA/SI Report Development	[Shaded bar from Feb to Mar]															
Draft SA/SI Report Submittal	[Arrow pointing to end of Draft SA/SI Report Development in Mar]															
Receipt of Draft SA/SI Report C	[Arrow pointing to end of Draft SA/SI Report Submittal in Apr]															
Final SA/SI Report Development	[Shaded bar from Apr to May]															
Final SA/SI Report Submittal	[Arrow pointing to end of Final SA/SI Report Development in May]															
IRPIMS Data Development	[Shaded bar from May to Jun]															
IRPIMS Data Submittal	[Arrow pointing to end of IRPIMS Data Development in Jun]															

Task [Shaded bar] Milestone [Diamond] Summary [Arrow]

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