N83447.AR.000194
NAS FORT WORTH
5090.3a

FINAL REMOVAL AND CLOSURE OF FUEL HYDRANT SYSTEMS CONSTRUCTION QUALITY PLAN AND ENVIRONMENTAL CLEANUP PLAN NAS FORT WORTH TX
1/1/1995
JACOBS ENGINEERING

NAVAL AIR STATION FORT WORTH JRB CARSWELL FIELD TEXAS

ADMINISTRATIVE RECORD COVER SHEET

AR File Number 354

United States Air Force
Air Force Base
Conversion Agency

FINAL

NAS Fort Worth JRB, Texas
(Formerly Carswell AFB, Texas)

REMOVAL/CLOSURE OF THE FUEL HYDRANT SYSTEM

CONSTRUCTION QUALITY PLAN & ENVIRONMENTAL CLEANUP PLAN

JANUARY 1995

United States Air Force Air Force Base Conversion Agency

FINAL

NAS Fort Worth JRB, Texas
(Formerly Carswell AFB, Texas)

CONSTRUCTION QUALITY PLAN

CAR-J03-10K70100-M4-0002

JANUARY 1995

By:

JE
JACOBS ENGINEERING GROUP INC.
600 17th Street, Suite 1100N
Denver, CO 80202

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

Section **Page**

List of Figures

List of Appendices

ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
BTEX	benzene, toluene, ethylbenzene, and xylene
CLEAN	Comprehensive Long-Term Environmental Action Navy
COR	Contracting Officer's Representative
CQP	Construction Quality Plan
DOE	U.S. Department of Energy
ECP	Environmental Cleanup Plan
EPA	U.S. Environmental Protection Agency
eV	electron volt
FCR	Field Change Request
HSP	Health and Safety Plan
IRP	Installation Restoration Program
Jacobs	Jacobs Engineering Group Inc.
JEMCI	Jacobs Engineering Merit Constructors Inc.
JRB	Joint Reserve Base
LEL	lower explosive limit
MSDS	Material Safety Data Sheets
NAS	Naval Air Station
NCR	Nonconformance Report
PAH	polycyclic aromatic hydrocarbon
PI	plasticity index
POC	point of contact
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RAC	Remedial Action Contract
Riedel	Riedel Environmental Services Inc.
SAP	Sampling and Analysis Plan
SOP	standard operating procedure
SOW	Statement of Work

TES	Technical Enforcement Support
TNRCC	Texas Natural Resource Conservation Commission
TPH	total petroleum hydrocarbons
UST	underground storage tank

1.0 INTRODUCTION

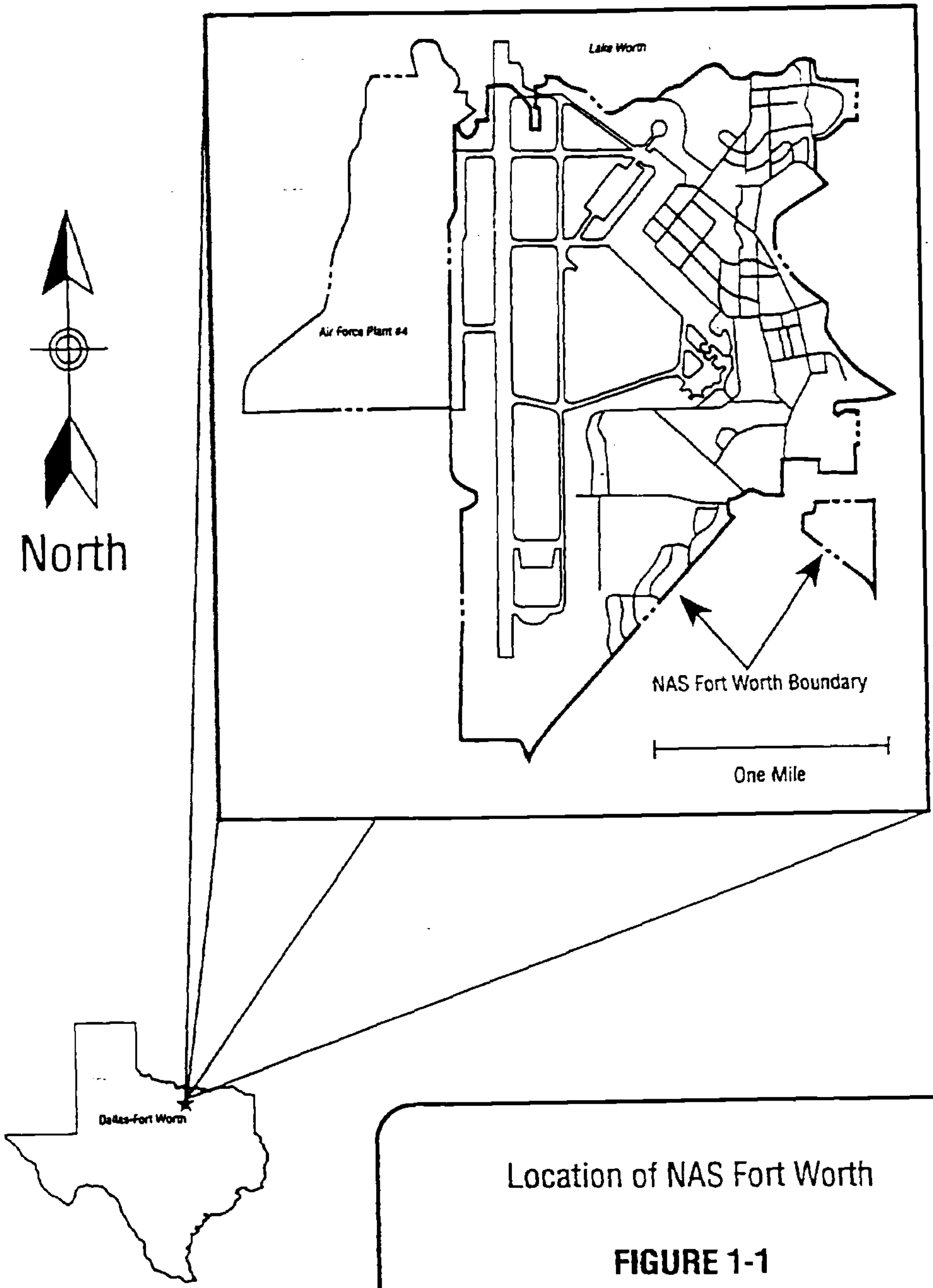
1.1 PURPOSE

This Construction Quality Plan (CQP) establishes the Jacobs Engineering Group Inc. (Jacobs) construction quality program to provide the necessary controls, supervision, inspections, and tests of work items, including suppliers and subcontractors. The CQP will establish procedures for in verifying compliance with contract documents, the Statement of Work (SOW), and applicable standards related to construction activities for the remediation of Delivery Order 0002, Closure of the Fuel Hydrant System at Naval Air Station (NAS) Fort Worth Joint Reserve Base (JRB), Carswell Field, Fort Worth, Texas. The station was formerly called Carswell Air Force Base (AFB), and will be referred to in this document as NAS Fort Worth. Implementation of the CQP will help make certain that the completed work meets or exceeds the plans and specifications. Companion documents to this CQP are the Sampling and Analysis Plan (SAP), Environmental Cleanup Plan (ECP), and the Health and Safety Plan (HSP).

This CQP is patterned after the basewide CQP prepared as part of Delivery Order 0001 of the contract. Overall program quality issues are addressed in the basewide CQP; this delivery order-specific CQP will incorporate quality issues related to this delivery order only.

1.2 SITE DESCRIPTION

NAS Forth Worth is located near Fort Worth, Texas. The station comprises 2,555 acres (Figure 1-1). It is surrounded by residential commercial and industrial areas. Lake Worth and the Trinity River border the property.



Location of NAS Fort Worth

FIGURE 1-1

1.3 HAZARDOUS MATERIALS

The hazardous material associated with the fuel hydrant system is JP-4 jet fuel. Material Safety Data Sheets (MSDS) are found in the HSP.

1.4 CONSTRUCTION QUALITY PLAN REQUIREMENTS

This document addresses the six content elements referenced in the NAS Fort Worth Remedial Action Contract (RAC) CQP:

- responsibility and authority;
- personnel qualifications;
- inspection activities;
- monitoring tests and observations;
- sampling requirements; and
- documentation.

1.5 COORDINATION

Implementation of this CQP will require that the Jacobs Site Manager and the subcontractors meet daily to discuss issues regarding quality, schedule, cost, and safety. These daily meetings will expedite the identification of problems and institute rapid solutions. The station Contracting Officer's Representative (COR) for the Air Force Center for Environmental Excellence (AFCEE) will attend these meetings during problem identification or resolution, or for project status updates.

Compliance with the project SOW, plans, and technical specifications will be enforced by the Site Manager. Necessary deviations will be documented for review and acceptance of other resolution. Effective and timely communication with the station COR on routine issues, as well as problems, will enhance client satisfaction.

1.6 SCOPE OF WORK

The CQP covers the closure of the fuel hydrant system and describes the following:

- quality control (QC) procedures during construction;
- methods of QC evaluation, test methods, and frequencies; and
- quantity and schedule of construction testing.

The following are the general activities required to accomplish closure of the fuel hydrant system:

- Remove and dispose of fuel.
- Demolish pumping station C.
- Remove six 25,000-gallon underground storage tanks (USTs).
- Decontaminate and dispose of fuel tanks.
- Locate, evaluate, and fill 23,700 linear feet of 3-inch to 8-inch underground steel pipe with grout.
- Collect drive-point samples and test for contamination under the fuel pipes and around the USTs.

2.0 PROJECT RESPONSIBILITY AND AUTHORITY

2.1 PROJECT ORGANIZATION

This project is being performed under the direction of NAS Fort Worth and AFCEE. Jacobs has been contracted to implement the removal action, which includes providing engineering, QC, sampling and analysis, and other technical field support. An organization chart for the Jacobs team is shown in Figure 2-1. This chart shows the lines of communication and authority with the project.

The following list includes key Jacobs personnel responsible for quality assurance (QA)/QC on this contract:

Director of QA:	Kris Barrett
Program Manager:	Lynn Schuetter
QA Manager:	Harold Thompson
Project Manager:	Lynn Schuetter
Site Manager:	John McManus

Resumes for each of the above-listed personnel are found in Appendix A of this document.

2.2 CORPORATE QUALITY ASSURANCE STRUCTURE

Figure 2-1 illustrates the Jacobs project management structure. The Jacobs project QA Manager reports to the Jacobs Program Manager for administrative purposes. However, the QA Manager will report directly to the Jacobs Director of QA, Mr. Kris Barrett on all matters related to quality. This reporting structure ensures that issues affecting quality are evaluated independently from other project-related issues, such cost and schedule. Therefore, quality receives prompt and focused attention.

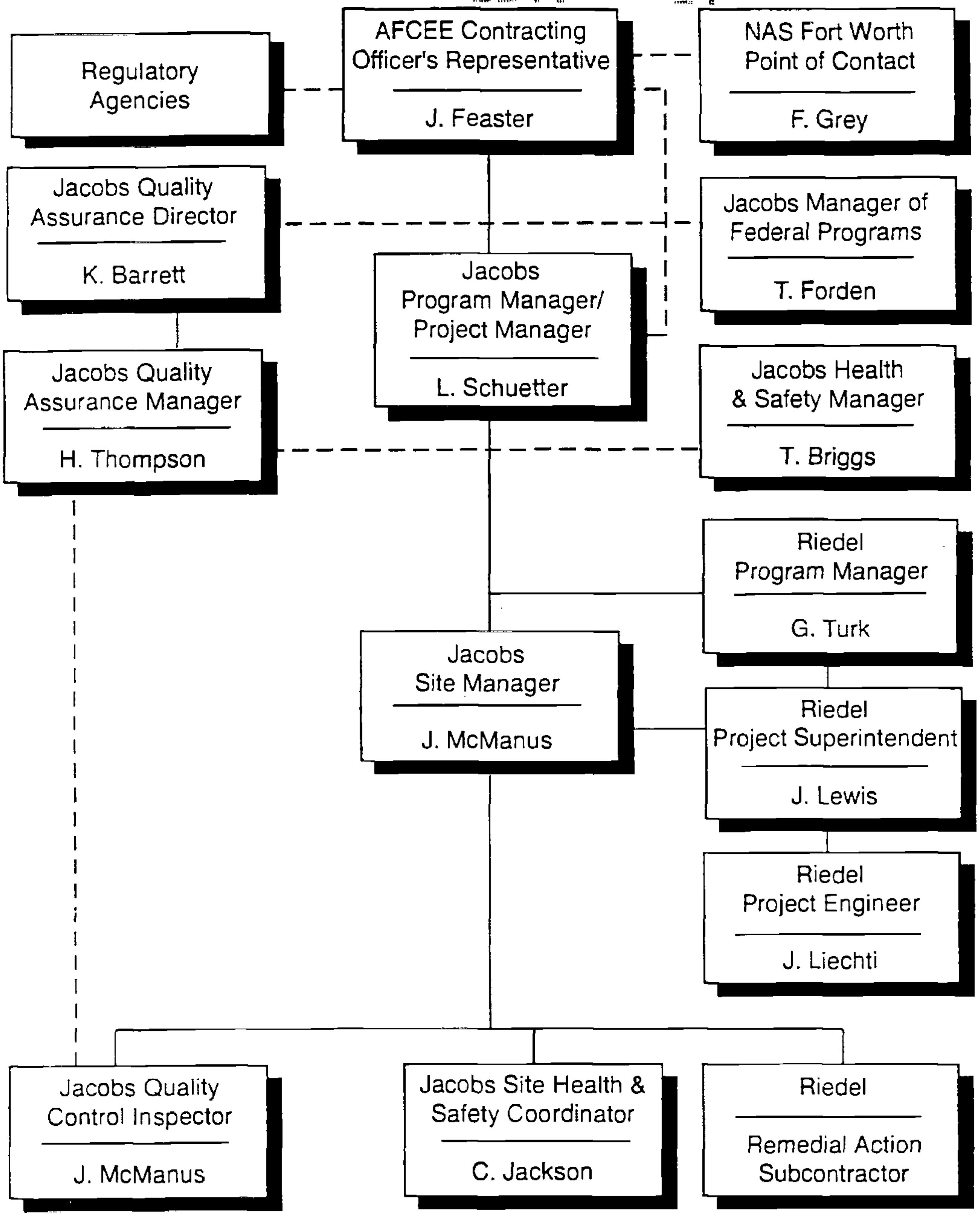


FIGURE 2-1
Project Organization Chart
Removal/Closure of Fuel Hydrant System
NAS Forth Worth, Texas

2.3 QUALITY ASSURANCE STRUCTURE

The QA program will be the focal point of QA/QC efforts on the project. The QA Manager, working closely with Project Manager and Site Manager, will ensure that each subcontractor and vendor QA/QC Manager understands the program QA goals.

The Site Manager has complete responsibility for quality, safety, and performance of field activities. The Site Manager will ensure that construction activities comply with the contract document. He will submit reports to the QA Manager to ensure compliance with the QA Program.

2.4 RESPONSIBILITY AND AUTHORITY

Each key project team member will receive a written description of his/her role on the project, authority, and chain of command. This information will be communicated to the team during project kickoff or premobilization meetings so that each member understands the project system.

The following paragraphs identify the key Jacobs personnel who are assigned to this delivery order.

Program Manager. Ms. Lynn Schuetter is the Program Manager for the NAS Fort Worth RAC. Ms. Schuetter has more than 20 years of experience in the environmental field, primarily focused in subsurface geological studies and investigations. Ms. Schuetter is a Department Head for the Jacobs Denver office and has held significant posts on such projects as the U.S. Air Force Installation Restoration Program (IRP), U.S. Navy Comprehensive Long-Term Action Navy (CLEAN), U.S. Department of Energy (DOE) Weldon Spring Remedial Action, and the U.S. Environmental Protection Agency (EPA) Technical Enforcement Support (TES) IV Contract.

The Jacobs Program Manager is responsible to AFCEE and Jacobs senior management for successful execution of the NAS Fort Worth program. The Program Manager will assign project managers and key program staff.

Jacobs Quality Assurance Director. The Jacobs QA Director, Mr. Kris Barrett, will ensure that all work is performed according to the specifications of this SAP. Mr. Barrett will report to the Air Force and be responsible for all program QA issues. In addition, Mr. Barrett will review evaluation reports, audits, and corrective action procedures to ensure that the project meets IRP Handbook standards.

Quality Assurance Manager. Mr. Harold Thompson has more than 34 years of experience in QA Management, ranging from the supervision of aerospace operations to construction of a strategic petroleum reserve for DOE. Mr. Thompson has been responsible for development and administration of QA programs for a wide variety of projects.

The QA Manager will be responsible for implementing the overall Jacobs QA program, including the program's QC plans. The QA Manager will review and modify corporate standard operating procedures (SOPs), industry standards, and prepare a delivery order-specific CQP to meet station and AFCEE COR requirements.

The QA Manager shall accomplish the following:

- Ensure compliance with the requirements identified in the SOW and CQP.
- Develop additional QA procedures as required to cover special tests, audits, or to improve total construction quality of the field QC program.
- Participate in the resolution of inspection problems concerning vendors, engineering, government regulatory agencies, and AFCEE COR quality representatives.

- Certify results of tests, qualifications, certifications, and other special tests as required by engineering, station, or AFCEE COR.

- Perform regularly scheduled QA audits of field office, laboratory, and vendor locations to ensure compliance with the AFCEE RAC QA program.

The QA Manager reports indirectly to the Program Manager and shall be assigned one or more QC inspectors to monitor the project during the life of a delivery order. The QA Manager reports directly to the Jacobs QA Director.

Project Manager. Ms. Lynn Schuetter is designated as Project Manager for Delivery Order 0002. Jacobs places full accountability for delivery order performance, including construction compliance, with the Project Manager. The Jacobs Project Manager is responsible for ensuring that the specifications identified and addressed in the delivery order planning documents are met. In these plans, the Project Manager identifies the Jacobs procedures and develops additional procedures (if necessary) that will be implemented on the delivery order in response to Air Force requirements. The Project Manager makes certain that the procedures are fully executed by team members and has the authority to stop work and/or remove personnel, subcontractors, or visitors from the job site. The Project Manager coordinates closely with the AFCEE COR.

Site Manager. Mr. John McManus is assigned as the Site Manager on Delivery Order 0002. Mr. McManus has 25 years of experience as a construction superintendent and mechanical engineer. He has more than six years of experience in the environmental field. Mr. McManus is responsible for the successful field management of a groundwater extraction/treatment system and an ex-situ biodegradation pile at Elmendorf AFB. Other noteworthy projects include Navy CLEAN, the DOE Pantex Facility Landfill Investigation, and a tank-cleaning project for Allied Signal, where he logged more than 400 hours in Level B personal protective equipment (PPE).

The Site Manager is directly responsible to the Project Manager for all fieldwork including investigations, monitoring, construction, remedial activities, and operations and maintenance. The Site Manager is identified as the single point of accountability for remedial action field activities at the station and coordinates field activities with the station representative (i.e., station Civil Engineer). The Site Manager will deploy resources in the most effective way to accomplish the required scope of work and will oversee daily management and fieldwork.

Specifically, the Site Manager's responsibilities include the following:

- overall responsibility for all field activities and implementing all Jacobs' safety policies and procedures;
- implementing field activities in response to technical management directives;
- supervising and monitoring subcontractors' work to ensure contract items and conditions are fulfilled in accordance with work plans, specifications, and SOPs, where appropriate;
- implementing the Jacobs Corporate Health and Safety Manual for Environmental Field Programs;
- keeping a daily activity report of all significant project site events, and submitting a weekly report to the Project Manager (all reports compiled and submitted with the final close-out report);
- ensuring that site personnel assigned to the project are knowledgeable of company policies and procedures and abide by them;
- ensuring a safe working environment through a coordinated effort with the Site Health and Safety Coordinator and the Jacobs Health and Safety Manager;

- coordinating closely with the Project Manager and project QA personnel to ensure project quality and efficiency ; and

- implementing Jacobs Government Property Procedures.

Jacobs Quality Control Inspector. Because of the limited size of this project, a separate QC Inspector will not be assigned. QC will be initiated by the subcontractor, Riedel Environmental Services Inc. (Riedel) and will be overseen by the Jacobs Site Manager. The Site Manager will ensure that the subcontractors record all pertinent information on the required forms and that the forms are submitted to Jacobs in a timely manner. As required, the Site Manager will fulfill the following inspection functions:

- Provide continuing surveillance of specific craft disciplines to ensure that high-quality standards of workmanship are maintained and that they conform to approved engineering drawings in all areas.

- Initiate action to prevent, stop, or correct the occurrence of QC deficiencies, defective work, and noncompliance reports. An emphasis will be placed on preventing errors.

- Perform or monitor tests, evaluations, and measurements to meet quality requirements.

- Maintain records and review procedures and documentation for completeness, accuracy, and compliance to specifications of subcontracts.

- Perform investigation and research to identify and resolve quality problems.

- Communicate with the QA Manager regarding the progress of QC activities.

- Perform oversight of subcontractors and Jacobs craft personnel to ensure the following:
  - approved engineering and workmanship methods are being used;
  - quality-approved materials are being used;
  - warning of possible problem areas is provided to supervisors;

- safety practices are being followed;
- cooperation is achieved among team members to meet quality goals; and
- accurate documentation of work and testing is maintained.

2.5 STATION COORDINATION

The AFCEE COR for Delivery Order 0002 is Captain Joseph Feaster at Brooks AFB, Texas. The station point of contact (POC) for this effort is Mr. Frank Grey at NAS Fort Worth, Texas. All activities conducted under this delivery order will be coordinated with these Air Force representatives through the Jacobs Project Manager, Ms. Lynn Schuetter, at the Jacobs office in Denver, Colorado.

3.0 INSPECTION ACTIVITIES

The observations and tests that are performed under QC inspection during the closure of the fuel hydrant system are identified in this section. The QC inspection will consist of observing and QC testing of the work, including that of the subcontractors, to document conformance to the plans and specifications with respect to the materials and workmanship. General observation guidelines are included in this section. Specific observation and testing guidelines are detailed in Section 4.0, Quality Control Sampling Strategies.

3.1 COORDINATION

The Project Manager will communicate the content and intentions of the contract documents to all members of the delivery order team to ensure consistency of implementation. Coordination will be based on the concept of the three-phased QC process: preparatory, initial, and follow-up.

Jacobs shall provide notification to station and AFCEE personnel for coordination of meetings, inspection, testing, and start-up activities at the job site. Jacobs will ensure that required engineering and other support services are provided throughout the construction process, accurate test results are achieved, and field reports are maintained.

Meetings will be scheduled throughout the project to enhance communication among personnel responsible for executing and inspecting closure of the fuel hydrant system. Project meetings will ensure familiarity with facility design, construction procedures, and design changes.

3.1.1 Preconstruction Quality Control Meeting

A preconstruction QC meeting, under direction of the Project Manager, will be held before the start of field activities. The topics of the meeting will include, but will not be limited to, the following:

- Provide each organization with relevant QC documents and supporting information.
- Familiarize each organization with the CQP and its role relative to the design criteria, plans, and specifications.
- Discuss modifications to the CQP.
- Review the responsibilities, line of authority, and communication of each organization.
- Discuss the established procedures for observations and tests, including sampling strategies.
- Review procedures for documenting and reporting inspections.
- Discuss the established procedures for managing construction deficiencies.
- Review procedures for distributing and storing documents and reports.
- Discuss procedures for storing construction materials.
- Publish minutes to indicate any required follow-up actions.

3.1.2 Daily Progress Meetings

Daily progress meetings will be held at the work area. These meetings will be attended by the Jacobs Site Manager, the Riedel Site Manager, and the station POC or his designee.

The purpose of the meetings will be to accomplish the following:

- Review the previous day's activities and accomplishments.
- Review the work location and activities for the day.
- Identify the contractor's personnel and equipment assignments for the day.
- Discuss any potential construction problems.

These meetings will be documented. Specific problems or questions will be addressed in the problem/deficiency report forms.

3.1.3 Problem or Work Deficiency Meetings

A meeting may be held when a problem or deficiency is present or likely to occur. At a minimum, the meeting should be attended by the construction contractor and the Jacobs Site Manager. The purpose of the meeting is to define and resolve any problem or recurring work deficiency in the following manner:

- Define and discuss the problem or deficiency.
- Review alternative solutions.
- Implement a plan to resolve the problem or deficiency.
- Require a deadline date for the resolution of the deficiency.

Jacobs will document the meeting.

3.2 GENERAL QUALITY CONTROL OBSERVATIONS AND TESTS

There are four sections of work involved in this project that are subject to QC inspection. Listed below are the four sections and the categories of work or subtasks for each primary task.

Pumping Station C Demolition/Tank Removal	
Work Category	**Subtask**
Remove fuel from pipes and equipment	
Demolition	Structural steel, Block wall, and Concrete floor.
Tank Removal	Inert, Excavation, Tank removal, Cleaning (interior and exterior), Demolition, transportation, and disposal, and tank saddle removal, and backfill.
Pipe Preparation	
Work Category	**Subtask**
Locate underground pipe at former pumping stations	
Excavate to expose pipe	
Prepare pipe	Drill holes to measure lower explosive limit (LEL) and remove fuel, Inert, Weld flange, Pig lines, and Collect and dispose of fuel.
Pipe Closure	
Work Category	**Subtask**
Cap/plug lines, grout lines, and backfill.	
Drive Point Soil Samples	
Work Category	**Subtask**
Locate pipe, drive-point sample, and soil-sample analysis	

The Site Manager will review site investigation information to be familiar with the expected site conditions. This knowledge will help with the completion of inspections. The work will be inspected using a three-phase QC inspection process: preparatory, initial, and follow-up.

3.2.1 Preparatory Phase

The preparatory phase activities to be performed for the closure of the fuel hydrant system include a review of the as-built drawings along with an inspection of the site. This phase will also include an examination of the old pumping station areas. This examination and inspection will assist the team members in identifying possible boundaries of the individual piping systems. Items not indicated on the drawings will be added to them.

Because Jacobs believes safety issues directly affect quality, some safety items are listed as quality related.

During the preparatory phase of QC inspection, each section of work and its associated subtasks will be reviewed to identified quality issues. Some preliminary quality issues have been identified for each section of work, and are discussed below.

Pumping Station C Demolition/Tank Removal. Preliminary quality issues associated with the demolition of pumping station C include the following:

- containment of fuel spills from pumping equipment;
- decontamination of pumping equipment;
- demolition controlled so that only the intended parts of the building are destroyed; and
- use of proper methods for disposal of building materials.

The removal of the USTs incorporates the following quality issues:

- utility clearance;
- excavation, including proper handling of contaminated soil and water in the excavation, and safe sloping of the sides of the excavation;
- tank removal, including removal of all fuel and sludge, inerting of tank atmosphere, rigging and lifting, and decontamination and disposal of the tanks;
- tank saddle removal;
- backfill compaction tests; and
- sampling of soils within the tank excavations.

Pipeline Preparation. Preliminary quality issues associated with the third section of work, pipeline preparation, are listed below:

- Identify pipe locations, including pipe interruptions at previously demolished pumping stations and branch lines. Excavation will be required to expose ends of pipe.
- Pipeline preparation includes fuel removal, inerting, removal of damaged pipe, and welding of flanges.
- Pig the pipeline, capture all displaced fuel, and prevent stuck pigs.

Pipeline Closure. Quality issues related to pipeline closure include verification of the extent of pipe to be grouted, the composition of the grout mixture, and the method of determining when all pipes are completely filled with grout.

Drive-Point Soil Samples. Quality issues associated with this section of work include operation of the drive-point sampler and collection of soil samples.

3.2.1.1 Drawing Review

A thorough review of the as-built drawings is required to assist Jacobs in understanding the extent of the piping systems. This review will identify the locations of pipes that have been cut off by previous contractors and also identify the branch lines associated with each system. A good understanding of these drawings will help keep the exploratory excavation to a minimum.

If there is any question about the location of a line, the suspected area will be checked with a pipe locator to verify the location. The location will be marked on the drawings.

Hand digging or probing will be performed to physically locate the lines when excavation is within 2 feet of the suspected line location.

3.2.1.2 Permitting

All appropriate permits and applications will be acquired by Jacobs Site Manager before any excavation work is performed. The following are some of the permits and notifications required:

1. Give 30-day written notification to Texas Natural Resource Conservation Commission (TNRCC) for tank removal.

2. Ensure subcontractor removing tank holds a valid TNRCC Class B license. License must be present onsite.

3. Notify fire marshal 24 hours in advance of tank removal.

4. Notify TNRCC 24 to 72 hours in advance of construction activities.

5. Acquire station construction permit

6. Identify underground utilities.

7. Disconnect electrical service and remove wiring for demolition.

8. Acquire hot work permit, as required.

9. Dispose of contaminated soils and liquids.

3.2.2 Initial Phase

This phase of the work includes implementing the initial controls, performing inspections, and testing each feature of the work.

The Site Manager will confirm that the workmanship standards have been established and will resolve any outstanding issues about standards at this phase.

Another element of the initial phase will be a meeting of all involved parties to discuss the activities to be performed. The purpose of the meeting is to define performance standards and to reach agreement on those standards. Implementation of actual work and QC inspection of the work will also be reviewed.

3.2.3 Follow-Up Phase

This phase will be performed continuously until completion of the project to verify that control procedures are being followed so that the result is a product in compliance with the design drawings and specifications.

As part of the follow-up phase, the Site Manager will conduct audits of the following:

- subcontractor procedures;
- facilities;

- equipment and records to confirm contract compliance;
- federal, state, and local regulation compliance related to the construction.

The services of outside subcontractors may be used for independent testing or review in specialized fields. Construction QC issues will be discussed with Jacobs and the subcontractors before each work phase. Major discrepancies observed will be recorded on a nonconformance report (NCR) and transmitted to the related subcontractor. Major discrepancies will be reviewed on a daily basis. Upon correction of the major discrepancy, the person who made the correction and the date corrected will be noted as described in Section 4.1, Problem Identification and Corrective Measures.

Conformance with Specifications. The QC Inspector will make observations and perform tests as required in the specifications.

Workmanship Observation. Items that will be embedded in the backfill will be monitored during backfill operations. Any corrective action required will be recorded.

Final Observation and Testing. Before grouting, systems being observed or tested will be documented by the Site Manager. The final observation or acceptance testing may then proceed in accordance with the following steps:

- The piping system to be grouted will be air (blow) tested to determine the pipeline's true pathway.
- The grout release form will be completed before grouting.

Meetings will be held with TNRCC at which time the commission will determine whether to inspect the tank and piping removal work.

Quality Control of Contaminated Soils. Soil excavated from the work areas will not be used for backfill. Soils will be disposed of offsite at an approved landfill, or recycled if possible.

Underground Storage Tank Soils Volume Control. After the removal of contaminated soils from the UST sites, the excavation will be measured and field surveyed to estimate the volume of soil that was removed and to determine pipe locations for as-builts. These soil volume estimates will be used to evaluate the amount of clean fill material required for backfilling the excavation.

Documentation. All records will be sorted according to Section 5.0. As-built drawings will be updated as the work progresses.

3.3 AUDITS

A senior member of Jacobs staff (i.e., Manager of Construction) will conduct three field audits of the project for compliance with project procedures; terms of the contract; and federal, state, and local regulations related to the construction. These audits will review procedures and record keeping and may be scheduled or unscheduled. The auditors will use appropriate forms for the audited activity. The audits will be conducted to accomplish two goals: (1) confirm that established requirements are being met and productivity is documented, and (2) provide guidance on how to improve the particular task or operation.

Items to be audited include, but will not be limited to, the following:

- document control, including engineering documents, chemical testing, and personnel health and safety records; and
- construction QC.

An example of the audit form is presented in Appendix B.

The Site Manager will conduct a preaudit meeting with the team to be audited. He will announce the procedure to be followed and the scope of the audit. The audit will be performed using appropriate forms and checklists for the audited activity.

At the completion of the audit, an exit meeting will be conducted to discuss the findings of the audit. A draft of the audit findings will be provided to the audited team. Corrective action will be discussed, and a plan and correction timetable will be established. The audit results will be formalized and distributed to the affected team, the Jacobs team management, and the AFCEE COR. The plan and corrective actions timetable will be monitored. The audit will be closed following corrective action, or reevaluated at the end of the timetable.

3.4 CALIBRATION EQUIPMENT

Each subcontractor will calibrate and maintain, according to industry standards, its own measuring and testing equipment. Records of calibration certifications will be maintained by the subcontractor according to the requirements listed in the SAP and will be periodically reviewed by the Site Manager. These records will be submitted to Jacobs at project completion.

4.0 QUALITY CONTROL SAMPLING STRATEGIES

This section presents the sampling activities, methods, frequency, and acceptance and rejection criteria to ensure that corrective measures are implemented as required. The test locations will be determined by the Site Manager and will be selected based on good field judgment.

4.1 PROBLEM IDENTIFICATION AND CORRECTIVE MEASURES

This procedure is intended as an enforcement system whereby all discrepancies in quality, workmanship, materials, equipment, supplies, and/or unauthorized deviations from engineering requirements on plans and specifications can be brought to the attention of responsible supervision and engineering personnel.

Discrepancies will be recorded on the NCR. The Site Manager will assign each NCR a number with a concise statement locating and describing the discrepancy.

When material, equipment, supplies, or workmanship do not conform to the contract drawings or specifications, the subcontractor or the Jacobs Site Manager will complete an NCR and immediately furnish copies to Jacobs Project Manager and Site Manager. Upon reviewing the NCR, the Site Manager will examine the rejected items. If any of the rejected items can be reworked to a usable condition, the discrepancy report will state that information. If the item cannot be reworked, either from a practical or economical standpoint, the item will be scrapped and an entry to that effect made on the discrepancy report.

Once a rework is complete, the Site Manager will be notified and will reinspect the item and compare the rework to the original requirements. If the rework is acceptable, the NCR will be closed out. From this point on, the item will be handled in the customary manner.

If, however, the rework is still not acceptable, the item will be treated as a first-time rejection, and it will be resubmitted for inspection only after further rework.

The daily project meetings will include an assessment of the schedule. When an item is affecting the schedule because of defective materials or work, the Project Manager, Site Manager, and the AFCEE COR will be notified. A resolution to the problem will be defined by the team members.

To reduce rework, an emphasis will be placed on contractors to complete the work items correctly the first time.

NCR forms will be periodically reviewed by the Site Manager and subcontractor so they can determine how uncorrected discrepancies can be resolved. They will establish timetables for final resolution of all discrepancies.

4.2 EARTHWORK

QC of backfill operations will be accomplished by oversight. Only clean material will be used for backfill. Imported materials will be sand. Backfill will be installed and compacted to within 1 foot of finished grade, and topsoil will then be added to bring the area to grade.

Specifically, QC will be conducted during the three following project phases: (1) preparatory phase; (2) initial phase; and (3) follow-up phase.

Each of the project phases is described in the following section.

4.2.1 Preparatory Phase Quality Control

General preparatory phase QC will include evaluating the potential sources of borrow materials to determine their acceptability. Backfill materials will be a select sandy material with a plasticity index (PI) of 4 to 12. Suppliers will provide gradation and PI test results.

4.2.2 Initial Phase Quality Control

During this phase, the Site Manager will ensure that all preparatory phase QC activities have been conducted, which includes observing and approving all work completed before further work is performed.

4.2.3 Follow-Up Phase Quality Control

Follow-up phase QC will be performed during construction. These evaluations will also serve as part of the certification program for final closure of the project.

Construction evaluation testing will consist of visual observation of the construction. This observation and an evaluation of the earth materials used in construction will be the primary methods of evaluating contractor compliance.

4.2.3.1 Placement

Only clean material will be used as backfill in excavations for tank foundation removal. All imported clean soils are to be used in the upper regions of backfill. Before placement of topsoil, a 10 mil visqueen layer will be placed over the clean fill material.

4.2.3.2 Compaction

General compaction and density requirements will be as follows:

- No compaction tests will be required.
- All standing water will be removed before backfill placement.
- Soils will be compacted by vibratory plate or roller. Wheel rolling with loaded trucks is acceptable.

- If, based on observation, subgrade or fills are unacceptable, additional compaction will be provided.

- If, based on visual observations or measurements, subgrade fills exceed the maximum lift thickness of 12 inches, lift thickness will be reduced.

4.2.3.3 Moisture Requirements

General moisture requirements will include the following:

- Moisture control is to be provided to the extent that the soil remains in a workable state during placement.

- Where subgrade or a layer of soil material must be moisture-conditioned, the moisture content is increased before compaction by uniformly applying water to the surface of the subgrade or layer of soil material. Water is added at such a rate as to avoid free water from appearing on the surface during or after compaction operations.

- Soil material that is too wet to permit compaction is to be removed and replaced, or scarified and air dried.

- Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Drying is to be assisted by discing, harrowing, or pulverizing until the moisture content is reduced to a satisfactory value, as determined by moisture-density relation tests.

4.2.3.4 Grading

General grading requirements will include the following:

- Smooth grade the final surface.
- Finished grades will be higher than surrounding area and sloped to existing contours.

4.2.3.5 Field Quality Control

General field QC requirements will include the following:

- Subgrades will be inspected and approved before further construction work is performed.
- Jacobs will be responsible for monitoring all earthwork activities.
- Subcontractor will cooperate with and assist with field QC in-place testing.
- Moisture content will be observed.

If, based on reports of testing and inspection, the subgrade or fills are inadequately compacted, necessary corrective actions will be taken.

4.2.3.6 Topsoil

Before placement of topsoil, a layer of 10 mil visqueen will be spread over backfill materials placed in the tank excavations. The visqueen will act as an impermeable barrier and prevent surface water from carrying potential contaminants from the surface through the clean backfill.

Areas where permanent grades are established will have a vegetative topsoil. Construction QC of the topsoil layer will consist of observing the initial growth of seeded areas to verify the successful establishment of vegetative cover as per the specifications.

Topsoil Specifications. The following topsoil specifications shall be observed:

- Segregate loam, or approved topsoil removed within the confines of the project, into piles, clean sufficiently, and reuse if the material meets the requirements stated in this section.

- Furnish all other loam or topsoil necessary to complete the work from approved sources offsite.

- Furnish good-quality friable topsoil. Topsoil is considered to be of good quality if it is free of stones over 2 inches in diameter, and a maximum of 85 percent of the topsoil passes through a Number 200 sieve.

- Ensure that topsoil is reasonably free from subsoil, clay lumps, stones, brush, objectionable stumps, roots, litter, toxic substances, and other material or substances that may be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations.

- Deposit on prepared areas to obtain a reasonable uniform compacted depth to match surrounding grades. Spread and till the topsoil, raking out all pieces of sod, roots, and grass.

- Compact into uniform layer by rolling to prepare for liming, fertilizing, and seeding.

Maintenance of Vegetated Areas. Protection of graded areas will include the following:

- Protect newly graded areas from traffic and erosion, and keep free of trash and debris.

- Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

Reconditioning of compacted areas will involve scarifying the surface, reshaping, and compacting.

4.3 EXCAVATION

The following items will be addressed during excavation:

- Note presence of any staining caused by JP-4 leakage.

- Note depth and location of staining.

- Note presence of any free fuel.

- Test soils for contamination using HNu and immunoassay test kits as described in the SAP. The HNu testing will be performed and documented by Riedel and witnessed by the Jacobs Site Manager. A 10.2 electron volt (eV) lamp should detect all benzene, toluene, ethylbenzene, and xylene (BTEX) compounds. The test kits will analyze for total BTEX and polycyclic aromatic hydrocarbons (PAHs) in soils. Jacobs will perform the immunoassay testing. Samples will also be collected and submitted to an off-site laboratory for analysis for BTEX and total petroleum hydrocarbons (TPH) from the UST excavations.

- Segregate clean soils from contaminated soils during excavation based on the results of the testing described above (place contaminated soils on 10 mil plastic). No excavated soils will be used for backfill. Any soils that are removed from an area where there is free-floating product must be stored separately from other contaminated soils.

- **Ensure Safety**: Side slopes on the excavation must be at least 1 1/2 to 1. No one is to enter an excavation that does not meet this slope requirement. Shoring or trench box may be used in smaller excavations.

- Standing water is to be removed before backfilling

4.4 DEMOLITION

Demolition will consist of the following steps:

- Demolition drawings will be updated before work begins. Updated drawings will reflect where cuts are to be made and state the demolition sequence.

- A review meeting will be held to discuss all areas of work and identify safety hazards.

- Daily meetings will be held to discuss activities and hazards.

- All workers will be clear of the building before any collapsing operations begin.

- Torch-cutting operations will address presence of combustibles or fuel residuals.

- A hot-work permit will be required.

4.5 FUEL SPILLS/CONTAINMENT

Provisions will be made to contain spills that might occur during the following:

- tank pumping;
- pipe opening;
- pipe sampling; and
- grouting.

Spills may be handled by placing buckets under joints being opened or by constructing berms and lining the area with visqueen to capture spills

4.6 DECONTAMINATION OF EQUIPMENT

A decontamination pad will be erected for decontamination of any piping and equipment removed from the pump station or cut from the buried lines. Materials will be rinsed with hot water from a high-pressure washer. Wastewater will be disposed of in accordance with procedures described in the ECP.

4.7 TANK REMOVAL

Contents of the fuel tanks are considered hazardous materials. JP-4 fuel and sludges must be removed before excavating beside the tanks. Additionally, the following items will be noted on the tank excavation checklist:

- fuel removed;
- fuel disposed of (according to ECP);
- atmosphere inerted to less than 10 percent LEL (according to HSP) (dry ice may be used);
- structural condition of the shell following tank excavation (i.e., gouges caused by excavator, rust holes, leaks, pipe rusted off, etc.);
- hold down straps removed; and
- stability of tank on sleepers.

Before lifting tank from the hole, the following information is required on the excavation checklist:

- completion of Lift Plan Form (see Jacobs Engineering Merit Constructors Inc. [JEMCI] safety notice);
- dimensions of tank;
- amount of product and sludge remaining inside;
- total weight of tank and contents;
- lifting points; and
- stability of soil for crane.

Following removal of each tank, the steps below must be followed:

- Verify residuals in tank are drained and properly stored.
- Verify tanks are properly decontaminated at the decontamination pad.

- Verify tank scrap is properly disposed of.
- Verify tank saddle concrete is removed.
- After tanks are removed, verify that soils under tanks are sampled to determine if any contamination is present.

4.8 PIPE PREPARATION

Identifying pipeline locations can be difficult. The initial step will be to review the drawings; however, changes may have been made to the pipelines since the production of the drawings. To help identify pipeline locations, the steps listed below should be followed:

- Review the drawings.
- Discuss the problem with the station engineer, if available, to determine what modifications have been performed.
- Visit the site of pumping station C and update the drawing to reflect the locations of all pipes. This step may help in locating similar piping on already-demolished pump stations.
- At previously removed pumping stations, excavate to expose abandoned pipes.
- Following drilling of pipe and testing for fuels, etc., attach a flange to the pipe ends to assist in testing and grouting.
- Run a pig through the lines to remove any residual fuel. Take steps to capture fuel that may exit at the end of the pipes.

* Discuss with the subcontractor how to prevent the pig from becoming stuck in the line. Determine corrective action if this situation arises.

4.9 PIPE CLOSURE

The method of closure on the piping system is to grout with a cement/bentonite slurry. Provisions must be made to identify and seal all openings in a line to prevent grout from escaping into surrounding soils. To ensure that the entire system is grouted, a plug should be applied to all open ends and air pressure applied at one end. If no pressure buildup occurs, look for air being blown through an uncapped opening in the pipe.

The following steps are to be performed to ensure the pipes are full:

* Cap and blow pipes.
* Determine length and size of pipes.
* Determine volume of pipe system being grouted.
* Verify grout mixture proportions.
* Be sure connection is well braced when introducing grout.
* Measure amount introduced and compare with calculated amount.
* Be prepared to capture any fuel pushed out by grout.
* Ensure lines are full by systematic capping of openings.

4.10 DRIVE-POINT SOIL SAMPLES

The following steps will be performed during drive-point sampling:

* Locate pipes by drawings.
* Use pipe locator to identify physical locations.
* Implement drive-point sampling and record depths and sample results. (Refer to the SAP).
* Collect samples for off-site laboratory analysis (Refer to the SAP).

(intentionally blank)

5.0 DOCUMENTATION

The subcontractor will document construction activities associated with the closure of the fuel hydrant system. Such documentation will include, as a minimum, daily reports of construction activities, periodic summary reports, and a summary record report on the construction project. Copies of reports will be submitted to the station. Example field report forms are included in Appendix B.

5.1 QUALITY CONTROL REPORTS

QC reports will include auditing documentation, test data sheets, corrective measures, and discrepancy reports.

5.1.1 Daily Reports

To supplement the information recorded in the field logbook, daily reports will also be maintained for every sampling location. An example of the daily report form to be used is in Appendix B. Copies of observation and test reports, including data and calculation sheets, will be submitted with the daily report.

5.1.2 Other Reporting Forms

The following list describes the forms that will be used. Samples of these forms are in Appendix B. This list is not all-inclusive and may be revised and updated as conditions require. The records will be available for review by the COR.

- Daily Report. This report is to be completed daily, as appropriate, covering the day's QC activities.

- NCR. The NCR is used to report discrepancies, both in materials and workmanship, noting the problem and corrective measure taken. Data from this report will be summarized and reported on the daily report.

- Field Change Request (FCR). The FCR is used to keep management informed about any changes being contemplated. The Air Force will be notified immediately in writing of any proposed changes. Changes will usually be initiated by the Site Manager or a subcontractor. Once checked for validity, the FCR will be forwarded to the Project Manager for signature and, if required, to the AFCEE COR. This document can then be used by QC to inspect the affected or changed work.

- Tank Excavation Checklist. The checklist is used to ensure that listed items are performed. This list will document various readings and safe removal and disposal.

- Calibration Records. Calibration records will be kept at the field office. Each time a piece of equipment is calibrated, the results will be documented on the Calibration Record forms.

- Field Audit Form. This form is to be used when conducting audits.

5.2 NONCONFORMANCE AND CORRECTIVE ACTION

It is important that any nonconforming material, assembly, or construction method that is identified be corrected through systematic actions. The following actions will be taken:

- If, at any time, materials or workmanship are observed that do not comply with drawings, specifications, codes, or acceptable construction practices, the Jacobs Site Manager or subcontractor will initiate prompt corrective action. The discrepancies, if they cannot be corrected immediately, shall be documented on an NCR. A detailed description of the item or condition that has failed to meet drawing or specification requirements will be given with an explanation of conditions at the time of failure and its probable cause.

- The subcontractor or Jacobs Site Manager will evaluate discrepancies to coordinate the resolution and determine methods of correction that may prevent recurrence of the problem.

- When corrective action is complete, the item will again be subject to final inspection.

- The Final Acceptance Report will note any retest required and performed, or change in identification of any replacement parts used in correcting the problem.

- A distribution list for discrepancy reports will be determined at the initial AFCEE planning process.

5.3 FINAL DOCUMENTS

The final documents will include copies of pertinent inspection reports, associated photographs, test results, and record drawings. The final documents will also include the following:

- as-built drawings depicting the location of the abandoned pipe ends (accomplished by marking up existing drawings);
- results of soil sample analyses for drive-point samples;
- records for contaminated soil disposal;
- records for contaminated liquid disposal; and
- inspection reports.

All closure documents will be sent to the Project Manager for inclusion in the Technical Report.

Name: **KRIS W. BARRETT**

Title: **Corporate Quality Assurance Director**

Education: M.S., 1984, Management of Technology Organizations, American University
M.S., 1978, Environmental Science, George Washington University
B.S., 1967, Biochemistry, Pennsylvania State University
Graduate (with Distinction), 1990, U.S. Naval War College

Special Training: Health and Safety for Hazardous Waste Operations (40 hour)

Certification: Certified Quality Auditor, 1992

Affiliations: American Society for Quality Control
American Chemical Society
American Society for Testing and Materials
American Defense Preparedness Association
Reserve Officers Association
Naval Institute

Mr. Barrett has over 26 years of environmental experience. As Corporate QA Manager, he is responsible for managing Jacobs QA Department, and for supervising Jacobs QA Officers to assure that all project quality requirements conform to the client's needs and specifications. For more than ten years, he has been ensuring the technical quality of hazardous waste site assessment projects from initial site discovery through remedial action selection. He is a member of the ASTM consensus standard committee on hazardous substances and oil spill response (F20) and Chairman of the ASTM Task Group on Conceptual Site Models. Mr. Barrett teaches environmental sampling for HTRW sites as part of his proactive audit and Total Quality Management Program.

Mr. Barrett has established technical review procedures, conducted onsite audits, reviewed and critiqued site-specific QC plans, and is solely responsible to Jacobs Board of Directors for the accountable performance of all federal projects nationwide. He has been actively providing QA oversight and direction on Jacobs $260 million Comprehensive Long-Term Environmental Action Navy (CLEAN) contract, U.S. Air Force's Installation Restoration Program (IRP) work, has performed QA audits of the offsite design program for Jacobs work on the Weldon Spring Site Remedial Action Program in Missouri, and the RI/FS for Anniston Army Amunition Depot in Alabama under the USATHAMA contract.

Mr. Barrett initiated and chaired a national technical workshop on analytical services for the U.S. Air Force. He is a frequent guest speaker on Total Quality Management and hazardous waste site cleanup.

As Manager at The MITRE Corporation, not-for-profit government consulting company, he was principally involved in systems analysis, regulatory action, program evaluation, and liaison with the U.S. Air Force and the EPA.

Concurrent with work at MITRE, he directed a U.S. Coast Guard Reserve Group encompassing West Texas and the State of New Mexico, developing and testing various readiness and contingency plans for the Texas coast. Mr. Barrett has been guest lecturer and instructor in hazardous chemical emergency response and readiness planning at the Coast Guard Training Center at Yorktown, Virginia. In addition, he was responsible for interagency liaison and Coast Guard representation at San Antonio, Texas.

Mr. Barrett served as Group Leader at the U.S. Air Force Center for Environmental Excellence at Brooks AFB, Texas, establishing a new remote office for MITRE at San Antonio. In this capacity, he was responsible for creating control mechanisms for the quality of technical work, nurturing new employee integration, and developing client confidence in technical projects involving the Air Force Installation Restoration Program, investigating and cleaning up hazardous waste sites. Specifically, he reviewed Air Force statements of work and contractor work plans, QA project plans, technical data and analyses, draft and final reports, and fieldwork for RI/FS and remedial design projects. He was responsible for development of Versions 3.0 and 4.0 of the Air Force IRP Handbook. He was also responsible for development and implementation of a nationwide environmental analytical services laboratory QA program including onsite laboratory audits. As Site Leader, he created management control mechanisms for ensuring the quality of work and development of newly hired employees and was responsible for contract management and direct client interface at the collocated site.

For the Metrek Division of The MITRE Corporation, Mr. Barrett was Project Officer for projects dealing with uncontrolled hazardous waste sites under Superfund and hazardous waste disposal by thermal decomposition under RCRA. Specifically, he was responsible for the development of the EPA uncontrolled hazardous waste site Hazard Ranking System (HRS) and the QA program used by EPA to implement the Federal Remedial Action Program for Hazardous Waste Sites. Subsequent to the enactment of SARA, he was responsible for developing modifications to the HRS required by the new legislation and coordinated these recommendations through the EPA Work Group process. He also:

- Coordinated and performed the QA program for the NPL, consisting of peer review of technical documentation of decisions and training
- Developed the original EPA HRS in the National Contingency Plan and a preliminary guidance manual on feasibility studies and conceptual design for cleanup
- Developed a major data management system for the thermal decomposition of hazardous waste, including data collection and verification
- Assisted EPA with strategy planning for research and development in industrial wastewater, industrial solid waste, and oil and hazardous substance spill response
- Worked on reviews of new source performance standards for petroleum refineries, portland cement industry, and sewage sludge incinerators
- Appeared as frequent guest lecturer at the U.S. Coast Guard Hazardous Chemical Training Course and wrote course instruction modules
- Developed a mechanism for estimating the hazardous waste generated by industry in conjunction with preparation of the EIS for Subtitle C of RCRA

KRIS W. BARRETT (3/4)

- Prepared status reports for EPA and wrote the report for the COMAT Task Force on the Environment, and an Information Source Bibliography for Organic Emissions from Organic Chemical Manufacturers
- Developed and computerized a program planning structure for EPA's Office of Energy and Minerals Industry
- Prepared an analysis of methods/approaches to estimating oil spill risk.

While with the University of Maryland, he directed operation of a faculty research supply center where he designed a self-service facility for scientific apparatus and chemicals and computerized a store facility for inventory control and billing. He provided expertise on gas chromatographic equipment and technical troubleshooting.

As a Captain in the U.S. Coast Guard Reserve, Mr. Barrett is responsible for training Coast Guard personnel in the areas of readiness planning, hazardous materials response, contingency planning, and port security/environmental response actions. He:

- Designed and implemented command and field training exercises
- Acted as the On Scene Coordinator representative at major oil spills
- Was responsible for operation of an electronic aid to navigation in Thailand
- Served as Boating Safety Administrator for Northern California. Involved in public relations, taught classes, and appeared as guest speaker at various functions
- Participated in EASTROPAC, EASTROLANT, and BOMEX oceanographic projects as Deck Watch Officer.

While at the University of Alaska, Mr. Barrett assembled and operated gas chromatographs while working on his thesis to determine ion exchange properties of clay minerals in glacial flour.

During his education at Pennsylvania State University, Mr. Barrett performed all chemical analyses for model sewage treatment plants (BOD, COD PO_4, turbidity); used radioisotopes of sulfur, phosphorus, and carbon; performed chromatographic analyses using thin layer, and gas and paper chromatography; assembled, made operational, and used gas chromatographs; and operated a computerized scintillation counter.

Employment History:

Jacobs Engineering Group Inc. Corporate Quality Assurance Director	1991 to date
U.S. Coast Guard Reserve Special Projects, Eighth Coast Guard District	1967 to date
The MITRE Corporation Group/Site Leader	1975 - 1991
University of Maryland Director of Chemistry Stores	1973 - 1975

KRIS W. BARRETT (4/4)

U.S. Coast Guard (Active Duty) Oceanographic Surveys; Boating Safety; LORAN	1967 - 1973
University of Alaska Oceanographic Research, National Science Foundation Grant	1967 - 1967
Pennsylvania State University Laboratory Technician	1966 - 1967

Name: **JOHN MCMANUS**

Title: **Environmental Site Manager**

Education: B.S., 1966, Mechanical Engineering, Texas Technological College

Certification: OSHA Hazardous Waste Training (29CFR1910.120)

Mr. McManus has 28 years of experience in the construction industry as Project Manager, Construction Manager, Superintendent, and Construction Engineer. For the past five years, he has been involved with environmental compliance projects with approximately 22 months of Levels A and B experience and approximately three years of medically monitored projects. His prior project experience includes power plant, and petrochemical and industrial projects with specific experience in the mechanical systems for those projects. His responsibilities include cost, schedule, quality assurance, subcontractor supervision, onsite engineering, and safety.

His environmental project experience includes:

- Site Manager for construction of groundwater pump and treat system and bioremediation project under the U.S. Air Force Installation Restoration Program (IRP) at Elmendorf AFB, Alaska
- Site Manager responsible for field activities at DOE's Pantex facility at Amarillo, Texas under the Tulsa U.S. Army Corps of Engineers District RCRA compliance program, including building decontamination/demolition, landfill excavation and investigation activities
- Site Manager for the U.S. Air Force IRP decontamination and drum storage facility construction project at Edwards AFB, California
- Construction Manager for a benzene abatement project for Monsanto Chemical at Carson, California
- Site Manager for underground storage tank removal at the U.S. Marine Corps Base at Barstow, California under the Comprehensive Long-Term Environmental Action Navy (CLEAN) contract
- Construction Manager for wastewater treatment upgrades for Unocal's Los Angeles Refinery
- Construction Manager for tankage and storage secondary containment for Unocal's Los Angeles Refinery.

Mr. McManus' project experience also includes:

- Construction Manager for a plant renovation project for Monsanto Chemical at Carson, California
- Construction Manager for genetron plant expansion for Allied Signal at El Segundo, California
- Construction Manager for an NO_X reduction project for Monsanto Chemical at Carson, California
- Construction Engineer for a NO_X reduction project for Texaco Refining & Marketing at Los Angeles, California
- Construction Engineer for an LLX reduction project for Kerr-McGee Chemical at Trona, California
- Mechanical Superintendent for an LM-2500, HRSG, cogeneration, HRSG project for Unocal Corporation at Los Angeles, California
- Construction Engineer for a 40 MW cogeneration, HRSG project for the University of Texas at Austin, Texas

JOHN MCMANUS (2/2)

- Mechanical Superintendent for a polyethylene unit for Exxon Chemical at Baytown, Texas
- Construction Engineer for a power plant boiler for Dow Chemical at Freeport, Texas.

Employment History:

Jacobs Engineering Group Inc. Environmental Site Manager Construction Site Manager	1992 to date
E & L Engineering Inc., Long Beach, California Construction Manager Construction Engineer	1987 - 1992
H.B. Zachry Company, San Antonio, Texas Mechanical Superintendent Mechanical Engineer	1980 - 1987
Group Construction Company, Freeport, Texas Mechanical Superintendent	1978 - 1980
McGill Mechanical Contractors, Freeport, Texas Mechanical Engineer	1977 - 1978
McManus Construction Company, Freeport, Texas Owner	1972 - 1977
Pacific Construction, Alaska Foreman	1970 - 1972
Hicks & Ragland Consulting Engineers, Dallas, Texas Field Engineer	1968 - 1970

Name:	**LYNN SCHUETTER, RG, CPG**
Title:	**Technical Manager**
Education:	M.A., 1972, Geology, University of South Florida B.A., 1970, Geology, Clark University
Registration:	Registered Geologist, PG-1684, Wyoming
Certifications:	Certified Professional Geologist (No. 7897) Licensed Geologist (No. G266), Alaska Certificate of Completion, 1988, Hazardous Waste Management for Project Managers, Colorado School of Mines EPA Approved 40-hour Health and Safety Training 4-hour Radiation Safety Training 8-hour Supervisor Health and Safety Training First Aid and CPR
Affiliations:	American Institute of Professional Geologists Association of Groundwater Scientists and Engineers American Association of Petroleum Geologists, Division of Environmental Geoscience
General:	The Mountain Geologist, 1989, Associate Editor

Ms. Schuetter has 22 years of experience in subsurface geological studies and environmental projects, with an emphasis on site investigations. She has conducted and supervised surface and subsurface soil sampling, monitoring well installation, groundwater sampling, and soil-gas sampling. She has written numerous reports that have included evaluation of data acquired during site investigations. She has contributed to the preparation of remedial investigation reports, RCRA studies, work plans, sampling plans, and health and safety plans. Ms. Schuetter has served as Project Manager and Project Geologist in the environmental and geological sciences, and is a Certified Professional Geologist.

Ms. Schuetter serves the Denver office as Group Leader for the Geoscience Group. In this position, she has personnel management responsibilities for a staff of 23 geologists and hydrogeologists. These responsibilities include performance evaluations, staffing assignments, assisting the staff with career planning and growth, and evaluation and interviews of potential new hires.

Under the U.S. Air Force Installation Restoration Program (IRP) contract, Ms. Schuetter is Jacobs Project Manager for a quarterly groundwater monitoring program at an Air Force installation at Fort Worth, Texas. The groundwater is contaminated with trichloroethylene (TCE), dichloroethylene (DCE), and possibly heavy metals. This project has involved preparation of cost proposals, a health and safety plan, a quality assurance project plan, and a field sampling plan. Ms. Schuetter also provided supervision of a field sampling team, and quality assurance review of the field data. This project included comprehensive sampling of over 250 wells in a six-week period.

Under the Air Force IRP contract, Ms. Schuetter is Jacobs Project Manager for an RI/FS at Indian Mountain Long Range Radar Station, Alaska. This project involves preparation of scoping and planning documents, implementation of fieldwork at a remote Alaska site, and preparation of an RI/FS report.

Ms. Schuetter served as Deputy Project Manager for an RI/FS at Eareckson Air Station, Alaska. Her primary duties included supervision of staff preparing planning documents, preparation and implementation of a staffing schedule for a three-month field effort, and participation in field sampling activities.

Ms. Schuetter served as Jacobs Project Manager for three projects under the Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) contract. One of these projects was RCRA Facility Assessment (RFA) of an active Marine Corps Base at Yuma, Arizona. For this project, she prepared cost proposals, implementation plans, a health and safety plan, and a report on the results of a preliminary review of background and historical site data. She also coordinated and conducted a visual site inspection (VSI). She was Project Manager for site inspections at an abandoned Navy installation at Sentinel, Arizona and an explosive ordnance disposal site at Yuma, Arizona. Ms. Schuetter provided technical support for other Navy CLEAN projects, including RFAs at Marine Corps bases at Twentynine Palms and Barstow, California, and preparation of an RI/FS work plan and sampling plan for a Marine Corps Base at Yuma, Arizona.

Ms. Schuetter has been extensively involved in CERCLA remedial activities at DOE's Weldon Spring Site Remedial Action Project, a National Priorities List (NPL) site in Missouri. This project involves remedial activities to decontaminate, treat, or dispose of mixed wastes at a 220-acre former uranium and thorium processing facility. Wastes include PCBs, asbestos, solvents, metals, and widespread low-level radioactive contamination; as well as explosives from earlier use of the plant as a trinitrotoluene (TNT) batch production plant. Contaminated media include soil, sludge, surface water, groundwater, and over 40 buildings and structures. Ms. Schuetter provided overall coordination, as well as technical writing and editing, for the RI report for one Operable Unit. She assisted the Waste Management Group at the site with developing and preparing waste handling standard operating procedures, performing RCRA inspections, and compiling an extensive waste inventory for the project. She has also prepared scoping documents and characterization reports in support of RI/FS activities, and has participated in soil sample preparation, oversight of monitoring well installation, and well development as part of the RI sampling work at the site.

Under EPA's technical support (TES IV) contract, Ms. Schuetter provided technical review of numerous documents, including CERCLA RI reports, preliminary assessment/site investigation reports, and groundwater investigations. She assisted in preparing a CERCLA Record of Decision for an inactive mine tailing site in South Dakota for EPA Region VIII, and participated in RFAs in Missouri and Iowa for EPA Region VII. Ms. Schuetter provided oversight of field activities conducted by Potentially Responsible Parties under CERCLA in Colorado for EPA Region VIII. She also supported many RCRA and CERCLA compliance projects including preparation of work plans and health and safety plans, review of sampling plans, oversight of soil sampling, and community relations activities. This work has included sites in Colorado, Wyoming, South Dakota, and Iowa.

Under the TES X contract, Ms. Schuetter served as Contractor Project Manager for an RFA of an active polyethylene production plant in Iowa for EPA Region VII. This project involved an extensive literature search as well as a visual site inspection and recommendations for further investigation.

LYNN SCHUETTER, RG, CPG (3/4)

Under the Alternative Remedial Contracting Strategy (ARCS) contract with EPA, Ms. Schuetter has provided support to numerous projects. This support has included preparation of work plans and health and safety plans, review of sampling plans, oversight of soil sampling, and community relations activities. This work has included sites in Colorado, Wyoming, South Dakota, and Iowa.

While a Consulting Geologist, Ms. Schuetter researched and developed potential oil and gas drilling prospects throughout the western United States. These prospects were based on extensive subsurface stratigraphic and structural interpretation. She prepared written reports and maps, and verbally presented work proposals to senior corporate management. Ms. Schuetter participated in an extensive 12-week training program, "Hazardous Waste Management for Project Managers," at the Colorado School of Mines. This course provided detailed instruction in many aspects of the hazardous waste industry including geochemistry, hydrology, remedial alternatives, statistics, regulations, economics, and health and safety.

While Senior Geologist for the Atlantic Richfield Company, Ms. Schuetter developed numerous potential oil and gas drilling prospects based on extensive subsurface stratigraphic and structural interpretations. She has experience in wellsite geology, geophysical logging and interpretation, well sampling and coring, and testing for hydrocarbons. She authored numerous in-house technical reports, and verbally presented work proposals and project results to senior corporate management. As Operations Manager, she originated and implemented procedures for drilling wells. She also supervised several well projects with budgets from $1 million to $10 million, and drilling schedules from four months to one year. Ms. Schuetter designed and organized reporting, documenting, and evaluating procedures, as well as work plans and schedules. She was responsible for estimates, budgets, and economic analyses and supervised contractors through written and verbal communications, as well as actual site visits. She assisted in training and supervising junior level personnel in technical and operational procedures, and authored the first in-house wellsite procedure manual for the onshore California Province. Ms. Schuetter served as Project Geologist and wellsite Geologist for numerous onshore and offshore California wells.

Ms. Schuetter served as Project Geologist and wellsite Geologist on several Alaskan North Slope wells for Sohio Petroleum Company. She directed the sampling, logging, testing, and evaluation of these wells, and reported progress and results to company offices. As part of a team evaluating the geology and hydrocarbon potential of the Atlantic Coastal Plain, Ms. Schuetter performed an extensive literature search; compiling and reviewing hundreds of geologic and well reports. This search enabled the team to assess available data, decide on additional data requirements, and prepare work plans accordingly.

Ms. Schuetter directed several geologic field sampling efforts in the Atlantic Coastal Plain. She worked closely with representatives of state geologic surveys in New Jersey, Delaware, Maryland, Virginia, and North and South Carolina to plan an itinerary for each sampling effort, based on availability of sampling locations. She then designed sampling programs and was responsible for collection, field description, documentation, and shipping of the samples. She completed laboratory description and classification of the samples, and wrote a detailed report of each effort for company files.

As Assistant to the Coordinator of Oil and Gas Drilling Funds of Belco Petroleum Corporation, Ms. Schuetter compiled information from a number of corporate departments to prepare quarterly and annual reports for fund investors. She was responsible for written and verbal communications with investors in response to their questions. She also reviewed legal documents such as divorce proceedings and probate settlements that may have affected an investor's interest in the funds.

Employment History:

Jacobs Engineering Group Inc. Technical Manager Geologist	1988 to date
Self Employed Consulting Geologist	1986 - 1988
ARCO Exploration Company Operations/Senior Geologist	1981 - 1985
Sohio Petroleum Company Geologist	1974 - 1981
Belco Petroleum Corporation Assistant to the Fund Coordinator	1973 - 1974
University of South Florida, Geology Department Graduate Teaching Assistant	1970 - 1972

Name: **HAROLD C. THOMPSON**

Title: **Quality Assurance Manager**

Education: Mechanical Engineering, Denver University

Special Training:
USAF Aircraft Systems, 23 weeks
Metals Engineering Institute Courses: Elements of Metallurgy, Weld Quality, Heat Treatment, Corrosion
Quality Management by ASQC
Quality Engineering and Statistics by ASQC
ASME Seminar Design of Pressure Vessels
Liquid Penetrant Examination

Certifications:
NASA Spacecraft System Certification School By Rockwell International, Inc.
DOD Air Force Missile System Certification School By Martin Marietta Corporation
SNT -TC - 1A Level II - RT, PT, MT, UT
AWS Certified Welding Inspector #82122451
Certified Auditor to ANSI 45.2
OSHA 40-hour course
Certified Trainer, Total Quality Management
Hazardous Spill First Responder Trained

Affiliations:
American Society of Quality Control
American Society of Metals International

Mr. Thompson has over 30 years of experience in quality assurance systems work associated with aerospace and government projects. He has designed QA manuals, audited job site quality, and resolved quality problems concerning vendors; been involved in the selection, training, and placement of QA personnel; and coordinated inspection of equipment and material supplies.

As Quality/Safety Manager for Jacobs, he is responsible for the following programs:

- Developed quality assurance corporate and project plans
- Administered project safety program
- Administered a quality system manual for ASME code compliance and repairs
- Authored a field quality inspection manual, including implementation and controls
- Administered development of project operations and system safety manual
- Developed project quality assurance manuals and inspection procedures and administered their implementation
- Coordinated vendor shop inspection of equipment and material suppliers
- Performed audits of vendors' capacity to comply with established quality standards, and audited jobsite quality and Jacobs internal systems
- Selected, trained, and placed quality assurance personnel
- Participated in the resolution of quality problems concerning vendors, contractors, engineering, governmental agencies, and client quality representatives
- Administered vessel recertification program, positive material identification procedure, and numerous code repair/alteration plans.

HAROLD C. THOMPSON

Representative assignments include:

- Inspector on the brine recovery stretch expansion for General Electric at Mount Vernon, Indiana. Project included engineering and procurement for a debottlenecking project to increase the existing chlor-alkali facility by 10 percent. Included cells, brine treating, chlorine, and hydrogen
- Inspector on the Vent Neutralization Project for General Electric at Burkville, Alabama
- Construction Surveillance Field Quality Engineer for start-up on the Strategic Petroleum Reserve, DOE Risk Abatement Project at Weeks, Louisiana:
  - reviewed contracts and specifications of contractors for compliance to codes and design
  - verified material, equipment, and construction installation to meet drawings and specifications
  - initiated and coordinated as-built corrections and redline drawings for final revisions to civil, mechanical, and instrument installations
  - developed and wrote a start-up procedure for emergency oil withdrawal, monitored current testing to assure its operational integrity, and issued final revision for future use by DOE
  - performed quality assurance audits of construction records and submittal to verify contractor compliance to task requirements
- Project Quality and Safety Manager for the U.S. Air Force unconventional propellant/hazardous waste operations at Vandenberg AFB, California. Responsibilities included:
  - developed and implemented a quality program to Mil-L-45208A and Mil-Q-9859A to deliver rock propellant to users and maintain all systems to support the activity
  - monitored design, procurement, fabrication, and installation of pipe modifications to hydrazine and nitrogen tetroxide storage facilities
  - participated in hazardous waste control program
  - managed project safety program that included writing project safety manual, hazard analysis reports, and performing system safety analysis reviews
  - provided classroom instruction in total quality management, first level supervisor training, monthly and quarterly safety training, and certification
  - developed and administered a pressure vessel recertification program for remaining life assessment by design verification through NDE examination
  - fatigue analysis, fracture mechanics, and flaw analysis in accordance with ASME codes
  - quality/safety design review of pressure vessel modifications to assure compliance to codes and physical verification of installation
  - performed quarterly audit of all project services to Air Force requirements
- Project quality management for GE Plastics at Bay St. Louis, Mississippi for a specialty polymer plant. Responsibilities included design review for reactor vessels to assure the quality requirement for motor selection, welding, assembly inspection, and polishing finish limits; compliance to ASME for unit vessels, exchangers, and piping system review of design and inspection requirements for modular construction; and selection and qualification of vendor capability to fabricate all items for the project

- BASF Chemicals at Freeport, Texas. Quality management responsibilities for QA project plants, estimates, and the vendor surveillance requirements and coordination of 2,000 tag items of equipment of multiple projects in the plant complex. Included quality audits of vendors, design drawing packages, purchase orders and quality documentation, administrative, and technical development of staff
- E-line polypropylene expansion for HIMONT U.S.A. at Bayport, Texas. Provided quality management of all source and jobsite inspection on loop reactor vessels and mechanical equipment
- Exxon Chemicals Inc. at Baytown, Texas. Quality management responsibility to develop QA/QC program for maintenance operations, selection, training, and placement of supervisors and staff, and their administration and technical development
- Oxyalkylation chemical plant for Nalso Chemical at Freeport, Texas. Supervised quality activity for vendor evaluation, engineering drawing reviews, weld procedure review and application, vendor inspection schedules and planning, and final resolution of quality problems relating vendor furnished equipment
- Exxon Corporation, CO_2 gasification plant at LaBarge, Wyoming. Quality management responsibility to source, qualify, and selection of inspection personnel for the structural fabrication, equipment assembly, pipe welding, control systems installation, and test and checkout of process modules
- Specialty polymer facility for GE Plastics at Bay St. Louis, Mississippi. Involved in total quality management of procurement of new equipment and construction and checkout. Project had 500 major tag items of equipment. Unique equipment was monomer reactors, steam tube dryers, and vacuum cyclone filters. Originated project quality plan and audit for compliance
- Grassroots 150 million PPY ABS plastic manufacturing facility and 50 million facility expansion for GE Plastics at Bay St. Louis, Mississippi. Major equipment included high alloy reactors, jacketed piping, extruders, heat exchangers, pelletizer with the air handling system, steel, pipe, and electrical equipment
- AMPS unit modification for Lubrizol Corporation at Houston, Texas. Replacement equipment included jacketed reactors, centrifuges and special pumps, and materials designed for corrosive service
- Ammonia retrofit project for E.I. du Pont de Nemours and Company at Beaumont, Texas. Installed equipment included stripper and reclaimer towers, pumps, compressors, and piping for high temperature and high pressure service. Detailed quality plans were generated for each item of equipment
- A 320,000 metric TPD plant for NAFCON (National Fertilizer Company of Nigeria) at Rivers State, Nigeria. Project included extensive inspection and expediting of all equipment including detailed export procedures and interfacing with client contract inspectors
- Polypropylene expansion for HIMONT U.S.A., Inc. at Lake Charles, Louisiana and Bayport, Texas. Unique equipment included jacketed internally polished pipe loop reactors, SS agitated and trayed reactors, cyclone dryers, catalyst metering skids, compressor skids, flake drying, and air handling equipment
- Sour gas processing plant for Shell Oil Company at Frederic Township, Michigan. This was a modularized project requiring 27 skids to contain all process equipment that included Waukesha gas engine driven compressors
- Crude charge heater at Wilmington, California plant and a revamp of the hydrocracker unit and saturates gas plant for Shell Oil Company at Martinez, California
- Strategic Petroleum Reserve Program for the DOE at six Gulf Coast sites. Provided quality management and assignment of inspectors at vendors and on field sites for the installation of piping and pump transfer systems from underground storage caverns. Project scope included development and implementation of a DOE Project Quality Manual, training program for welding and NDE, and a document control system for all drawings and records

HAROLD C. THOMPSON

- Titan I, II, and III projects for Martin Marietta Corporation at Denver, Colorado. Included verification of all systems for static firing ground tests. This included countdown preparations, loading hypergolic propellants, pressurization and control systems, and control systems for data acquisition
- Carbon dioxide removal unit revamp for Huffington Oil at the Bontang, Indonesian LNG plant
- Sulfur handling and export facility in Saudi Arabia for ARAMCO/Wimpey ME&C
- Catalytic dewaxing unit and amine treating unit for Gulf Oil Company at Port Arthur, Texas. Major equipment included heavy wall high alloy reactor, trayed towers, tanks and drums, shell and tube exchangers, compressor skid units, pumps, structural steel, and pipe spools
- Propane production facility for Hawaiian Independent Refinery at Oahu, Hawaii. Purchased equipment included trayed towers, compressor skid units with electrical controls, storage bullets, piping system, and electrical substations
- Hydrazine facility for Olin Chemical at Lake Charles, Louisiana. Total use of alloy analyzer for all material to assure chemistry compatible to process towers, exchangers, pumps, valves, and instrumentation.

In previous employment with Daniel International, Inc. Mr. Thompson served as Mechanical/Welding Inspector. He conducted field inspections of uranium and plutonium nuclear services project for Allied General Corporation at Barnwell, South Carolina. Equipment inspected was onsite steam generators with all accessory piping, centrifuges, metal shears, tanks and piping, and all instruments and laboratory sampling equipment. Verified construction of the facility to nuclear codes by DOE contractors.

As Senior Spacecraft Inspector for Rockwell International, he worked on Apollo and Skylab projects at Cape Kennedy, Florida. He verified assembly, modification, test, countdown, and launch of all Apollo spacecraft and missile boosters. His equipment and facility experience included cryogenics, hypergolic propellants, hydraulics, heat transfer insulation, pressurization systems, and flight controls. Mr. Thompson's experience also included quality management, surveillance, audit, testing, and documentation.

Employment History:

Jacobs Engineering Group Inc. Quality Assurance Manager	1977 to date
The Lummus Company Chief Inspector	1975 - 1977
Daniel International, Inc. Mechanical/Welding Inspector	1974 - 1975
Rockwell International Senior Spacecraft Inspector	1964 - 1974
Martin Marietta Corporation Senior Missile Inspector	1960 - 1964
U.S. Air Force Crew Chief B-52	1956 - 1960

APPENDIX B

PROJECT FORMS

JACOBS ENGINEERING GROUP INC.
DAILY ACTIVITY REPORT

Site Location____________________ **Today's Date**____________________

Type of Work____________________ **Report Day**____________________

Site Manager____________________ **Safety Manager**____________________

Weather

Manpower	Staff	Craft	Total
Contractor			
Subcontractor			
Subcontractor			
Hours Worked			

Visitor ____________________

Site Activities ____________________

Quality ____________________

Safety/Accident ____________________

Schedule ____________________

Areas of Concern ____________________

Submitted By ____________________ Title____________________

h:\wp\af\siteform October 19, 1994 WP51

JACOBS ENGINEERING GROUP INC.

REQUEST FOR INFORMATION

CONTRACT ______________________________ RFI ____________

TO:	FROM:	DISTRIBUTION:
____________ ____________ ____________ ATTN: ________	____________ ____________ ____________ ____________	

NUMBER AND TITLE OF DOCUMENT IN QUESTION

DESCRIPTION OF PROBLEM/INFORMATION REQUIRED (Attached sketches as necessary)

INFO NEED DATE	COST IMPACT?	SCHEDULE IMPACT?	PREPARED BY:
	☐ YES ☐ NO	☐ YES ☐ NO	DATE:

RESPONSE

BY: TITLE: DATE:

DISTRIBUTION:

(RESPONSE) ☐ CONSTRUCTION MANAGER ☐ PROJECT MANAGER ☐ FIELD ENGINEER ☐ ________

☐ FILE ☐ OPERATIONS MANAGER ☐ SITE MANAGER ☐ ENGINEER ☐ ________

JACOBS ENGINEERING GROUP

FIELD QUALITY CONTROL PROGRAM
NON-CONFORMANCE REPORT

CONTRACT ______________________________

ITEM

LOCATION

REF.DWG. CODE OR SPEC.

NONCONFORMANCE:

RECOMMENDED CORRECTIVE ACTION:

☐ REPLACE ☐ REWORK ☐ REPAIR ☐ USE AS-IS ☐ OTHER

QUALITY CONTROL SUPERVISOR	DATE

DESIGN CHANGE: ____________ YES ____________ NO

PROJECT FIELD ENGINEER	DATE

FINAL ACCEPTANCE:	QC INSPECTOR	DATE:

INSPECTED BY
CONTRACTOR ______________________ DATE __________
CLIENT ______________________ DATE __________

JACOBS ENGINEERING GROUP INC.
AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE

FORM ___
REPORT NO. ___

FIELD AUDIT FORM

Project Name	
Description	
Audit	
Auditor (Name/Title/Company):	
Audit Date/Time	
Auditor Comments/Observations/Problems Encountered	
Corrective Actions	

Completed By: ______________________________
(Signature) (Date)

Checked By: ______________________________
(Signature) (Date)

TANK EXCAVATION CHECK LIST

Project Number ______________________________

Location ______________________________

JEG Representative ______________________________

Subcontractor ______________________________ Rep ______________

Tank No. _______ Date Installed ___________ Capacity ___________ Contents ______________

Tank Material ______________________________ Est. Weight ______________

Construction ______________________________

Dates of Removal: Begin ______________________ End ______________

Weather ______________________________

Background Monitoring Levels HNu ______ O_2 ______ Explosimeter ______ Hazmat Level A B C D ______

Instrument I.D. No. ____________ HNu ______________ O_2/Explosimeter ______________

UST Surface Cover Asphalt, Concrete, Grass, Soil, Gravel, Other ______________________

Tank Emptied ________________ Liquid Disposal Site ______________________

Tank Cleaning Procedure ______________________________

____

____

O_2 Reading ______________ Prior to Cleaning ______________ Post Cleaning ______________

Explosimeter Reading ___________ Prior to Cleaning ___________ Post Cleaning ___________

Purging Procedure ______________________________

____

Inerting Procedure ______________________________

Post Inerting O_2 Reading ____________ Plastic Pad for Excavated Material Yes ______ No ______

Post Inerting LEL Reading ______________________________

Piping Removal ______________________________

____

Piping Condition ______________________________

____

(win) \wp\af\carswell\txlist

Tank Condition ______________________________

____

____

____

Spoils Pile Observation ______________________________

____

____

____

Sample #	Location (Piping/Tank)	Date	Time	Headspace Reading	Time

RIGGING

Type of Lift ______________ Critical Lift Plan Attached? Yes ________ No _______

Tank Lifting Eyes or Lugs Inspected? Yes ________ No ________ Subcontractor Initial ___________

Yes ________ No ________ Site Super Initial ___________

Lift Rigging ______________________________

____

Rigging Inspected? Yes ________ No ________ Subcontractor Initial ___________

Yes ________ No ________ Site Superintendent Initial ___________

Work Load Verified? Yes ________ No ________ Subcontractor Initial ___________

Yes ________ No ________ Site Superintendent Initial ___________

Lift Equipment: ______________________________

____

Lift Equipment Inspected? Yes _____ No ________ Subcontractor Initial ____________________

Yes _____ No ________ Site Superintendent Initial ________________

Lift Capacity Verified? Yes _____ No ________ Subcontractor Initial ____________________

Yes _____ No ________ Site Superintendent Initial ________________

Lift Area Defined? Yes _____ No ________ Subcontractor Initial ____________________

Yes _____ No ________ Site Superintendent Initial ________________

Lift Area Cleared? Yes _____ No ________ Subcontractor Initial ____________________

Yes _____ No ________ Site Superintendent Initial ________________

Proceed With Lift ____ Date ______________
[Site Supervisor to Sign]

Time of Lift Start ________________________ Finish ________________________

Security and Safety Fence in Place? ____

Backfill Procedure/Date ____

Amount of Backfill Material/Observations ____

____

Compaction Tests/Dates ____

____

Photographs ____

Health and Safety Issues ____

____

Date Tank Removed From Site ____

Explosimeter Reading Prior to Offsite Removal ______________________________________

Surface Report/Date/Procedure ____

____

Site Secured/Return to Original Condition/Date ______________________________________

Site Manager ______________________________________ Date ________________

TAB

Environmental Clean up Plan

United States Air Force Air Force Base Conversion Agency

FINAL

NAS Fort Worth JRB, Texas
(Formerly Carswell AFB, Texas)

ENVIRONMENTAL CLEANUP PLAN

CAR-J03-10K70100-M1-0002

JANUARY 1995

By:

JACOBS ENGINEERING GROUP INC.
600 17th Street, Suite 1100N
Denver, CO 80202

TABLE OF CONTENTS

Page

TABLE OF CONTENTS

Page

List of Figures

List of Plates

ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFCEE	Air Force Center for Environmental Excellence
BTEX	benzene, toluene, ethylbenzene, xylene
CFR	Code of Federal Regulations
CGI	combustible gas indicator
COE	U.S. Army Corps of Engineers
COR	Contracting Officer's Representative
CQP	Construction Quality Plan
ECP	Environmental Cleanup Plan
EPA	U.S. Environmental Protection Agency
HSP	Health and Safety Plan
IRA	interim remedial action
IRP	Installation Restoration Program
ITIR	Informal Technical Information Report
I-30	Interstate Highway I-30
Jacobs	Jacobs Engineering Group Inc.
JRB	Joint Reserve Base
LEL	lower explosive limit
NAS	Naval Air Station
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PEL	permissible exposure limit
PID	photoionization detector
POC	Point of Contact
ppm	parts per million
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act

ACRONYMS AND ABBREVIATIONS

Riedel	Riedel Environmental Services, Inc.
RMP	Remediation Management Plan
SAP	Sampling and Analysis Plan
SHSC	Site Health and Safety Coordinator
TCE	trichloroethene
TPH	total petroleum hydrocarbons
UST	underground storage tank

1.0 INTRODUCTION

This Environmental Cleanup Plan (ECP) has been prepared by Jacobs Engineering Group Inc. (Jacobs) for the closure of the fuel hydrant system at Naval Air Station (NAS) Fort Worth Joint Reserve Base (JRB), Carswell Field, Fort Worth, Texas. This station was formerly called Carswell Air Force Base (AFB), and will be referred to in this document as NAS Fort Worth. The ECP constitutes one of the planning documents required by the Statement of Work for Contract F41624-94-D-8116, Delivery Order 0002, issued to Jacobs by the Air Force Center for Environmental Excellence (AFCEE). Other planning documents prepared for this contract and delivery order include the Sampling and Analysis Plan (SAP), Construction Quality Plan (CQP), and the Health and Safety Plan (HSP).

The ECP consists of four sections. Section 1.0, Introduction, includes a site description and history and a summary of previous investigations related to the fuel hydrant system. Section 2.0 is the project Work Plan, which describes the scope of work, project objectives, project management organization, waste management, record keeping and reporting, and data quality and data submittals. Section 3.0 of the ECP is the Remediation Management Plan (RMP). The RMP includes sections discussing the following topics:

- site preparation;
- site security;
- air monitoring;
- surface water management;
- groundwater management;
- spill and discharge control;
- emission control;
- excavation;
- transportation; and
- demobilization and closure.

Section 4.0 of the ECP includes the references used to prepare the plan.

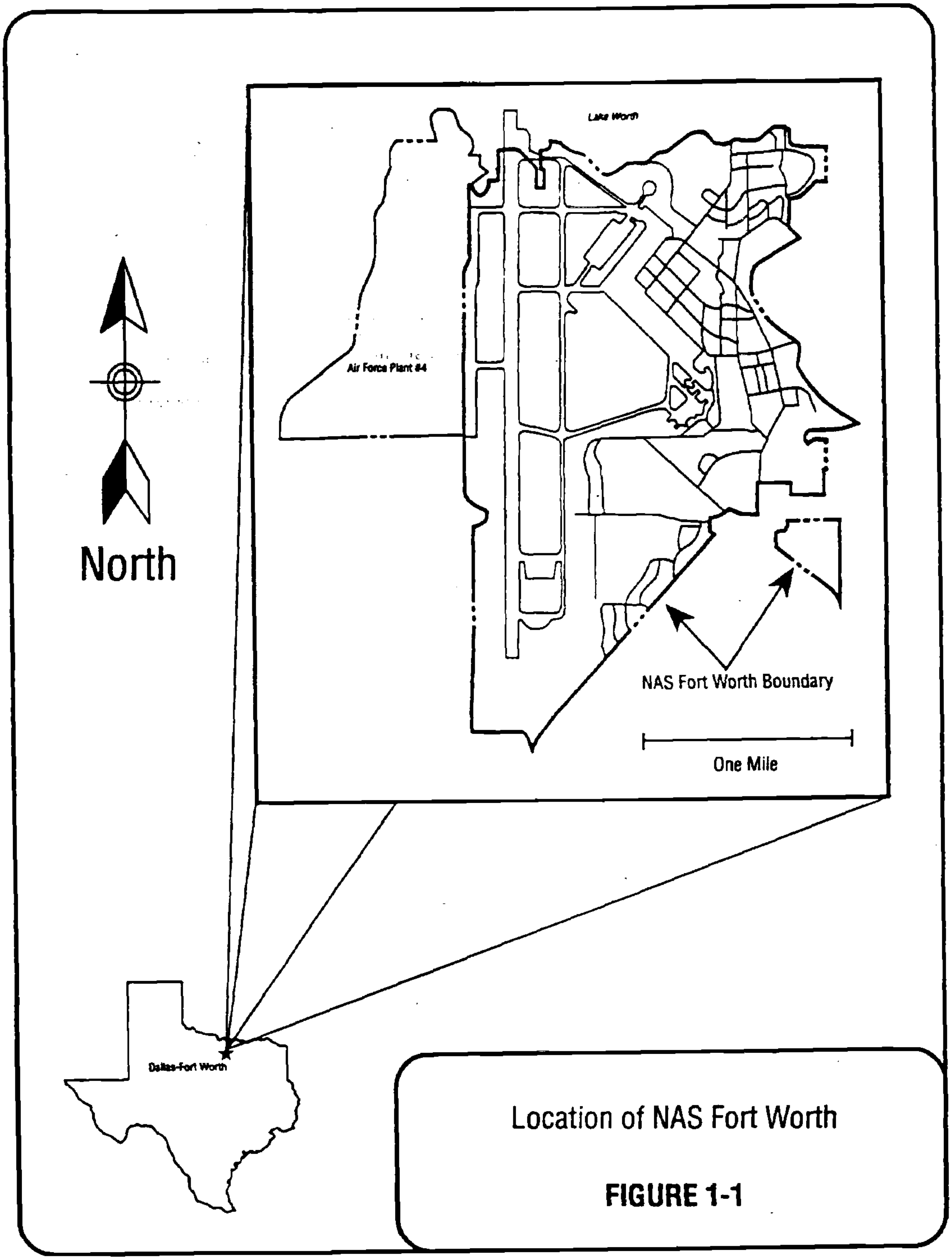
1.1 SITE DESCRIPTION AND HISTORY

The following paragraphs describe the location and land uses of the area around NAS Fort Worth and the historical uses and remediation of the fuel hydrant system.

1.1.1 Site Description

NAS Fort Worth is located in north-central Texas in Tarrant County, 8 miles west of downtown Fort Worth (Figure 1-1). The area surrounding the station is mostly suburban, including the residential areas of the cities of Fort Worth, Westworth Village, and White Settlement. The main station totals 2,264 acres and is bordered on the north by Lake Worth, on the east by the Trinity River and Westworth Village, on the northeast and southeast by Fort Worth, on the west and southwest by White Settlement, and on the west by Air Force Plant 4 (Lockheed).

The existing land uses in the immediate vicinity of the station include industrial, commercial, residential, and recreational. The land uses west of the station are primarily industrial as a result of industrial complexes at Air Force Plant 4 and in White Settlement. Additional uses to the west include residential and some supporting commercial. South of the station are commercial areas at the interchange of Interstate Highway I-30 (I-30) and State Highway 183. This area includes a regional shopping mall, a discount shopping center, and a small convenience center. Both single-family and multifamily residential development dominate the area southeast of the station and north of I-30 and the area east of the station. The area north of the station is predominantly composed of recreational and public facilities. The south shore of Lake Worth is restricted to public access because of the presence of NAS Forth Worth and Air Force Plant 4, but the lake is open for recreation. A fish hatchery, a YMCA camp, and private recreational land are along the



Location of NAS Fort Worth

FIGURE 1-1

af\carswell\map3.fh3

West Fork of the Trinity River northeast of the station. The area surrounding the Offsite Weapons Storage Area is primarily rural, although a residential development is located south of White Settlement Road.

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 a source of drinking water. Recharge is from precipitation and leaking water supply lines, sewers, and storm drains. Discharge occurs as 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, based on drill data, has been entirely removed by erosion from one location on Air Force Plant 4. This erosion suggests the possibility of local hydraulic communication between the Terrace Formation Aquifer and the deeper Paluxy Aquifers.

A trichloroethene (TCE) plume is contained in the Terrace Alluvium Aquifer and appears to be migrating in an easterly to southeasterly direction toward NAS Fort Worth from Air Force Plant 4.

1.1.2 Site History and Previous Investigations

NAS Fort Worth was originally a modest dirt runway built to service the aircraft manufacturing plant now called Air Force Plant 4. The installation was established in 1942 and was referred to as the Tarrant Field Airdrome. Its mission was to provide training for B-24 bomber pilots. The Strategic Air Command assumed control of the installation in 1946. In 1948, the base was renamed Carswell AFB in honor of Fort Worth native Major Horace S. Carswell. Carswell AFB became host base for its first B-52s and KC-135s in 1956.

Pursuant to the Base Closure and Realignment Act of 1990, Carswell AFB was selected for closure and associated property disposal during Round II Base Closure Commission deliberations. This announcement initiated the closure and disposal and reuse planning process. Drawdown activities were initiated in 1992, and all aircraft were relocated by January 1993. The base officially closed on 30 September 1993. On 01 October 1994, the U.S. Navy assumed control of Carswell AFB; the base was renamed NAS Fort Worth.

The fuel hydrant system at NAS Fort Worth was installed when the station was originally constructed and was expanded during the past 50 years of Air Force activity. The system consisted of five pumping stations, each with six 25,000-gallon underground storage tanks (USTs), a filtering system, a delivery pump, and a shelter at each pumping station and approximately 20,000 feet of 3-, 6-, and 8-inch diameter steel pipeline. Each station serves several refueling hydrants on the edge of the Alert Apron.

In 1984, the Installation Restoration Program (IRP) was initiated at NAS Fort Worth with a records search by CH2M Hill, Inc. that identified 15 sites requiring further evaluation (CH2M Hill 1984). Several other IRP studies have been conducted at the station that included the fuel hydrant system, including a 1989 Resource Conservation and Recovery Act (RCRA) Facility Assessment by A.T. Kearney, Inc. (A.T. Kearney, Inc. 1989) and a 1990 investigation by Maxim Engineers, Inc. on a potential JP-4 fuel leak called "Spot

35." (Maxim Engineers, Inc. 1990) The latter study documented that both soil and groundwater had been contaminated and that additional investigations would be necessary to delineate the extent of contamination. No other investigations have been conducted under the IRP at the fuel hydrant system.

Interim remedial action (IRA) at the fuel hydrant system began in 1992 when pumping station E and its associated piping were removed by the U.S. Army Corps of Engineers (COE). Fuel-contaminated soil was encountered during the removal, but no soil was removed from the site and the area of contamination was not delineated. During the summer of 1994, the COE removed pumping stations A, B, and D under a second IRA project.

1.2 PREVIOUS ANALYTICAL RESULTS AND RECOMMENDATIONS

As stated in Section 1.1.2, an investigation was conducted at Spot 35 in 1990. This investigation consisted of nine soil borings, three of which were converted into monitoring wells. Soil samples were collected from each boring and analyzed for total petroleum hydrocarbons (TPH) using U.S. Environmental Protection Agency (EPA) Method E418.1. Three of the soil samples were also analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) using EPA Method SW8020.

Contaminants were detected in soils primarily along the trench in which the pipeline is located. TPH was detected in concentrations up to 4,047 parts per million (ppm). BTEX was detected at levels up to 177 ppm. Groundwater collected from the monitoring wells also contained TPH at concentrations up to 174 ppm. The study concluded that any fuel leaks have impacted only the soils within the trench line. Recommendations included excavation of a 30-foot section of the pipeline to a depth of 3 or 4 feet, disposal of the impacted soil, and repair of the pipeline (Maxim Engineers, Inc. 1990).

2.0 WORK PLAN

The proposed work plan is discussed in detail in this section. The subsections describe the scope of work, the objectives, the project management strategy, the residual and waste management objectives, record keeping and reporting, and data quality and data submittal requirements.

2.1 SCOPE OF WORK

The scope of work consists of an IRA to abandon a portion of the fuel hydrant system at NAS Fort Worth. This scope includes abandonment of approximately 4 miles of fuel pipeline, demolition of a pumping station, removal of six 25,000-gallon USTs, and sampling associated soils near the tanks and piping. The work will be accomplished by Jacobs and its team subcontractor Riedel Environmental Services, Inc. (Riedel). Subcontracts will be issued by Jacobs for drive-point sampling services and analytical laboratory services, and by Riedel for grouting services.

2.2 APPROACH AND OBJECTIVES

Four different field tasks will be conducted as part of the closure of the fuel hydrant system at NAS Fort Worth: demolition of pumping station C, UST removal, pipeline abandonment, and subsurface soil sampling. Each of these tasks is described in the following sections.

2.2.1 Demolition of Pumping Station C

Pumping system equipment will be drained of fuel and all residual fuels will be removed from the piping system associated with the building at pumping station C. All equipment will be dismantled and removed following control of the lower explosive limit (LEL) as described in Section 2.2.2.

The next step will be to prepare the building's roof structure for collapse and demolition. This will be accomplished by flame-cutting the I-beam supports and knee braces in an approved sequence, thereby allowing the overhanging shed roof structure to be severed and toppled. Once toppled, the structure will be cut into manageable-sized pieces and placed into a steel recycler's bin. The building roof will then be detached and pulled from the building. Once on the ground, the roof will be cut up and placed into bins. Following this, the building walls will be dropped outward with the exception of the wall closest to the power transformer. This wall will be dropped inward to lay on the building floor. The walls, in addition to the building and pump area floors, will be broken up and stockpiled for later transport to a recycler or landfill.

2.2.2 Underground Storage Tank Removal

The initial field task will include pumping residual fluids out of the USTs and filling them with an inert substance such as pelletized dry ice or gaseous carbon dioxide. This step will reduce the LEL of the atmosphere in the tank to less than 10 percent by volume by displacing any explosive vapors in the tank. Once the LEL in the tanks is reduced to less than 10 percent, the building at pumping station C will be demolished. (Refer to Section 2.2.1.)

Following building demolition, all six tanks will be removed using the following procedures. The soils overlying the tanks will be carefully excavated and removed to a stockpile area. The removed soils will be screened for contamination using a photoionization detector (PID) and immunoassay test kits. Soils will be segregated according to the screening results. Clean and contaminated soils will be stockpiled separately on polyethylene sheeting for later disposal classification.

The LEL in each tank will be checked to ensure that it is less than 10 percent. The tank hold-down straps will be cold cut and as much of the strapping will be removed as possible. Lifting straps will be attached to the tank, a truck-mounted crane will be used to lift the tank and place it in the equipment decontamination area. The tank will be externally cleaned and evaluated to determine the necessity for internal cleaning. If internal cleaning is not necessary, or after any required cleaning is performed, the tank will be placed outside the decontamination area where it will be cut up, crushed, and placed into bins for recycling.

Additional soils will be removed to allow for the removal of the concrete piers and tank saddles. The piers and saddles will also be decontaminated as necessary and stored for potential recycling.

2.2.3 Pipeline Abandonment

The subsurface piping will be prepared and pigged in six zones. Five of the zones involve the delivery piping from the removed pumping stations to the fuel hydrants. The sixth zone involves the transfer lines from the bulk fuel storage area to the five pumping station locations. Figure 2-1 is a flowchart of pipeline abandonment activities.

An electromagnetic locator will be used to locate the refueling and defueling lines that connected to the former pumping stations. A backhoe will be used to expose the ends of each line. The current status of the line will determine the approach to gain access to the interior of the line. If the line is capped, a 0.5-inch hole will be cold cut into the top of the line to allow for measurement of the LEL and the depth of any standing fuel. If there is fuel in the line and the LEL is below 10 percent, a 2.25-inch diameter hole will be cold cut in the pipe to allow for the removal of the fuel.

If fuel is present and the LEL is above 10 percent, the 0.5-inch diameter hole will be threaded and a brass fitting installed to allow for the connection of a regulated supply of carbon dioxide gas. A 0.25-inch diameter hole will be cold cut on top of the line at least 6 inches away from the 0.5-inch hole to serve as a monitoring point for the LEL within the

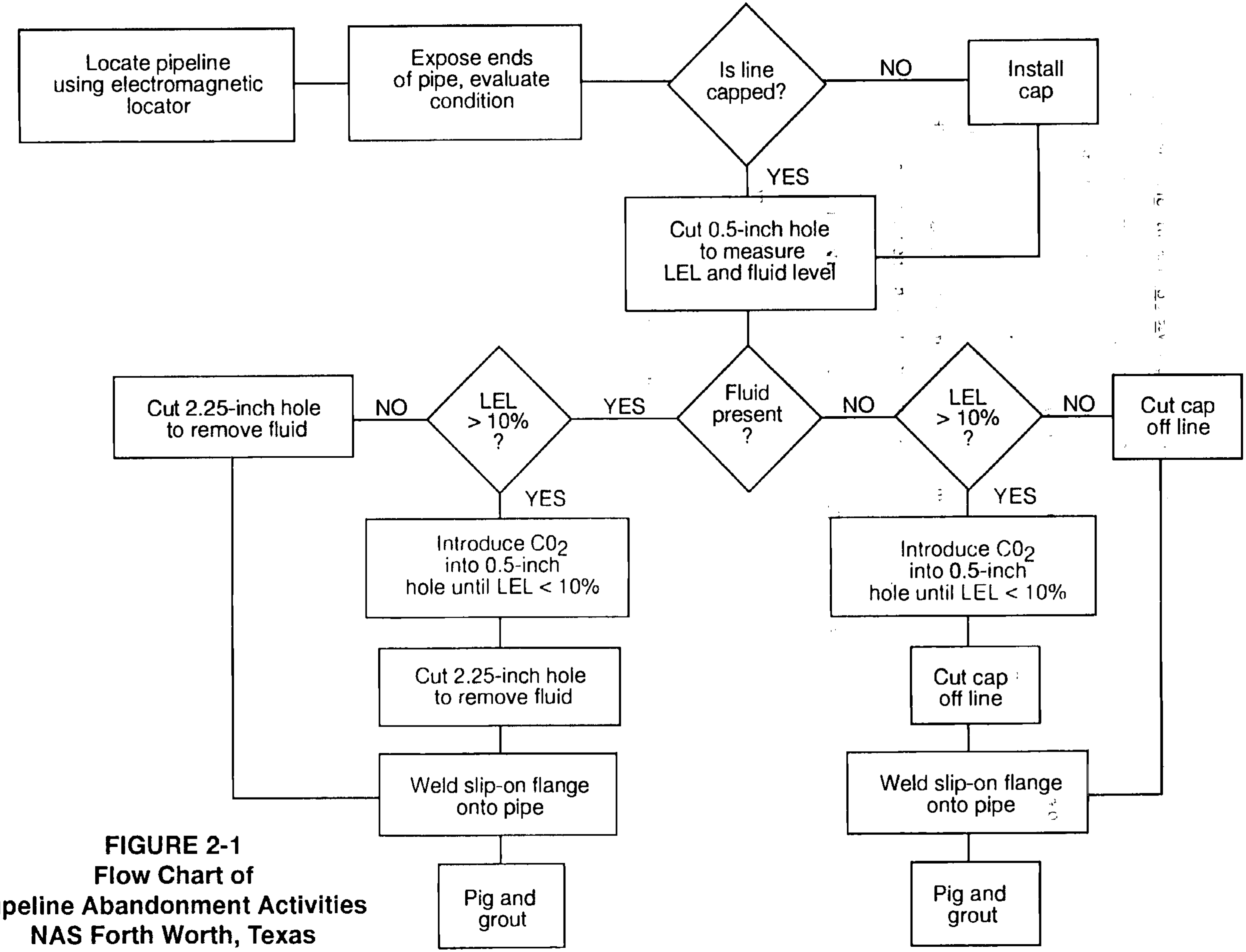


FIGURE 2-1
Flow Chart of
Pipeline Abandonment Activities
NAS Forth Worth, Texas

line. When less than 10 percent of the LEL is reached, carbon dioxide gas will continue to flow while a 2.25-inch hole is cold cut.

If there is no fuel present, or after it is drained, and the LEL is below 10 percent, the cap will be cold cut off the line. If there is no fuel and the LEL is greater than 10 percent, carbon dioxide will be used while the cap is cold cut from the line. If the pipes are crushed or sheared closed, more pipe will be exposed and the same procedure will be followed as for the capped pipe. Once the pipe has been accessed, a slip-on flange will be welded to the pipe to facilitate pigging and subsequent grouting operations. Pigs driven by compressed air will be launched and received to travel as many of the flow paths as possible in a given zone. These multiple launches will ensure that as much fuel as possible has been swept from the pipe.

The transfer line will have to be exposed and inspected at each point where it tied to the former pumping stations to inspect and cap as necessary. If this line is discontinuous or damaged in more than one location, it will be more cost effective to excavate and remove the line from pumping station A to pumping station D, and prepare and pig the remainder of the line. This determination will be made in the field when the condition of the pipe is known.

Following pigging of the lines, a slurry of cement, fly ash, and bentonite grout will be pumped through the piping. This procedure will be accomplished by using equipment for transport and storage of the dry material as well as a unit that mixes and pumps the grout slurry in approved proportions. Instrumentation will be used to indicate real-time flow rates and pipe pressures, and will generate graphs of each element as the event progresses.

2.2.4 Subsurface Soil Sampling

Drive-point methods will be used to collect soil samples at no more than 100-foot intervals along the fuel hydrant system and at 90-degree bends or junctions in the pipeline at locations where the surface is composed of asphalt, grass, or other unconsolidated material. Soil samples will be collected at every location for BTEX (100-foot intervals) and at every other location for polycyclic aromatic hydrocarbons (PAH) (200-foot intervals). Drive-point samples will be collected where the pipeline and the edges of concrete surfaces intersect, but not where concrete is covering the surface along the taxiways and aprons. Plate I shows the entire fuel hydrant system that is to be abandoned, pumping station C, and schematic locations of drive-point samples. Plate II is a detailed inset of a portion of Plate I showing additional drive-point sample locations. Based on existing engineering drawings, it is estimated that a total of approximately 160 locations will be sampled. In areas where parallel fuel lines are located within 8 feet of each other, drive-point sample locations will be located between the two lines to characterize both lines. If parallel fuel lines are located at distances greater than 8 feet, drive-point samples will be collected adjacent to each fuel line. Drive-point samples will also be collected around the perimeter of the UST locations.

The drive-point samples will be collected as close as possible to the estimated position of the buried fuel lines and no more than 4 feet away. Up to three soil samples will be obtained from each location from depths ranging from 1 to 5 feet below the estimated depth of the buried fuel lines to up to 20 feet below the ground surface. The precise intervals sampled will depend on the presence of staining, odor, or readings on the field monitoring equipment.

Soil samples will be collected adjacent to or under each UST using a backhoe after the USTs have been removed from pumping station C. It is estimated that samples will be collected from the location at the bottom of each of the six USTs, and 12 samples will be collected from the perimeter of the excavation (north, south, east, and west) for a total of 18 samples. These samples will be submitted to an off-site analytical laboratory for analysis using Method SW8020 for BTEX and Method E418.1 for TPH. Excavated soil will be analyzed using Method E418.1 and immunoassay for BTEX, confirmed with ten percent SW8020 analyses. Overall sampling frequency will be approximately one per 50 cubic yards of soil.

During the field investigation, immunoassay field test kits will be used to perform rapid screening analyses of total BTEX and PAH in the soil samples. The screening data will be used for two primary purposes: (1) to identify the presence or absence of BTEX and/or PAH contamination at each site and (2) to select areas that may have soil contamination higher than the State of Texas soil remediation standards delineated in the state UST regulations. These standards include benzene 0.5 ppm, ethylbenzene 70 ppm, toluene 100 ppm, xylenes 560 ppm, and TPH 500 ppm for fine grained soils which are anticipated during this investigation. It is anticipated that approximately 500 samples, including duplicates, will be analyzed using these test kits during the project. Ten percent of the samples collected for screening analyses will be duplicated and submitted to an off-site laboratory for confirmation analysis. Samples will be analyzed using Methods SW8020 for BTEX and SW8310 for PAH.

Following completion of fieldwork, the Jacobs/Riedel team will begin report preparation. The reports will be submitted in draft and final form over a four-month period to allow sufficient time for Air Force review and comment. The period of performance for the entire project is estimated at 15 months, from September 1994 to December 1995.

2.3 PROJECT ORGANIZATION AND RESPONSIBILITIES

The organization for the Jacobs project team includes technical professionals with experience in project management, quality assurance (QA), analytical chemistry, environmental engineering, field investigations, data management, and other technical/engineering skills. An organization chart that shows all key project personnel for implementing the field investigations has been prepared (Figure 2-2). Responsibilities for each of the project team positions are described below.

Contracting Officer's Representative. The AFCEE Contracting Officer's Representative (COR) for Delivery Order No. 0002 is Captain Joseph Feaster, who is located at Brooks AFB, Texas. The point of contact (POC) for this project is Mr. Frank Grey, who is located at NAS Fort Worth, Texas. The Jacobs project team will coordinate all activities conducted under this delivery order with these Air Force representatives through the

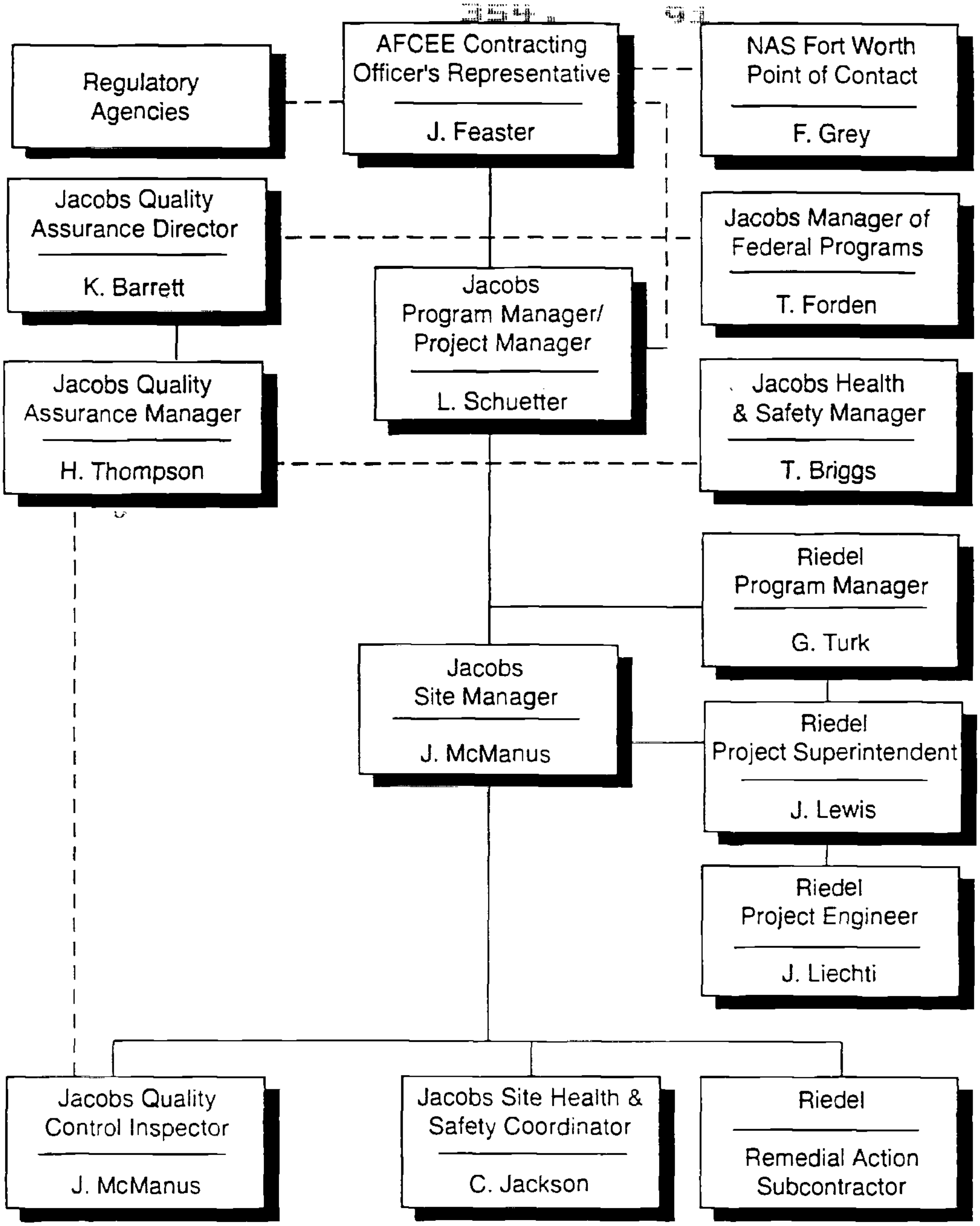


FIGURE 2-2
Project Organization Chart
Removal/Closure of Fuel Hydrant System
NAS Forth Worth, Texas

Jacobs Project Manager, Ms. Lynn Schuetter, located at the Jacobs office in Denver, Colorado.

Jacobs Manager of Federal Programs. The Jacobs Manager of Federal Programs is Mr. Tim Forden, who is located at the Jacobs office in Houston, Texas. Mr. Forden's responsibilities for the project include monthly administrative review of project progress, as well as coordination with AFCEE on contract-related issues.

Jacobs Program Manager/Project Manager. The Jacobs Program Manager/Project Manager, Ms. Lynn Schuetter, has overall responsibility for work performed for the Air Force under this contract. As Program Manager, Ms. Schuetter, will ensure high-quality work, make resources available, and approve all work under this delivery order. In addition, the Program Manager will review progress, anticipate and resolve problems, and ensure client satisfaction.

As the Jacobs Project Manager, Ms. Schuetter, has day-to-day responsibility for all aspects of Jacobs work on Delivery Order No. 0002. The Project Manager maintains close communication and coordinates all activities with the AFCEE COR and the POC for NAS Fort Worth. She is responsible for identifying appropriate staff for each task and providing oversight of all work to ensure its successful completion. In addition, the Project Manager uses the information provided by Jacobs Project Controls and Accounting to track the progress of costs and schedules and prepare monthly summary reports for the COR.

Jacobs Quality Assurance Director. The Jacobs QA Officer, Mr. Kris Barrett, will ensure that all work is performed according to the specifications of this SAP. Mr. Barrett will report to the Air Force and be responsible for all program QA issues. In addition, Mr. Barrett will review evaluation reports, audits, and corrective action procedures to ensure that the project meets IRP Handbook standards.

Jacobs Health and Safety Manager. The Health and Safety Manager, Dr. Terry Briggs, will make certain that all work is performed in accordance with the approved HSP and the provisions of the Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.120 for worker health and safety. Dr. Briggs will provide assistance, oversight, and senior review of the HSP. The Health and Safety Manager or his designee will perform audits to make certain that fieldwork is conducted to the specifications of the HSP.

Riedel Program Manager. The Riedel Program Manager, Mr. Gary Turk, has overall responsibility for performance of the tasks assigned to Riedel Environmental Services, the team subcontractor. Riedel will provide resources for accomplishing the tasks described in the Work Plan and SAP. These tasks include construction of a decontamination facility, demolition of pumping station C and removal of the six associated USTs, and in-place abandonment of the fuel hydrant system.

Riedel Project Superintendent. The Riedel Project Superintendent, Mr. Jon Lewis, will report to both the Riedel Program Manager and the Jacobs Site Manager. The project superintendent is responsible for the execution of the scope of work as it relates to Riedel's field activities. He will supervise the work crews performing the removal of the USTs and fueling system, the demolition of the structure above the USTs, and the pipeline abandonment in place. Additionally, he is responsible for maintaining Riedel's schedule and budget throughout the project, making adjustments as necessary to any changed conditions, and reporting/explaining any variances that may occur. The project superintendent also makes sure that safe operating practices are used at all times onsite, and is ultimately responsible for Riedel's onsite adherence to the site health and safety plan. The project superintendent is also the manager for any second-tier subcontractor, such as the grouting mix supplier, that will be used during the project.

Riedel Project Engineer. The Riedel Project Engineer, Mr. John Liechti, has responsibility for contributing to preparation of planning documents and providing overall technical oversight for all of Riedel's efforts.

Jacobs Project Quality Assurance Manager. The Jacobs Project QA Manager, Mr. Harold Thompson, will ensure that all work is performed in accordance with the SAP. Mr. Thompson will act as the Jacobs QA director's designee when reviewing and auditing field operations. Additional responsibilities of the QA Manager are outlined in the CQP. In addition, the Project QA Manager will review the project chemist's data quality review efforts, assist in performance of any field analytical audits, and report to the Jacobs Project Manager and Jacobs QA Director.

Jacobs Site Manager. The Site Manager, Mr. John McManus, has the responsibility of ensuring that the field investigation portion of the project is performed in a manner that maximizes data quality while maintaining a safe environment for the field crew. The Site Manager or his designee is responsible for reviewing all field sampling data forms for completeness, making decisions about sample locations, and making certain that the overall objectives of the field program are met while ensuring that the Air Force Handbook procedures are followed in meeting these objectives. The Site Manager also has responsibility for ensuring quality control (QC) on construction activities as described in the CQP for this project.

Jacobs Quality Control Inspector. The QC Inspector will be responsible for reviewing all documentation for completeness and correctness. In addition, the QC Inspector will be responsible for ensuring that sample integrity is maintained throughout the field investigation. Mr. John McManus will serve as QC Inspector as well as Site Manager. Additional responsibilities include audits and inspections of construction activities as discussed in the CQP.

Jacobs Site Health and Safety Coordinator. The Site Health and Safety Coordinator (SHSC), Mr. Cary Jackson, has the responsibility for ensuring that the procedures outlined in the site HSP are followed by all members of the field team. The SHSC will investigate all accidents or injuries related to the project that occur at NAS Fort Worth and has the authority to stop all work onsite if deemed necessary for the protection of personnel. The SHSC will also provide a briefing to all field sampling crew members regarding site hazards before field activities begin. The SHSC will be a member of the field team and will be identified when the field team members are assigned.

2.4 RESIDUAL AND WASTE MANAGEMENT OBJECTIVES

The demolition of the pumping station building and the six UST systems will result in the generation of several waste streams, most of which should be recyclable. The main objectives in managing the removal and fate of the materials generated from the demolition are to minimize the volume and to recycle as much material as is economically feasible. Waste minimization will be achieved through efficient decontamination of the UST structures, screening and segregating of the excavated soil, and containment of fuel-contaminated material.

The walls and floor of the pumping station building are constructed of reinforced concrete. The roof of the building is constructed of steel. The six USTs, which consist of the tanks and the associated piping, pumps, and filter housings, are all constructed of steel. The tank hold-down straps are also steel. The tank saddles and ballast are reinforced concrete. Residual fuel from the USTs; fuel-contaminated soil surrounding the USTs; and rinsate generated from decontamination of the USTs, construction equipment, and personnel will be collected during project execution.

The demolition of the pumping station and the USTs will be performed in steps. In the first step, the residual fuel in the USTs will be removed and temporarily stored onsite in a portable fuel storage tank. The fuel pumps and filters will then be dismantled and placed on the decontamination pad. Next, the roof of the building will be detached, pulled to the ground, cut into pieces, and placed in a steel recycling bin. The walls and floor of the building will then be demolished and stockpiled.

Soil above the tanks will be removed, immediately field-screened using a PID, segregated according to contamination, and then placed onto the appropriate stockpile.

The exposed tanks and associated piping will then be removed and placed on the decontamination pad. The exterior surfaces of the tank, piping, pumps, and filters will be cleaned. Tank interiors containing residual fuel will be cleaned by first removing any sludge and then spraying the surfaces using a hot-water pressure washer. After being cleaned, the tanks, piping, pumps, and filters will be placed outside the pad, cut into manageable-sized pieces, and placed into collection bins for recycling.

After the tanks are removed from the excavations, the saddles and ballast slabs will be removed and visually inspected. Concrete rubble that is visibly stained with fuel will be placed on the decontamination pad, pressure washed, and then stockpiled. All soil between the tanks and ballast slabs will be excavated, screened, and then placed on the appropriate soil stockpile. Any additional soil removed from the excavations will be handled in the same manner.

The fuel lines between the bulk storage tanks and the USTs, and the lines between the filters and the hydrants, will be pigged. Any fuel recovered from these lines during the pigging operations will be collected into a vacuum truck and then transferred into the temporary waste fuel storage tank.

The bins of scrap steel will be transported to a metal recycling facility. The steel-reinforced concrete rubble will be loaded into bins and transported to a concrete recycling facility. The fuel in the waste fuel storage tank will be transported to a fuel-blending facility to be recycled. Rinsate collected in the decontamination pad will be pumped into a portable storage tank and transported to a wastewater recycling or treatment facility. Any material, including soil removed from excavations, that is not recyclable will be transported to and disposed of at an approved landfill.

As soon as possible after removal of the tank system, the excavated holes will be backfilled to grade for safety considerations. Clean imported fill will be used for backfill material. Contaminated soil will be treated or disposed of off-station, at a commercial treatment/recycling facility if possible.

Section 2.1.6 in the SAP describes procedures for handling of investigation-derived waste from soil sampling.

2.5 RECORD KEEPING

Records will be kept for all activities associated with the field activities as a means of maintaining full documentation of project QA/QC procedures and compliance. Records will be kept in the form of logs and standardized forms. The following logs and forms will be used on this site:

- soil boring log (includes PID readings);
- field logbook;
- immunoassay sample preparation form;
- immunoassay measurements and calculations form;
- field laboratory logbook;
- visitor log;
- photograph log; and
- daily field activity forms.

These forms will supplement the Site Manager's Field Logbook. Copies of these forms may be found in Appendix C of the SAP.

2.6 DATA QUALITY OBJECTIVES AND REPORTING

The overall QA objective for this investigation is to ensure that all field data and field screening analytical data are technically sound, statistically valid, and properly documented. Only soil samples will be collected for this investigation effort. The soil samples will be analyzed in the field using immunoassay field screening methods. All samples collected at the UST excavation and ten percent of the drive-point samples will be sent to an AFCEE-audited laboratory; Air Force Level II analytical results will be produced by this investigation. The primary objective of this investigation is to only indicate the presence or absence of petroleum-based fuel contamination in soil.

All field summary forms and a portion of the raw data and calculation forms will be reviewed by a Jacobs chemist. Third-party validation is not required under this investigation. However, duplicate and replicate QC samples will be analyzed, instruments will be properly calibrated, and all data will be evaluated by Jacobs before being reported to the Air Force.

Total BTEX and PAH will be analyzed using immunoassay screening techniques (EPA Method SW4030). Procedures for generating data using immunoassay screening methods are detailed in the SAP. Manufacturer's instructions for conducting analyses using immunoassay techniques for BTEX and PAH are contained in Appendix A.

2.6.1 Field Quality Assurance/Quality Control Procedures

Immunoassay screening is a data collection technique categorized as an EPA Level I field screening method. The ability to assess data quality for this method depends on the QA/QC steps taken during the sample collection/analysis process. Such steps will include the following:

- documentation of the sample and sampling procedures;
- documentation of the field laboratory and analytical procedures;

- method calibration;
- method blanks;
- matrix-background samples;
- duplicate samples; and
- matrix spike samples and matrix spike replicate samples.

Additional information on data quality objectives, including off-site laboratory data quality requirements, may be found in Section 1.4 of the SAP.

2.6.2 Data Reporting

Analytical data will be tabulated in the completion report. QC and cross-references will be reported in accompanying data tables. In addition, method, detection limits, control limits, and holding times will be summarized. An Analytical Data Informal Technical Information Report (ITIR) as described in the Air Force IRP Handbook (U.S. Air Force 1993) will not be submitted.

3.0 REMEDIATION MANAGEMENT PLAN

3.1 INTRODUCTION

The RMP includes information on management of activities planned during closure of the fuel hydrant system at NAS Fort Worth. These activities involve control of physical features such as surface water, groundwater, and erosion; and management of tasks including transportation, excavation, and demobilization and closure.

3.2 SITE PREPARATION

The site will be grubbed and cleared of debris and vegetation. The areas designated for the decontamination pad and stockpiles will then be scanned for underground fuel lines using an electromagnetic locator. The decontamination pad, stockpile areas, storage tanks, recycling bins, and office trailer will all be strategically placed to maximize operating efficiency. Location of support facilities will be determined by NAS Fort Worth personnel prior to field mobilization. A former fuels office located in the Alert Apron area may be available as a field office.

The decontamination pad measuring approximately 20 feet by 40 feet will be constructed by first grading the soil in the designated area level and then forming a 2-foot high soil berm around the perimeter of the pad area. A hole for a sump approximately 3-feet wide and 3-feet deep will be dug at the edge of the pad area. Visqueen sheeting, with a minimum thickness of 10 mils, will be placed over the pad area including the berm. Wire mesh will then be placed onto the sheeting. Next, a layer of gunnite approximately 3-inches thick will be sprayed over the mesh. The surface of the gunnite in the pad will be finished to slope toward the sump. An electric sump pump will then be placed in the sump to pump rinsate and any collected rainwater into a portable wastewater storage tank.

Containment pads for the stockpiles of concrete rubble (20 feet by 20 feet), petroleum hydrocarbon contaminated soil (20 feet by 40 feet), and the uncontaminated soil (20 feet by 40 feet) will be constructed by placing a soil berm approximately 1-foot high around the perimeter of each pad area. Visqueen sheeting will then be placed over the pad and berms.

3.3 SITE SECURITY

Site security includes two items: personal safety and prevention of vandalism and theft. Both items are discussed below.

3.3.1 Securing for Personal Safety

During site operations, unsafe conditions including open excavations, debris from demolition, stockpiles, and uneven ground will exist and create potential slip/trip/fall hazards. Site workers will secure these areas at the end of each day. Excavations will be backfilled as soon as possible. If excavations must be left open over night they will be properly guarded with temporary fencing. Material stockpiles will be covered with visqueen. Temporary fencing, barricades, caution banner tape, warning signs, or other effective means of delineation will be used around the material stockpiles. Material placed in labeled and covered roll-off bins will be considered secure. All operating equipment will be shut down before leaving the site. Potential energy in equipment (raised platforms, forklifts, and arms/buckets of heavy equipment) will be released when not in use to eliminate the possibility of crushing accidents. Electrically energized systems will be guarded at all times. Lines and hoses under pressure will be shut off and relieved of pressure before leaving the site.

3.3.2 Securing Against Vandalism and Theft

All tools and equipment will be secured at the end of each shift. Smaller tools will be locked in a sea container or job box. Larger equipment and site trailers will be locked.

Excavators, loaders, and other "bucket" equipment will be secured by lowering the buckets to the ground. The practice of suspending equipment (i.e., compressors or generators) in the air during off-hours to prevent theft will not be allowed. Using bucket equipment to secure equipment on the ground is acceptable if all potential energy is released. Station security will be notified if any theft or vandalism occurs.

3.4 AIR MONITORING

Air monitoring will be conducted during work periods to control and limit exposure to potential and unknown hazardous vapors. The majority of exposure monitoring will be conducted using direct-reading instruments in the workers breathing zone. Initial upwind background readings will be obtained before initiation of activities. Readings will be taken every 15 minutes for activities that are not intrusive (e.g., use of shallow geophysics for utility locating). Intrusive activities (such as removal of USTs or drive-point sampling), or demolition of structures at pumping station C will require continuous monitoring. Monitoring results will be recorded in a logbook dedicated to the documentation of health and safety procedures. Monitoring, calibration, and instrument maintenance shall be the responsibility of the SHSC or designee and will be performed according to the manufacturer's instructions. The results of such maintenance will be included in the SHSC logbook documentation.

The monitoring instruments to be used will be selected based on the contaminants of concern associated with an area. PIDs will be used to monitor for organic vapors in the breathing zone. Oxygen meters and combustible gas indicators (CGIs) will be used to monitor conditions within USTs during removal and until they are disposed.

3.5 SURFACE WATER MANAGEMENT

The presence of surface water at any site at which environmental work will occur presents three potential concerns. One concern is that the surface water may come in contact with contaminants at the site and become contaminated. The second concern is that surface water that becomes contaminated may then transport contaminants into uncontaminated soil and/or into the groundwater. The third concern is that the water may delay construction activities.

The presence of surface water at this site should only be from incidental rainwater. Moderate rainfall should not affect site activities. Heavy rainfall or torrential conditions will likely interrupt site activities, but this condition is not anticipated. Since the area surrounding the site is relatively level, stormwater flowing into the excavations should not occur. Any surface water that enters an excavation at the site will be considered wastewater and will be pumped into temporary storage tanks staged onsite. Excavations will be controlled against stormwater run-on by soil berms covered with visqueen sheeting placed to divert the flow away from the excavation.

Since all concrete rubble and excavated soil will be stockpiled on bermed containment pads and covered with visqueen sheeting, rainwater should not come in contact with these stockpiled materials. Incidental rainwater that falls onto the decontamination pad will be considered contaminated and will be pumped into the portable wastewater storage tank(s).

3.6 GROUNDWATER MANAGEMENT

Groundwater is not anticipated to be encountered in any of the UST or piping excavations. If groundwater is encountered in an excavation it will be pumped, as necessary to complete remedial tasks, into portable wastewater storage tanks placed onsite. The water will then be transported to a wastewater treatment or recycling facility.

3.7 SPILL AND DISCHARGE CONTROL

Potential for spills or releases of JP-4 or its by-products will be controlled onsite using various spill control methods. During removal of any residual liquids from tanks, proper methods will be used to minimize potential for spilling of material. Equipment and hoses will be inspected for integrity before pumping operations begin.

Removal of fuels from lines will be completed in a manner to minimize the potential for spills. Buried lines will be located before excavation. Soils around buried lines will be carefully excavated with heavy equipment. Manual digging may be necessary in areas where heavy equipment has difficulty. Spill containment and cleanup kits will be available onsite for use. When possible, 10 mil visqueen sheeting will be placed under valves, flanges, openings, etc., during pumping operations for containing an uncontrolled release. Drums and buckets will be used to catch controlled releases when necessary. Spills will be immediately reported to the station POC. In the event of a spill, the following procedures will be followed if it is safe to do so:

- Report the spill to the station POC.
- Stop the spill (shut off valves, hoses, etc.).
- Contain the spilled materials.
- Clean up the spill.

These steps can occur simultaneously.

Waste materials from spill cleanups will be placed in containers and labeled for proper disposal.

3.8 EMISSION CONTROLS

Two types of emissions, volatile organic emissions and particulate emissions, may occur during field activities. Control of each is described in the following sections.

3.8.1 Volatile Organic Emissions

The greatest chemical health hazard to personnel is the inhalation of organic vapors created from the JP-4 jet fuel. For personnel working onsite, respiratory protection will be used during operations where breathing zone airborne organic vapors exceed the permissible exposure limit (PEL). Air monitoring for organic vapors, during operations with potential for vapor release, will be performed. Airborne organic vapors exceeding the PEL at perimeter downwind site locations will require that activities be stopped until engineering controls bring levels below the PEL. Contaminated soils piles will be covered with a vapor-suppressing material (i.e., visqueen). Off-gassing of tanks and lines will be monitored. Excessive off-gassing is not expected but will be controlled by covering tank and line openings.

3.8.2 Particulate Emissions

Engineering controls will be used for controlling visible emissions of airborne particulate. Although chemical exposure through airborne particulates is not a concern, dust is likely to be generated as a result of excavation operations and other soil-moving operations (including driving of heavy equipment across dry ground). Dust will be controlled by using a water spray.

A visible sighting of airborne particulate, including dust, will generally be the indicator for water spraying activities to begin. An instrument for monitoring airborne particulate will be made available if necessary for assistance in evaluating effectiveness of engineering controls.

3.9 EROSION CONTROL

Because the site is relatively level, the only areas where soil erosion may occur is along the sides of the UST excavations. Any erosion along these sides will most likely be because of stormwater entering the excavations. If stormwater begins to channel into an excavation, soil berms covered with plastic sheeting will be placed to divert the flow away from the excavation.

3.10 EXCAVATION

Before beginning any excavation, all surface debris and vegetation will be cleared from the excavation area as well as from the surrounding work area. All excavations will be dug using a track-type excavator and/or a rubber-tired backhoe. The excavations will be supervised by an OSHA-certified competent person. This person will determine what methods, if any, need to be used to maintain a safe excavation based on classification. For UST removal, the supervisor will hold a Class B license issued by the State of Texas. Mr. Pete Flores of Riedel is currently assigned as supervisor; a copy of his Class B license is included as Figure 3-1. If another individual is substituted, a copy of his/her Class B license will be submitted to the Air Force and station personnel. The method of choice for maintaining a safe excavation that exceeds 4 feet in depth and has to be entered by personnel will be sloping of the excavation walls. The excavated materials, soils, and otherwise, will be immediately field classified and stored in specific stockpiles according to classification. It is not anticipated that groundwater will be encountered in any of the excavations; however, should water exist in the excavation, dewatering procedures will only be conducted to keep the excavation workable. All waters generated during any potential dewatering will be stored in temporary onsite wastewater storage tanks.

The import backfill material of choice will be washed construction sand. The backfill material will be placed in lifts not exceeding 12 inches in depth and will be compacted using an excavator-mounted vibrating plate or wheel-type compactor. Site locations and the surrounding areas are relatively flat; therefore, if heavy rainfall occurs during the execution of this project, problems associated with stormwater control should not be encountered. If there are areas that channel stormwater into an excavation, backfill material and visqueen sheeting will be used to redirect the flow away from the excavation.

FIGURE 3-1

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Underground Storage Tank On-Site Supervisor

LICENSE

(NON-TRANSFERABLE)

Be it known that

Pete Flores

has fulfilled all the necessary requirements for a TYPE B *Underground Storage Tank On-Site Supervisor License with the Texas Natural Resource Conservation Commission and is hereby authorized to perform the*

REMOVAL OF
UNDERGROUND STORAGE TANKS

within the State of Texas pursuant to Title 30, Texas Administrative Code, Chapter 334, Subchapter I. This license will be valid for one year from the date of issuance.

License No: ILP001651

Date of Expiration: **February 23, 1995**

Chairman
TNRCC

THE STATE OF TEXAS

Executive Director
TNRCC

3.11 TRANSPORTATION

All solid and liquid materials and waste generated at the site from the decontamination, demolition, and excavation activities will be temporarily stored at the site and then transported to the appropriate recycling or waste disposal facilities. The containers in which the materials and wastes are transported will conform to all federal, state, and local requirements. All containers will be properly labeled and sealed. The transporters of the materials and wastes will have the required licenses and permits to transport the materials and wastes. Appropriate documentation (i.e., manifests or bill of ladings) will accompany each shipment. Copies of these documents will be maintained by the generator, transporters, recycling and disposal facilities.

3.12 DEMOBILIZATION AND CLOSURE

Upon completion of all field activities, the Air Force will conduct a prefinal inspection to verify that all field tasks under this delivery order have been completed satisfactorily. After the Air Force has evaluated the site for attainment of all of the project goals and confirmed that all goals have been met, demobilization activities will begin. All equipment used in the work areas will be decontaminated, before demobilization, in the equipment decontamination area using a hot-water pressure washer. All rinsate generated by the decontamination operations will be stored in the temporary onsite water holding tank. When all the equipment has been decontaminated and no additional wastewater will be generated, the water in the tank will be analyzed and recycle/disposal options reviewed. The equipment decontamination pad will be broken up and placed in onsite storage containers. Samples will be taken and analyzed to confirm that the material can go to a recycler.

4.0 REFERENCES

A.T. Kearney, Inc. 1989 (March). *RCRA Facility Assessment PR/VSI Report.*

CH2M Hill Inc. 1984 (February). *Phase I Records Search.*

Maxim Engineers Inc. 1990 (October). *Limited Subsurface Investigation, Hydrant Fueling System Spot 35, Carswell AFB-Fort Worth, Texas.*

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

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE