

N83447.AR.000107
NAS FORT WORTH
5090.3a

DRAFT QUALITY CONTROL PLAN FOR GROUNDWATER REMEDIATION AT LANDFILLS 4
AND 5 NAS FORT WORTH TX
4/20/1993
INTERNATIONAL TECHNOLOGIES



132 70

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

**ADMINISTRATIVE RECORD
COVER SHEET**

AR File Number 132

File: 17A-53
A.F.

#132

100 01

CONTRACT QUALITY CONTROL PLAN ADDENDUM
GROUNDWATER REMEDIATION OF LANDFILLS 4 AND 5
AT CARSWELL AFB
AIR FORCE PLANT NO. 4
FT. WORTH, TEXAS

Contract No: DACA56-92-D-0008
Delivery Order No: 0013

D
R
A
F
T

Reviewed and Approved By:

Senior QA Manager

Victor Al Hojji

Project Manager, IT Corp.

Date

20 April 1993

Date

Table of Contents

List of Tables	ii
List of Figures	ii
1.0 Delivery Order Description	1-1
1.1 Introduction	1-1
1.2 List of Operations	1-1
1.3 Project Background	1-2
2.0 Delivery Order Organization and Responsibility	2-1
2.1 Quality Control Support	2-4
3.0 Chemical Testing and Quality Control	3-1
3.1 Sampling Procedures and Frequency	3-1
3.2 Analytical Field Equipment and Procedures	3-1
3.3 Off-Site Laboratory and Methods	3-1
4.0 Verification of Chemical Data	4-1
4.1 Minimum Data Reporting Requirements	4-1
5.0 Preventive Maintenance	5-1
5.1 Field Equipment/Instruments	5-1
5.2 Laboratory Instruments	5-1
6.0 Construction Verification and Quality Control	6-1
7.0 Peer Review	7-1
Figures	

List of Tables

Table	Title
2-1	Personnel Matrix
2-2	Subcontractor Listing
3-1	Chemical Data Quality Objective Summary
3-2	Precision, Accuracy, Completeness, and Sensitivity Summary
3-3	Internal Quality Control Summary
3-4	Sample Containers, Preservative, and Holding Times Summary, ITAS Samples
4-1	Chemical Data Verification Summary

List of Figures

Figure	Title
1	Site Location Map
2	Organization Chart

1.0 Delivery Order Description

1.1 Introduction

This document presents the Contract Quality Control Plan (CQCP) for the work to be performed during the groundwater remediation project at Landfills 4 and 5 (LF4 and 5) at Carswell AFB for Air Force Plant 4 in Ft. Worth, Texas. This work is being performed under Contract DACA56-92-D-0008, Delivery Order No. 0013. This plan is prepared as an addendum to the Quality Assurance Management Plan (QAMP) prepared for the USACE, Tulsa District Program. This CQCP focuses on specific procedures, data quality objectives, and verification activities required for the project. The QAMP primarily establishes processes for contractual elements of the program.

The purpose of this project is to implement a groundwater remediation program for the LF4 and 5 Area at Carswell AFB. The complete scope of work for the project is specified in the project cost estimate dated January 27, 1993. The scope includes additional characterization of existing hydrogeologic and groundwater analytical conditions, engineering of a groundwater recovery and on-site treatment system, and construction and start-up of the engineered system.

This CQCP addresses the specific tasks associated with the Phase I hydrogeologic and groundwater analytical characterization work. The scope of work for these tasks is specified in the Field Sampling, Analysis, and Testing Plan (FSATP) for the project. The quality assurance/quality control (QA/QC) requirements for the groundwater recovery and on-site treatment system engineering tasks are identified in Chapter 4.0 of the program QAMP. The QA/QC requirements for the construction and start-up of the engineered system will be identified in the equipment and installation subcontractor specifications. These specifications will be prepared as a part of the system engineering. The specific requirements for these additional phases of work will be presented in addenda to this CQCP.

1.2 List of Operations

A description and list of all operations to be performed for this project is included in the project cost estimate. The operations listed in this section have been identified as having quality control components. The operations specifically addressed in this plan are identified

first. The location of the specific QA/QC requirements for the other operations are also identified.

- Addressed in this CQCP Addendum
 - Site Safety and Health Plan (SSHP)
 - CQCP
 - FSATP
 - Phase I Drilling and Well Completion
 - Pumping Tests and Sampling
 - Laboratory Analysis
 - Phase I Report
- Addressed in Additional CQCP Addenda
 - Phase II Drilling and Well Completion
 - Air Discharge Permit Application
 - Publicly Owned Treatment Works (POTW) Discharge Permit Application
 - Permit to Construct Application
 - Permit to Operate Application
- Addressed in Additional CQCP Addenda and Program QAMP
 - GW Extraction System Engineering
 - Prepare Final Mass Balance and P&ID
 - Prepare Water Treatment Plant (WTP) Long-Lead Specifications
 - Prepare WTP Drawings
 - Prepare Remaining Specifications
 - Complete WTP Drawings
 - Procure WTP Subcontractors
 - Submit Consent Package for Long-Lead Equipment
 - Submit Consent Package for WTP Subcontractors
- Addressed in Additional CQCP Addenda and System Specifications
 - Install WTP
 - System Start-Up.

1.3 Project Background

The LF4 and LF5 Area at AF4 to be investigated as part of the work scope is a small portion of the total area of AF4 and is located on the eastern side of Carswell Air Force Base Taxiway 191. Figure 1 shows the general location of this area. Previous investigations have shown this area to contain unconsolidated sediments (upper zone) with trichloroethylene (TCE) contamination. Based on analytical data collected by Radian Corporation in 1990, the TCE contamination forms a narrow concentrated central plume paralleling a bedrock valley

with the thickest portion of the upper zone sand and gravels, with a broader, lower-concentrated outlying plume moving in the direction of upper-zone groundwater flow.

D
R
A
F
T

2.0 Delivery Order Organization and Responsibility

An Organization Chart for the Phase I work of the groundwater remediation project at LF4 and 5 is presented in Figure 2. This chart identifies individual IT staff and subcontractor's responsibilities and lines of communication. A Personnel Matrix which identifies individual's QA/QC responsibilities is included as Table 2-1. A listing of proposed subcontractors is included as Table 2-2. A description of the QA/QC responsibilities of IT project management and home office support is provided in the Program QAMP. The specific responsibilities of the project personnel are described in this chapter.

Project Manager, Victor Dozzi. The Project Manager is responsible for the overall project technical, cost, and schedule elements. This includes all identified deliverable submittals in adherence with project schedule.

Senior QA Manager, Warren Niederhut. The Senior QA Manager for the program is responsible for project adherence to all program and internal QA/QC policies. This includes review and approval of the CQCP.

Safety and Health Officer, William Clawson. The project Safety and Health Officer is responsible for project adherence to all program and internal health and safety policies. This includes review and approval of the SSHP.

Project Hydrogeologist, Gary Gallot. The Project Hydrogeologist is responsible for the technical elements associated with the characterization of the site hydrogeological and groundwater analytical conditions. This includes review and approval of the Field Sampling and Analysis Plan and Phase I Report.

Site Hydrogeologist, Richard Wice. The Site Hydrogeologist is responsible for performing the field characterization work in adherence with all project specific and program requirements. This includes the FSATP, CQCP, and SSHP. The individual is also responsible for performance of the Site Safety and Health Officer's and Site QC Supervisor's duties.

**Table 2-1
Personnel Matrix**

Submittal	Activity	Authorized Employee	Position of Employee
All Project Submittals	Review and Approve	Victor Dozzi	Project Manager
Contract Quality Control Plan	Review and Approve	Warren Niederhut	Senior QA Manager
Site Safety and Health Plan	Review and Approve	William Clawson	Safety and Health Officer ↑
Field Sampling, Analysis and Testing Plan	Review and Approve	Gary Gaillot F	Project Hydrogeologist
Phase I Report	Review and Approve	A Gary Gaillot	Project Hydrogeologist
None	Site Safety and Health Officer and Site QC Representative R	Richard Wice	Site Hydrogeologist
None D	Administer and Track Project in Compliance with Program Control Requirements	Terry Robinson and John Lopez	Home Office Support

**Table 2-2
Subcontractor Listing**

100 09

Activity	Company and Contact	Address
Drilling Subcontractor	Geo Projects International Inc.	8834 Circle Drive Austin, TX 78736 ATTN: Pat Goodson
Analytical Laboratory	IT Analytical Services	5103 Old William Penn Hwy Export, PA 15632 ATTN: Carrie Smith

D
R
A
F
T

2.1 Quality Control Support

As required, the Site Hydrogeologist will be supported by other technical staff with specialized skills necessary to provide task-specific quality control. Final authority still rests with the Site Hydrogeologist.

D
R
A
F
T

3.0 Chemical Testing and Quality Control

This chapter identifies the specific quality control requirements for the groundwater chemical analytical samples collected during the aquifer pumping tests. It also specifies the requirements for on-site field testing and off-site analytical laboratory quality control. A summary of the data quality objectives for the groundwater samples is presented in Table 3-1. Target goals for precision, accuracy, completeness, and sensitivity are summarized in Table 3-2. A summary of the internal quality control requirements for the analytical work are presented in Table 3-3. A summary of the sample containers, preservatives, and holding times for ITAS samples and the USACE-Southwest Division Laboratory (SWDL) triplicate sample is presented in Table 3-4.

3.1 Sampling Procedures and Frequency

A description of the sampling procedures and frequency for the groundwater chemical analytical samples collected during the aquifer pumping tests is included in the FSATP. A summary of the analytical methods, field samples, field QC duplicate samples, field QA duplicate samples, and laboratory QC samples is included in the plan. The specific QA/QC procedures for collecting the groundwater chemical analytical samples are included in the plan. The groundwater samples will be tested for pH in the field.

3.2 Analytical Field Equipment and Procedures

A description of the analytical field equipment and procedures for measurements made during the aquifer pumping tests is included in the FSATP. A description of the procedures used for operation of the equipment including instrument calibration, calibration frequency, measurement frequency, sample analysis, and reporting are specified.

3.3 Off-Site Laboratory and Methods

The off-site laboratory used for the groundwater chemical analytical testing is the IT Analytical Services Laboratory in Export, Pennsylvania. The analytical methods and analytical QA/QC requirements for each sample are specified in the FSATP and in Tables 3-1 through 3-4.

Table 3-1

100 22

Chemical Data Quality Objectives Summary

Test	Method	Field Samples	Field QA Duplicate Samples	Field QC Triplicate Samples	Lab QC Samples	Quality ⁶ Level
VOA	SW-846 ¹ 8240	9	1 (+ 3 Trip Blanks ²)	1	3	Level 3
Semi-VOA	SW-846 ¹ 8270	9	1	1	3	Level 3
Metals (8 Heavy Metals)	SW-846 ¹ 6000 & 7000 series	9	1	1	2	Level 3
Nitrate/ Nitrite	LACHAT ³ 10-107-04-1A or MCAWW ⁴ 353.2	9	1	1	2	Level 3
Sulfate	MCAWW ⁴ 375.2	9	1	1	2	Level 3
Chloride	MCAWW ⁴ 325.3	9	1	1	2	Level 3
Alkalinity	MCAWW ⁴ 310.1	9	1	F	2	Level 3
BOD	SM ⁵ 507	9	A	1	1	Level 2
COD	MCAWW ⁴ 410.1	9	1	1	1	Level 3
Settleable Solids	SM ⁵ 209E	R 9	1	1	0	Level 2
TSS	MCAWW ⁴ 160.1	9	1	1	0	Level 3
TDS	MCAWW ⁴ 160.2	9	1	1	0	Level 3

¹Test Methods for Evaluating Solid Waste, Physical Chemical Methods*. US EPA SW-846, 3rd Revised Edition, November 1986

²One trip blank per cooler containing aqueous sample for VOC analysis.

³Quick Chem Method, Lachat Instruments, 1987

⁴Methods for the Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.

⁵Standard Methods for the Examination of Water and Wastewater, 17th ed., 1989.

⁶Quality level descriptions are included in the QAMP.

NOTE: *Eight heavy metals include - Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Silver, and Selenium.

*Lab QC samples include, method blank, duplicate, matrix spike, and matrix spike duplicate as appropriate.

*Field QA duplicate samples will be shipped to USACE-SWD laboratory.

Table 3-2
Precision, Accuracy, Completeness, and Sensitivity Summary

Test	Method	Spike Limits Precision	Accuracy	Completeness ¹	Sensitivity
VOA	SW-846-8240 ²	± 25% RPD	75-125% Recovery	85%	10 µg/l
Semi-VOA	SW-846-8270 ²	± 25% RPD	75-125% Recovery	85%	10 to 25 µg/L
Metals	SW-846 ² 6000 & 7000 Series	± 25% RPD	75 to 125% Recovery	85%	0.2 to 5,000 µg/L
Nitrate/ Nitrite	LACHAT ³ 10-107-04-1A or MCAWW ⁴ 353.2	± 25% RPD	75 to 125% Recovery	90%	0.2 mg/L
Sulfate	MCAWW ⁴ 375.2	± 25% RPD	75 to 125% Recovery	F 90%	10 mg/l
Chloride	MCAWW ⁴ 325.3	± 25% RPD	75 to 125% Recovery	90%	1 mg/l
Alkalinity	MCAWW ⁴ 310.1	± 25% RPD	A 75 to 125% Recovery	90%	1.0 mg/l
BOD	SM ⁵ 507	R ± 25% RPD	N/A	90%	2 mg/l
COD	MCAWW ⁴ 410.1	± 25% RPD	N/A	90%	50 to 250 mg/l
Settleable Solids	SM ⁵ 209E	N/A	N/A	90%	N/A
TSS	MCAWW ⁴ 160.1	± 15% RPD	N/A	90%	4 mg/l
TDS	MCAWW ⁴ 160.2	± 15% RPD	N/A	90%	10 mg/l

¹Matrix or Surrogate Spike Interferences will not be included in Percent completeness.

²"Test Methods for Evaluating Solid Waste, Physical Chemical Methods", U.S. EPA SW-846, 3rd Revised Edition, November 1986.

³Quick Chem Method, Lachat Instruments, 1987.

⁴Methods for the Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.

⁵Standard Methods for the Examination of Water and Wastewater, 17th ed., 1989.

**Table 3-3
Internal Quality Control Summary**

Test	Method	Matrix Spike	Matrix Spike Duplicate	Duplicate	Spike	Method Blank	Trip Blank
VOA	SW-846 ¹ 8240	✓	✓			✓	✓
Semi-VOA	SW-846 ¹ 8220	✓	✓			✓	
Metals	SW-846 ¹ 6000 & 7000 Series			✓	✓	✓	
Nitrate/ Nitrite	LACHAT ² 10-107-04-1A or MCAWW 353.2			✓	✓	✓	
Sulfate	MCAWW ³ 375.2			✓	✓	✓	
Chloride	MCAWW ³ 325.3			✓	✓	✓	
Alkalinity	MCAWW ³ 310.1			✓	✓	✓	
BOD	SM ⁴ 507	R		✓		✓	
COD	MCAWW ³ 410.1			✓		✓	
Settleable Solids	SM ⁴ 209E						
TSS	MCAWW ³ 160.1			✓			
TDS	MCAWW ³ 160.2			✓			

¹"Test Methods for Evaluating Solid Waste, Physical Chemical Methods". U.S. EPA SW-846, 3rd Revised Edition, November 1986.

²Quick Chem Method, Lachat Instruments, 1987

³Methods for the Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.

⁴Standard Methods for the Examination of Water and Wastewater, 17th Edition, 1989.

Table 3-4
Samples Containers, Preservatives, and Holding Times Summary
Environmental Samples

Test	Method	Media	Number and Type of Sample Container	Preservative	Holding Time
VOA	SW-846-8240 ¹	Groundwater	3 x 40 ml VOA glass	HCl 4 drops	10 days VTSR
Semi-VOA	SW-846-8270 ¹	Groundwater	1 x 2.5 liter amber glass	Cool 4°C	5 days ⁵ VTSR ⁶
Metals	SW-846 ¹ 6000 & 7000 Series	Groundwater	1 x 1 liter plastic	HNO ₃ to pH < 2	26 days Hg others 180 days
Nitrate/ Nitrite	LACHAT ² 10-107-04-1A or MCAWW 353.2	Groundwater	1 x 1 liter plastic	H ₂ SO ₄ to pH < 2	28 days
Sulfate	MCAWW ³ 375.2	Groundwater	1 x 1 liter plastic	Cool to 4°C	28 days
Chloride	MCAWW ³ 325.3	Groundwater	1 x 1 liter plastic	Cool to 4°C	28 days
Alkalinity	MCAWW ³ 310.1	Groundwater	1 x 1 liter plastic	Cool to 4°C	14 days
BOD	SM ⁴ 507	Groundwater	1 x 1 liter plastic	Cool to 4°C	48 hours
COD	MCAWW ³ 410.1	Groundwater	1 x 1 liter plastic	H ₂ SO ₄ to pH < 2	28 days
Settleable Solids	SM ⁴ 209E	Groundwater	1 x 1 liter plastic	Cool to 4°C	24 hours
TSS	MCAWW ³ 160.1	Groundwater	1 x 1 liter plastic	Cool to 4°C	7 days
TDS	MCAWW ³ 160.2	Groundwater	1 x 1 liter plastic	Cool to 4°C	7 days
pH	MCAWW ³ 150.1	Groundwater	N/S	---	Immediately Analyzed in Field

¹"Test Methods for Evaluating Solid Waste, Physical Chemical Methods", U.S. EPA SW-846, 3rd Revised Edition, November 1986.

²Quick Chem Method, Lachat Instruments, 1987.

³Methods for the Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.

⁴Standard Methods for the Examination of Water and Wastewater, 17th ed., 1989.

⁵For Semi-VOA, 5 days to extract and 40 days to analyze.

⁶VTSR - Validated Time of Sample Receipt at laboratory.

4.0 Verification of Chemical Data

A summary of the groundwater chemical data verification requirements (off-site laboratory and field measurements) is specified in Table 4-1. As per the QAMP, these requirements represent the required level of review. Verification of the off-site laboratory analytical is the responsibility of the laboratory performing the analysis. Verification of the field testing data is the responsibility of the individual performing the test procedure. As required by the program plan, validation of all project data is the responsibility of the home office technical staff. Validation of the chemical data will also be performed by the USACE.

4.1 Minimum Data Reporting Requirements

Reporting of chemical data will be in accordance with USACE-Missouri Division requirements and will include:

- Sample identification table
- Shipping cooler/receipt forms
- Equipment/travel blank results
- QA/QC duplicate results
- Matrix spike/matrix spike duplicate results
- Analytical duplicate results
- Instrument/method blank results
- Field duplicates.

D

R

A

F

**Table 4-1
Chemical Data Verification¹ Summary**

Data Use	Verify Chain-of Custody	Verify Holding Time	Verify Calibration	Calibration Check Performed	Review of Internal ² QC Samples	Review of Nonconformance Reports	Certificate of Analysis Required	Numerical Listing of Data Only
Field GW Measurements			✓	✓		✓		✓
Lab GW Analytical Data (SW-846)	✓	✓	✓	✓	✓	✓	✓	
Lab GW Analytical Data (pH, settleable solids, BOD)	✓	✓	✓	✓		✓		✓
Lab GW Analytical Data (All remaining)	✓	✓	✓	✓	✓	✓	✓	

¹Data verification will be performed by the analytical laboratory.

²For QC sample reporting requirements, refer to Section 4.1.

100 12

✓

✓

5.0 Preventive Maintenance

The measurement equipment used in this project will be subject to a preventive maintenance program. The degree and frequency of maintenance is established according to the frequency of use and the sensitivity of the equipment to environmental conditions like mechanical shock, temperature, and atmospheric moisture. A description of the required preventive maintenance is included in this chapter. Field equipment maintenance, operation, and calibration will be performed on-site. Maintenance of laboratory equipment will be performed by the laboratory. All maintenance records will be available during an inspection or audit.

5.1 Field Equipment/Instruments

Preventive maintenance of equipment is essential if project resources are to be used in a cost-effective manner. Preventive maintenance consists of both regularly scheduled activities to minimize down time and verify accuracy of measurements, and the availability of critical spare parts, backup systems, and equipment.

The schedule of preventive maintenance for field equipment is presented in the FSATP. Any equipment or device determined not to be in safe working order by the Site Hydrogeologist will be replaced or repaired. Specific preventive maintenance procedures for the field equipment as recommended by the manufacturer will be followed.

As discussed in the FSATP, field instruments will be checked and calibrated as necessary before use. Calibration checks will be documented on the field activity daily logs (FADL). Critical spare parts such as tape, pH probes, and batteries will be kept on site to reduce down time. Backup instruments and equipment will be available on site or within a few days shipment to avoid delays in the schedule.

5.2 Laboratory Instruments

As part of their QA/QC program, a routine preventive maintenance program is conducted by the off-site laboratory to minimize the occurrence of instrument and system malfunctions. The laboratory instruments are maintained in accordance with the manufacturer's specifications.

The laboratory is responsible for the maintenance and calibration of equipment used during the analytical procedures. Specific instrument calibration requirements are met to verify that the results are reliable. It is the responsibility of the laboratory to ensure that backup systems and equipment are available as required.

D
R
A
F
T

6.0 Construction Verification and Quality Control

This section presents the verification inspections and testing activities required for the aquifer pumping test system installation and start-up. Documentation of these activities will be recorded on the FADLs. Performance of activities will be the responsibility of the Site Hydrogeologist.

Receiving Inspections. The on-site QC Supervisor (Site Hydrogeologist) during the aquifer pumping tests will visually inspect the test equipment upon delivery to the site. The inspection will identify conformance of the as-received equipment to the procurement specifications. The results of the receiving inspection will be documented on the shipping/packing list. Equipment that does not meet the procurement specifications will not be accepted.

Construction Inspections. The Site Hydrogeologist will inspect the system installation on a continual basis during construction. The Site Hydrogeologist is sufficiently experienced in the installation of Aquifer Pumping Systems. The inspection will identify conformance of the installation with the conceptual system drawings. Due to the simplicity of the temporary Aquifer Pumping System, conceptual drawings are adequate for the system installation.

System Test. Upon completion of the installation, the pumping test system will be subjected to a short term dynamic test run at normal operating conditions. The system will be operated to verify the pump's capacity to deliver the required flow rate for the test. The flow meter, control valve, discharge pipe, well drawdown and other components of the system will be checked. The specific test procedure and results will be recorded by the Site Hydrogeologist in the FADLs. The pumping well will be allowed to fully recover after the system test before the aquifer pumping test begins.

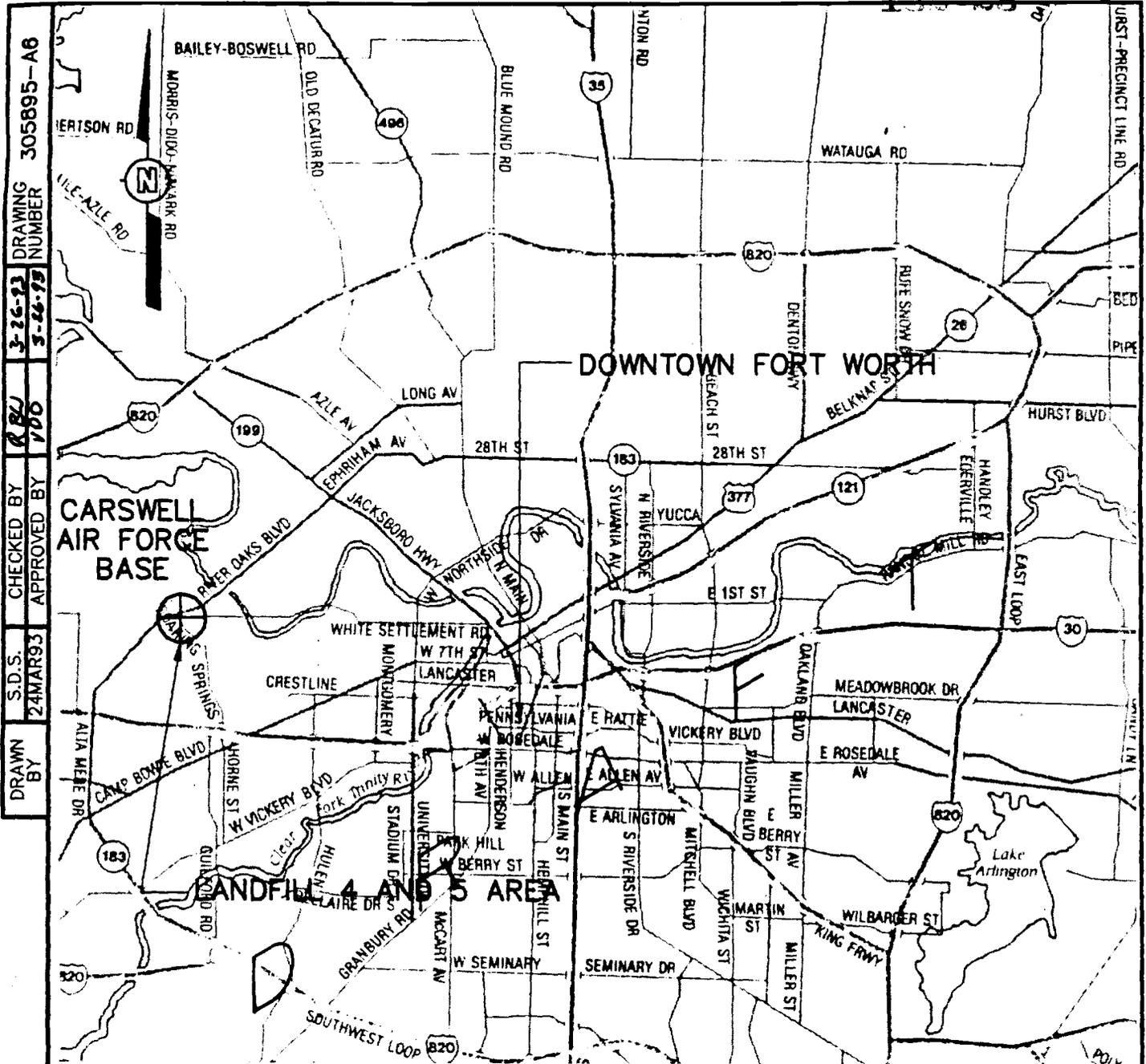
7.0 Peer Review

Peer review of the groundwater chemical analytical data (laboratory and field) is accomplished through the data verification process as specified in Chapter 4.0. As specified, internal and method standard verification procedures will be implemented. All review is performed by a qualified individual. The verification records will be available during an inspection or audit.

Review of the required project plans will be performed by the qualified individuals identified in Chapter 2.0 and the project cost estimate. These individuals will review the plans technical contents as well as the plans compliance with internal and program requirements.

Review of the hydrogeologic field work, including the well installations and aquifer pumping tests, will be performed by the Project Hydrogeologist as specified in Chapter 2.0. This individual will verify the field data, test results and the soundness of the conclusions. The Project Hydrogeologist will also review and approve the Phase I Report.

D
R
A



DRAWN BY: S.D.S. 24MAR93
 CHECKED BY: R.B.U.
 APPROVED BY: V.D.O.
 DRAWING NUMBER: 305895-A6
 DATE: 3-26-93
 REVISION: 3-26-93

FIGURE 1
SITE LOCATION MAP

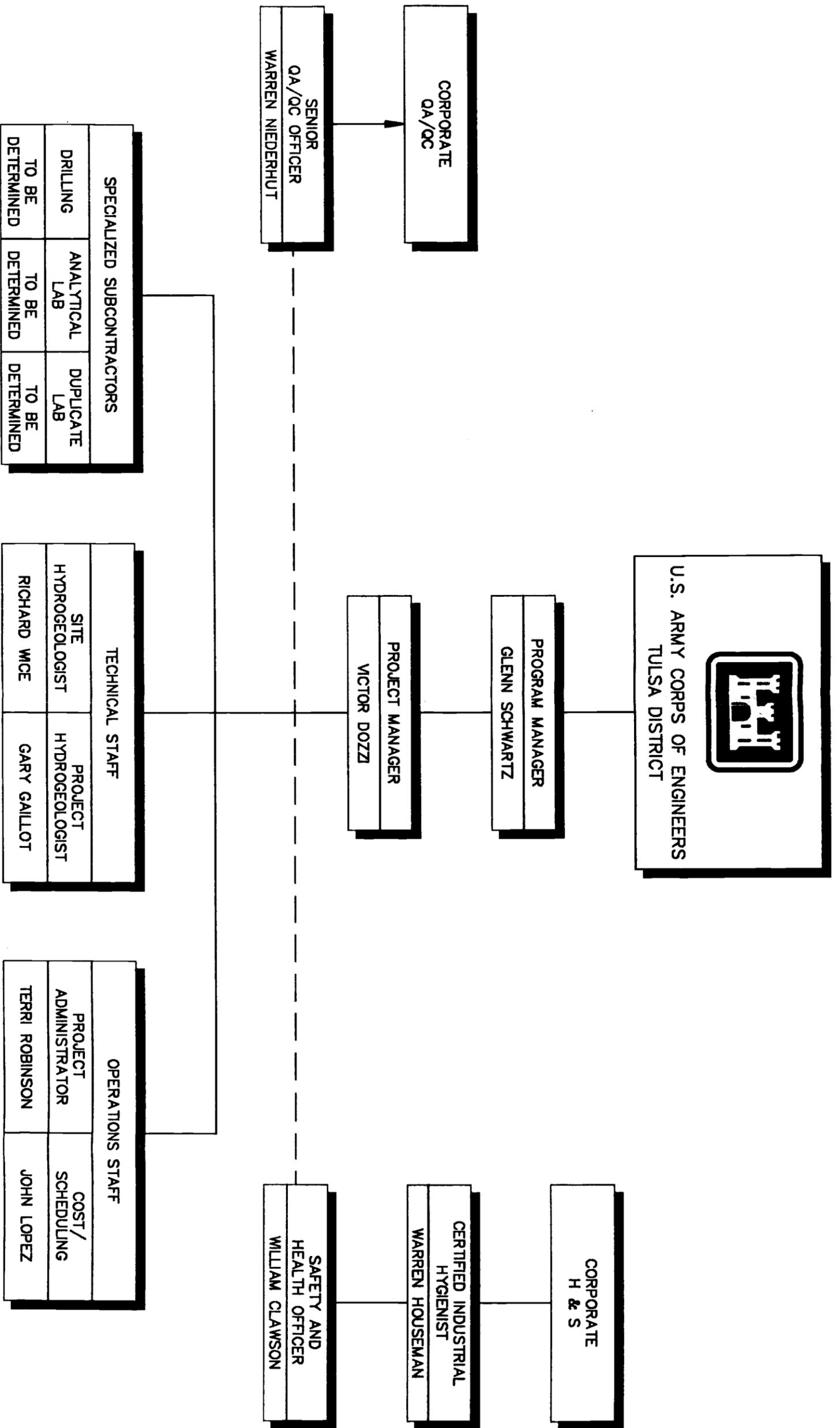
PREPARED FOR
 U.S. AIR FORCE PLANT #4 (CARSWELL)
 FORT WORTH, TEXAS



© 1984 IT CORPORATION
 ALL COPYRIGHTS RESERVED

"Do Not Scale This Drawing"

02
04



LEGEND:
 _____ REPORT FUNCTIONALLY
 - - - - - COORDINATE FUNCTIONALLY

FIGURE 2
 ORGANIZATION CHART

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE

FINAL PAGE

ADMINISTRATIVE RECORD

FINAL PAGE