TETRA TECH, INC.

March 30, 2006

Mr. Roy Crossland
START Project Officer
U.S. Environmental Protection Agency, Region 7
901 North 5th Street
Kansas City, Kansas 66101

Subject: **Quality Assurance Project Plan**
Ottumwa (ex) Naval Air Station Site, Ottumwa, Iowa
EPA ID: IAN000703254
U.S. EPA Region 7 START, Contract No. EP-S7-06-01,
Task Order No. 0002.006.007
Task Monitor: Brian Mitchell, EPA Task Monitor

Dear Mr. Crossland:

Tetra Tech EM Inc. is submitting the attached Quality Assurance Project Plan (QAPP) for Preliminary Assessment activities at the Ottumwa (ex) Naval Air Station site, Ottumwa, Iowa. If you have any questions or comments, please contact Jenna Mead at (913) 495-3938, or Kumud Pyakuryal at (913) 495-3955.

Sincerely,

Jenna Mead
START Project Manager

Ted Faile, PG, CHMM
START Program Manager

Enclosures

X9004/06.0002.006.007

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Tel 913.894.2600 Fax 913.894.6295

QUALITY ASSURANCE PROJECT PLAN
FOR A PRELIMINARY ASSESSMENT

OTTUMWA (EX) NAVAL AIR STATION SITE
OTTUMWA, IOWA
EPA ID: IAN000703254

Superfund Technical Assessment and Response Team (START) Contract
Contract No. EP-S7-06-01, Task Order 0002.006.007

Prepared For:

U.S. Environmental Protection Agency
Region 7
Superfund Division
901 North 5th Street
Kansas City, Kansas 66101

March 30, 2006

Prepared By:

Tetra Tech EM Inc.
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for the Ottumwa (ex) Naval Air Station (NAS) Site

Project Information:

Site Name: Ottumwa (ex) Naval Air Station (NAS) Site		**City:** Ottumwa	**State:** Iowa
EPA Project Manager: Brian Mitchell		**START Project Manager:** Jenna Mead	
Approved By: Jenna Mead		**Prepared For:** EPA Region 7 Superfund Division	
Title: START Project Manager	**Date:** 3-30-06		
Approved By:			
Title: START Program Manager	**Date:** 3-30-06		
Approved By: Kathleen Horner	3-30-06	**Prepared By:** Jenna Mead **Date:** 3/29/06	
Title: START QA Manager	**Date:**		
Approved By:			
Title: EPA Project Manager	**Date:**	**Tetra Tech START Project Number:** X9004.06.0002.006.007	
Approved By:			
Title: EPA Region 7 QA Coordinator	**Date:**		

1.0 Project Management:

1.1 Distribution List

EPA—Region 7: Brian Mitchell, EPA Task Monitor
Diane Harris, Region 7 QA Coordinator

START: Jenna Mead, Project Manager

1.2 Project/Task Organization

Brian Mitchell, of the EPA Region 7 Superfund Division, will serve as the EPA Project Manager for the activities described in this QAPP. Jenna Mead, of Tetra Tech EM Inc. (Tetra Tech), will serve as the START Project Manager.

1.3 Problem Definition/Background:

Description: This site-specific Quality Assurance Project Plan form contains site-specific data quality objectives for the sampling activities described herein.

■ Description attached.

☐ Description in referenced report: _____ _____
Title **Date**

1.4 Project/Task Description:

■ CERCLA PA ☐ CERCLA SI ☐ Brownfields Assessment
☐ Other (description attached): ☐ Pre-CERCLIS Site Screening ☐ Removal Assessment

Schedule: Field work is scheduled for late May or early June 2006.

☐ Description in referenced report: _____ _____
Title **Date**

1.5 Quality Objectives and Criteria for Measurement Data:

a. Accuracy:	■ Identified in attached table.
b. Precision:	■ Identified in attached table.
c. Representativeness:	■ Identified in attached table.
d. Completeness*:	■ Identified in attached table.
e. Comparability:	■ Identified in attached table.

Other Description:

*A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, EPA may still be able to make site decisions based on any or all of the remaining validated data.

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1.6 Special Training/Certification Requirements:

■ OSHA 1910 ■ Special Equipment/Instrument Operator (describe below): ☐ Other (describe below):
Geoprobe® sampling will be conducted by an experienced START operator.

1.7 Documentation and Records:

■ Field Sheets ■ Site Log ■ Trip Report ■ Site Maps ☐ Video
■ Chain of Custody ■ Health and Safety Plan ■ Letter Report ■ Photos

■ Sample documentation will follow EPA Region 7 SOP 2420.05D.

■ Other: Analytical information will be handled according to procedures identified in Table 2.

2.0 Measurement and Data Acquisition:

2.1 Sampling Process Design:

☐ Random Sampling ☐ Transect Sampling ■ Biased/Judgmental Sampling ☐ Stratified Random Sampling
☐ Search Sampling ☐ Systematic Grid ☐ Systematic Random Sampling ■ Definitive Sampling
☐ Screening wo/ Definitive Confirmation ☐ Screening w/ Definitive Confirmation
■ Sample Map Attached

The proposed sampling scheme for this project will be biased/judgmental, with definitive laboratory analysis, in accordance with procedures included in the Guidance for Performing Site Inspections Under CERCLA, OSWER Directive #9345.1-05, September 1992, and Removal Program Representative Sampling Guidance, Volume 1: Soil, OSWER Directive 9360.4-10, November 1991. All samples will be submitted for analysis by the EPA Region 7 laboratory. See Appendices A and B for additional site-specific information and maps. The proposed number of samples is a balance between cost and coverage and represents a reasonable attempt to meet the study objectives while staying within the budget constraints of a typical site investigation.

Sample Summary Location	Matrix	# of Samples*	Analysis
On-site locations	Soil	17	Perchlorate, explosives, VOCs, SVOCs, TPH, PCBs, and metals.
Private drinking water wells	Water	4	Perchlorate, explosives, VOCs, SVOCs, low level PAHs, TPH, PCBs, and metals.
Geoprobe® temporary monitoring wells	Water	3	Perchlorate, explosives, VOCs, SVOCs, TPH, PCBs, and metals (total and dissolved).
On-site drainageways and tributaries to Cedar Creek or Little Cedar Creek	Water	3	Perchlorate, explosives, VOCs, SVOCs, TPH, PCBs, and metals.
On-site drainageways and tributaries to Cedar Creek or Little Cedar Creek	Sediment	3	Perchlorate, explosives, VOCs, SVOCs, TPH, PCBs, and metals.

*NOTE: Background/QC samples are not included with these totals. See Table 1 for a complete sample summary.

2.2 Sample Methods Requirements:

Matrix	Sampling Method	EPA SOP(s)/Methods
Soil	Soil samples will be collected from Geoprobe® Macro-Core Samplers with PVC liners and transferred to the appropriate sample containers.	SOPs 4230.07A, 4230.03B, & 4231.2012; Method 5035
Water – Temporary monitoring wells	Groundwater samples will be collected from Geoprobe® temporary monitoring wells. These groundwater samples will be collected through Geoprobe® rods via disposable polyethylene tubing and a peristaltic pump or check valve.	SOPs 4230.07A and 4230.15A
Water – Private drinking water wells	Groundwater samples will be collected directly into sample containers from private drinking water wells at spigots/faucets closest to the well heads. The samples will be collected into appropriate containers after purging the wells for a minimum of 5 minutes and field water quality parameters have stabilized.	SOP 4230.10A
Water – Surface water	Surface water samples will be collected directly into appropriate containers from on-site drainageways that become tributaries to Cedar Creek or Little Cedar Creek.	SOP 4230.17A
Sediment	Sediment samples will be collected with stainless steel spoons or using a hand auger from the same locations as the surface water samples.	SOP 4230.08A

2.3 Sample Handling and Custody Requirements:

■ Samples will be packaged and preserved in accordance with procedures defined in Region 7 EPA SOP 2420.06D.
■ COC will be maintained as directed by Region 7 EPA SOP 2420.04C.
■ Samples will be accepted according to Region 7 EPA SOP 2420.01D.

☐ Other (Describe):

2.4 Analytical Methods Requirements: ■ Identified in attached table.

■ Rationale: The requested analyses have been selected based on the historical information on the site and program experience with similar types of sites.

☐ Other (Describe):

2.5 Quality Control Requirements. ☐ Not Applicable ■ Identified in attached table.

■ Field QC Samples: For this investigation, field QC samples will include one field blank (water) and one equipment rinsate blank (water), both prepared with DI water provided by EPA Region 7 laboratory. The field blank will be collected to evaluate contamination of sampling containers and/or preservatives, and to assess contamination potentially introduced during the sampling procedure(s). The equipment rinsate will evaluate the effectiveness of decontamination procedures for Geoprobe® soil and groundwater sampling equipment. One water trip blank and one soil trip blank will be prepared by the EPA Region 7 laboratory and be used to evaluate contamination introduced during transportation of the containers/samples. In addition, five field duplicates will be collected (one surface water sample, one sediment sample, one water sample from a private well, one water sample from a temporary Geoprobe® well, and one soil sample) to evaluate total method precision. All QC samples will be submitted for the analyses listed in the attached tables. Evaluation of blank samples is dependent on the levels of contamination found in environmental samples to determine whether the environmental samples are representative. Analytical results of blank samples will be evaluated on a qualitative basis by the EPA Project Manager and EPA contractor(s) to determine a general indication of field-introduced and/or lab-introduced contamination. The relative percent difference of duplicate samples will be calculated to determine the total method precision for the various matrices.

☐ Other (Describe):

2.6 Instrument/Equipment Testing, Inspection, and Maintenance Requirements: ☐ Not Applicable

■ Testing, inspection, and maintenance of analytical instrumentation will be performed in accordance with the previously referenced SOPs and/or manufacturers' recommendations.

■ Other (Describe): Testing, inspection, and maintenance of field instruments (water quality meter, PID, etc.) will be performed in accordance with manufacturers' recommendations.

2.7 Instrument Calibration and Frequency: ☐ Not Applicable

■ Calibration of laboratory equipment will be performed as described in the previously referenced SOPs and/or manufacturers' recommendations.

■ Other (Describe): Calibration of field instruments (water quality meter, PID, etc.) will be performed daily, as described in the manufacturers' recommendations.

2.8 Inspection/Acceptance Requirements for Supplies and Consumables: ☐ Not Applicable

■ All sample containers will meet EPA criteria for cleaning procedures for low-level chemical analysis. Sample containers will have Level II certifications provided by the manufacturer in accordance with pre-cleaning criteria established by EPA in *Specifications and Guidelines for Obtaining Contaminant-Free Containers.*

☐ Other (Describe):

2.9 Data Acquisition Requirements: ☐ Not Applicable

■ Previous data/information pertaining to the site (including other analytical data, reports, photos, maps, etc., which are referenced in this QAPP) have been compiled by EPA and/or its contractor(s) from other sources. Some of that data has not been verified by EPA and/or its contractor(s); however, the information will not be used for decision-making purposes by EPA without verification by an independent professional qualified to verify such data/information.

☐ Other (Describe):

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2.10 Data Management:

■ All laboratory data acquired will be managed in accordance with Region 7 EPA SOP 2410.01D.

☐ Other (Describe):

3.0 Assessment and Oversight:

3.1 Assessment and Response Actions:

■ Peer Review ■ Management Review ☐ Field Audit ☐ Lab Audit

■ Assessment and response actions pertaining to analytical phases of the project are addressed in Region 7 EPA SOPs 2430.05C and 2430.12E.

☐ Other (Describe):

3.1A Corrective Action:

■ Corrective actions will be taken at the discretion of the EPA project manager whenever there appear to be problems that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the site.

☐ Other (Describe):

3.2 Reports to Management:

☐ Audit Report ☐ Data Validation Report ☐ Project Status Report ☐ None Required

■ A letter report describing the sampling techniques, locations, problems encountered (with resolutions to those problems), and interpretation of analytical results will be prepared by Tetra Tech START and submitted to the EPA.

☐ Other (Describe):

4.0 Data Validation and Usability:

4.1 Data Review, Validation, and Verification Requirements: ☐ Identified in attached table.

■ Data review and verification will be performed by a qualified analyst and the laboratory's section manager as described in Region 7 EPA SOPs 2430.05C and 2430.12E.

☐ Other (Describe):

4.2 Validation and Verification Methods: ☐ Identified in attached table.

■ The data will be validated in accordance with Region 7 EPA SOPs 2430.05C and 2430.12E.

■ The EPA Project Manager will inspect the data to provide a final review. The EPA Project Manager will review the data, if applicable, for laboratory spikes and duplicates, laboratory blanks, and the field blank to ensure that they are acceptable. The EPA Project Manager will also compare the sample descriptions with the field sheets for consistency and will ensure that any anomalies in the data are appropriately documented.

☐ Other (Describe):

4.3 Reconciliation with User Requirements:

■ If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded and re-sampling or re-analysis of the subject samples may be required by the EPA Project Manager.

☐ Other (Describe):

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Table 1: Sample Summary

Site Name: Ottumwa (ex) Naval Air Station (NAS) Site		**Location:** Ottumwa, Iowa	
START Project Manager: Jenna Mead		**Activity/ASR #:** To be determined	**Date:** 3/29/06

No. of Samples	Matrix	Location	Purpose	Depth or other Descriptor	Requested Analysis	Sampling Method	Analytical Method/SOP
17	Soil	On-site Geoprobe® locations	to assess potential soil contamination from site operations	0-2 feet and 10-12 feet at 7 locations; 0-2 feet at 3 additional locations	Perchlorate, VOCs, SVOCs, metals, PCBs, explosives, and TPH	EPA SOPs 4230.07A, 4230.03B, & 4231.2012; EPA Method 5035	Region 7 SOP for perchlorate in soil; EPA Methods 5035 and 8330A; EPA SOPs 3230.02D, 3121.14E, 3122.03B, 3240.02F; Methods OA-1 & OA-2.
3	Water	On-site Geoprobe® temporary monitoring wells	to assess potential groundwater contamination from site operations	directly below water table	Perchlorate, VOCs, SVOCs, PCBs, metals (total and dissolved), explosives, and TPH	EPA SOPs 4230.07A & 4230.15A	EPA SOPs 3135.09B, 3230.13C, 3230.02D, 3240.02F, 3121.14E, 3122.03B, & EPA Method 8330A; Methods OA-1 and OA-2.
4	Water	Private drinking water wells	to assess potential contamination of drinking water supplies from site operations	N/A	Perchlorate, VOCs, SVOCs, PCBs, metals, low level PAHs, explosives, and TPH	EPA SOP 4230.10A	EPA SOPs 3135.09B, 3230.09C, 3230.02D, 3240.02F, 3121.14E, 3122.03B, 3260.03C, & EPA Method 8330A; Methods OA-1 and OA-2.
3	Water	Surface water from on-site drainage	to assess potential impact on surface water from site operations	N/A	Perchlorate, VOCs, SVOCs, PCBs, metals, explosives, and TPH	EPA SOP 4230.17A	EPA SOPs 3135.09B, 3230.13C, 3230.02D, 3240.02F, 3121.14E, 3122.03B & EPA Method 8330A; Methods OA-1 and OA-2.
3	Sediment	Co-located with surface water samples	to assess potential impact on sediment from site operations	0-6 inches	Perchlorate, VOCs, SVOCs, metals, PCBs, explosives, and TPH	EPA SOP 4230.08A	Region 7 SOP for perchlorate in soil; EPA SOPs 3230.01E, 3230.02D, 3121.14E, 3122.03B, 3240.02F, and EPA Method 8330A, & Methods OA-1 & OA-2.

Table 1: Sample Summary (continued)

No. of Samples	Matrix	Location	Purpose	Depth or other Descriptor	Requested Analysis	Sampling Method	Analytical Method/SOP
Background Samples							
1	Soil	Geoprobe® boring upgradient of site	to assess background concentrations in soil	0-2 feet	Perchlorate, VOCs, SVOCs, metals, PCBs, explosives, and TPH	EPA SOPs 4230.07A, 4230.03B, & 4231.2012; EPA Method 5035	Region 7 SOP for perchlorate in soil; EPA Methods 5035 and 8330A; EPA SOPs 3230.02D, 3121.14E, 3122.03B, 3240.02F; Methods OA-1 & OA-2.
1	Water	Geoprobe® temporary well upgradient of site	to assess background concentrations in groundwater	directly below water table	Perchlorate, VOCs, SVOCs, PCBs, metals (total and dissolved), explosives, and TPH	EPA SOPs 4230.07A & 4230.15A	EPA SOPs 3135.09B, 3230.13C, 3230.02D, 3240.02F, 3121.14E, 3122.03B, & EPA Method 8330A; Methods OA-1 and OA-2.
1	Water	Private drinking water well upgradient of site	to assess background concentrations in drinking water supplies	N/A	Perchlorate, VOCs, SVOCs, PCBs, metals, low level PAHs, explosives, and TPH	EPA SOP 4230.10A	EPA SOPs 3135.09B, 3230.09C, 3230.02D, 3240.02F, 3121.14E, 3122.03B, 3260.03C, & EPA Method 8330A; Methods OA-1 and OA-2.
1	Water	Surface water	to assess background concentrations in surface water	N/A	Perchlorate, VOCs, SVOCs, PCBs, metals, explosives, and TPH	EPA SOP 4230.17A	EPA SOPs 3135.09B, 3230.13C, 3230.02D, 3240.02F, 3121.14E, 3122.03B & EPA Method 8330A; Methods OA-1 and OA-2.
1	Sediment	Co-located with surface water sample	to assess background concentrations in stream sediment	0-6 inches	Perchlorate, VOCs, SVOCs, metals, PCBs, explosives, and TPH	EPA SOP 4230.08A	Region 7 SOP for perchlorate in soil; EPA SOPs 3230.01E, 3230.02D, 3121.14E, 3122.03B, 3240.02F, and EPA Method 8330A, & Methods OA-1 & OA-2.

Table 1: Sample Summary (continued)

No. of Samples	Matrix	Location	Purpose	Depth or other Descriptor	Requested Analysis	Sampling Method	Analytical Method/SOP
QC Samples							
1	Water	trip blank	To assess field/transportation-related contamination	N/A	VOCs and TPH-purgeables	N/A	EPA SOP 3230.09C; Method OA-1
1	Water	rinsate blank	to evaluate effectiveness of decontamination procedures for Geoprobe® soil and groundwater sampling equipment	N/A	Perchlorate, VOCs, SVOCs, metals, PCBs, explosives, and TPH	N/A	EPA SOPs 3135.09B, 3230.09C, 3230.02D, 3240.02F, 3121.14E, 3122.03B, & EPA Method 8330A; Methods OA-1 and OA-2.
1	Water	field blank	to assess field-introduced contamination	N/A	Perchlorate, VOCs, SVOCs, metals, PCBs, low-level PAHs, explosives, and TPH	N/A	EPA SOPs 3135.09B, 3230.09C, 3230.02D, 3240.02F, 3121.14E, 3122.03B, 3260.03C, & EPA Method 8330A; Methods OA-1 and OA-2.
1	Soil	Trip blank	To assess field/transportation related contamination	N/A	VOCs and TPH-purgeables	N/A	EPA Method 5035; Method OA-1
1	Soil	field duplicate – on-site Geoprobe® boring	to assess the precision of analytical and sampling methods	0-2 feet bgs	Perchlorate, VOCs, SVOCs, metals, PCBs, explosives, and TPH	EPA SOPs 4230.07A, 4230.03B, & 4231.2012; EPA Method 5035	Region 7 SOP for perchlorate in soil; EPA Methods 5035 & 8330A; EPA SOPs 3230.02D, 3121.14E, 3122.03B, 3240.02F; Methods OA-1 & OA-2.
1	Water	field duplicate – groundwater from Geoprobe® well	to assess the precision of analytical and sampling methods	directly below water table	Perchlorate, VOCs, SVOCs, PCBs, and metals (total and dissolved), explosives, and TPH	EPA SOPs 4230.07A & 4230.15A	EPA SOPs 3135.09B, 3230.13C, 3230.02D, 3240.02F, 3121.14E, 3122.03B, & EPA Method 8330A; Methods OA-1 and OA-2.
1	Water	field duplicate – groundwater from private drinking water well	to assess the precision of analytical and sampling methods	N/A	Perchlorate, VOCs, SVOCs, PCBs, metals, explosives, and TPH	EPA SOP 4230.10A	EPA SOPs 3135.09B, 3230.09C, 3230.02D, 3240.02F, 3121.14E, 3122.03B, & EPA Method 8330A; Methods OA-1 and OA-2.
1	Water	field duplicate – surface water sampling location	to access the precision of analytical and sampling methods	N/A	Perchlorate, VOCs, SVOCs, PCBs, metals, explosives, and. TPH	EPA SOP 4230.17A	EPA SOPs 3135.09B, 3230.13C, 3230.02D, 3240.02F, 3121.14E, 3122.03B & EPA Method 8330A; Methods OA-1 and OA-2.
1	Sediment	field duplicate – sediment sampling location	to assess the precision of analytical and sampling methods	0-6 inches	Perchlorate, VOCs, SVOCs, metals, PCBs, explosives, and. TPH	EPA SOP 4230.08A	Region 7 SOP for perchlorate in soil; EPA SOPs 3230.01E, 3230.02D, 3121.14E, 3122.03B, 3240.02F, EPA Method 8330A; Methods OA-1 & OA-2.

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Table 2: Data Quality Objective Summary

Site Name: Ottumwa (ex) Naval Air Station Site	**Location:** Ottumwa, Iowa	
START Project Manager: Jenna Mead	**Activity/ASR #:** To be determined	**Date:** 3/29/06

Analysis	Analytical Method	Data Quality Measurements					Sample Handling Procedures	Data Management Procedures
		Accuracy	Precision	Representativeness	Completeness	Comparability		
WATER (Groundwater, Drinking Water, and Surface Water)								
Perchlorate, VOCs, SVOCs, PCBs, metals, explosives, and TPH.	see Table 1	per analytical method	per analytical method	biased/judgmental sampling based on professional judgment of the sampling team	100%; samples from private drinking water wells are considered critical samples	standardized procedures for sample collection and analysis will be used	see Section 2.3 of QAPP form	see Section 2.10 of QAPP form
SOIL/SEDIMENT								
Perchlorate, VOCs, SVOCs, PCBs, metals, explosives, and TPH.	see Table 1	per analytical method	per analytical method	biased/judgmental sampling based on professional judgment of the sampling team	100%; soil samples from on-site Geoprobe® borings are critical samples	standardized procedures for sample collection and analysis will be used	see Section 2.3 of QAPP form	see Section 2.10 of QAPP form

APPENDIX A

SITE-SPECIFIC INFORMATION FOR A PRELIMINARY ASSESSMENT AT THE OTTUMWA (EX) NAVAL AIR STATION SITE

INTRODUCTION

The Tetra Tech EM Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) has been tasked by the U.S. Environmental Protection Agency (EPA) Region 7 Superfund Division to conduct Preliminary Assessment (PA) activities at the Ottumwa (ex) Naval Air Station (NAS) site at Ottumwa, Wapello County, Iowa.

The purpose of this PA is to determine whether any threats to human health or the environment exist as a result of releases to site soils, groundwater, and surface water. This Quality Assurance Project Plan (QAPP) identifies site-specific features and addresses elements of the sampling strategy and analytical methods proposed for this investigation.

SITE LOCATION/DESCRIPTION

The former Ottumwa NAS is located about 5 miles north of Ottumwa in Wapello County, Iowa, and was commissioned in March 1943. In June 1945, the site included 76 buildings, an aircraft landing field with two concrete runways, asphalt landing mats, and a concrete aircraft parking area. In 1947, the Federal Government leased the property to the City of Ottumwa for use as a public airport and other approved purposes (the City sub-leased to various businesses and individuals). In 1954, the lease was modified to delete one building from the City lease and designate it as a U.S. Marine Corps training center. In 1957, title to the 1,440 acres where most of the facility improvements were located reverted to the City of Ottumwa. In 1957, improvements (65 buildings) and 29.12 acres for rail spur easement were reported as excess to the General Services Administration. In 1959, this was withdrawn and the facility (minus two buildings that were transferred to the City) was transferred to the Air Force. The Air Force used the site as the Ottumwa Tracking and Data Acquisition Annex. The Air Force reported the rail spur easement and 42 buildings excess in 1964, and they were sold to the City shortly thereafter (Naval Construction Battalion Center 1974). In 1964, the U.S. Army Reserve (USAR) requested space for the Motor Repair Shop and Reserve Center. The USAR used an existing building until 1981, when a new building was constructed.

This site includes the NAS dating to original construction and the U.S. Army Reserve Motor Repair Shop dating to 1964. The site covers approximately 1,440 acres and is situated in a rural area within Sections 22, 23, 26, and 27, Township 73 North, and Range 14 West. The geographical coordinates for the center of the site are latitude 41°06'11" north and longitude 92°26'16" west. While in operation, the site consisted of 76 buildings, an aircraft landing field with two concrete runways, two asphalt landing mats, a

rifle range, a concrete aircraft parking area, underground storage tanks (UST) that held fuel, a sewage system, hangers, and a water supply system (U.S. Army Corps of Engineers [USACE] 1991a). Currently, the site is owned by the City of Ottumwa and is known as the Ottumwa Industrial Airport. The City has used many of the buildings, and several industries are located on the property.

In 2001, companies and institutions that use the leased buildings included Boys and Girls Town, a youth detention center; Al-Jon Inc., which builds car crushers; Briggs Transportation; American Bottling Company; Roadway Package System, which operates similar to UPS; Norris Asphalt Paving Corporate Headquarters; Bakery Supply; a truck driving school; and Southeast Iowa Drug Task Force. The American Bottling Company is located where Everco Industries used to be located, which is above the USTs (Tetra Tech 2001). The original campus for Indian Hills Community College (IHCC) was at the Ottumwa Airport, and an airport campus housing two aviation programs is still on site (IHCC 2006).

The U.S. Department of Agriculture (USDA) has classified soil in the area as Taintor silty clay loam with some Mahaska silty clay loam (USDA 1976). The Taintor soil type is described by the USDA as a nearly level, poorly drained soil found on broad flats in the loess-covered uplands. The Mahaska soil type is described as nearly level, somewhat poorly drained soil found on narrow flats and the outward edges of moderately broad to broad flats in the loess-covered uplands. The Mahaska-Taintor soil association, which formed in loess under native vegetation, is nearly level or gently sloping. This soil association has low permeability and thus a relatively high runoff volume (Tetra Tech 2001).

Review of the Iowa Department of Natural Resources (IDNR) Geosam database indicates about 40 feet of glacial drift is present in the site area (IDNR 2006). The glacial drift overlies lower and middle Pennsylvanian-age Cherokee Group and Caseyville Formation bedrock (IDNR 2004). The primary lithology of the Pennsylvanian bedrock is shale, and this serves as an aquiclude. Below the Pennsylvanian bedrock lies the Mississippian aquifer, which consists of limestones, dolomites, and some interbedded sandstones. The depth to the top of this aquifer is somewhere between 140 and 190 feet below ground surface (bgs). Other aquifers are below the Mississippian aquifer; however, the water quality is poor, and these are not used for drinking water (Tetra Tech 2001).

Review of the IDNR Geosam database indicated 74 registered wells within a 4-mile radius of the site (IDNR 2006). Static water levels available through this database were generally between 50 and 100 feet bgs, with the main water-bearing units indicated at depths of 100 to 300 feet bgs. It should be noted that unregistered wells may also be present in the area, with an unknown number of residents obtaining drinking water from these wells. The City of Ottumwa obtains its municipal water from the Des Moines

River, which serves approximately 24,000 residents of Ottumwa (City of Ottumwa Water Works 2001). The City supplies water to residents on and around the site; water is pumped into a reservoir on the site (approximately 220,000 gallons). The water is stored in the reservoir until pumped out for customer use via a rural water system (Tetra Tech 2006). The original pump station on site is still used for this. The City water works pumps one million gallons per day to rural water customers (the exact number of rural water customers was not determined).

Intermittent tributaries surround the site and collect surface runoff. The nearest surface water body is Comstock Creek, a perennial stream located 0.75 mile to the west of Section 22. Comstock Creek flows into the Des Moines River, which flows southeast and is located about 3 miles southwest of the airport. The 15-mile Target Distance Limit (TDL) for this drainage pathway would end in the Des Moines River. Comstock Creek receives drainage from only the northwestern portion of the site, which is situated on a drainage divide between the Des Moines River and Cedar Creek. Drainage at the southern portion of the site is to Little Cedar Creek. This creek flows southeast at the site, then turns to the northeast to discharge into Cedar Creek. Drainage from the northern portion of the site is into unnamed tributaries of Cedar Creek. Cedar Creek flows southeast paralleling the Des Moines River through neighboring Jefferson County and discharging into the Skunk River in Henry County. The 15-mile TDL for this drainage pathway would end in Cedar Creek.

PREVIOUS INVESTIGATIONS

Previous investigations at the Ottumwa NAS site have included the following:

> USACE conducted a site visit on October 19 and 20, 1989. A Project Summary Sheet indicated a building had been constructed over two 100,000-gallon and two 25,000-gallon reinforced concrete USTs formerly used by the NAS. These tanks were part of a fuel hydrant system and were connected to seven pumping stations on the runway. In 1970, the property had been leased to Everco Industries, Inc., who poured a building foundation over the tank area, but left a manhole between the USTs (USACE 1991a, 1991b, 1991c). In 1986, Moog Automotive purchased Everco. Moog hired a contractor to sample the USTs and install monitoring wells around them. The contractor excavated a 15- by 15-foot area around one of the 100,000-gallon tanks to about 8 feet bgs. Excavation stopped when odors were detected. The excavation was backfilled with clean soil and the concrete patched. In 1989, soil borings in the area indicated that free petroleum product was present. Analyses indicated that no metals or polychlorinated biphenyls (PCB) were detected (USACE 1991b). In December 1990, the owner ceased the investigation and remediation activities with the understanding that the USACE would complete the contract. The Project Summary Sheet recommended further environmental sampling and possible remediation for this area (USACE 1991b).

In addition to these USTs, four smaller (1,000-gallon to 3,000-gallon) USTs were discussed in the Site Survey Summary Sheet (USACE 1991c). The locations of these USTs were not specified, but appear to have been at the former location of the USAR Motor Repair Shop. Testing and possible removal of these USTs was recommended. A copy of a letter from the Department of the Army to the State of Iowa (dated as received by EPA on June 3, 1997) indicates that three 2,000-gallon USTs and associated piping were removed in March 1995. Levels of petroleum hydrocarbons in soil samples collected from the excavation were below regulatory limits (USACE 1997). The State issued a No Further Action letter for the site in August 1997 (IDNR 1997).

A letter report from ChemWaste Management to Everco Corporation, dated February 14, 1990, summarized an investigation at the Everco Facility in December 1989. This letter indicates much of the information previously summarized by USACE. The letter indicates that 24 samples were collected for analysis of volatile organic compounds (VOC), PCBs, and Extraction Procedure (EP) Toxicity metals. PCBs were not detected above a detection limit of 5 parts per million (ppm), and VOCs were not detected above a detection limit of 100 ppm. Metals results for EP Toxicity were also below detection limits. A sample of waste solvent from Tank 1 indicated that trichloroethene (TCE), tetrachloroethene (PCE), and 1,1,1-trichloroethane were present at concentrations of 0.29 to 0.43 percent by weight. Fuel oil compounds were also present in the sample.

A USACE memorandum dated August 17, 1992, discussed the contaminants detected from the Chemical Waste Management study of December 1989 and Environmental Resources Management studies of December 1990 and June 1992. According to this memorandum, soil Sample 1-A, located in the Tank 4 area, contained high levels of chlorinated hydrocarbons generally associated with cleaning and degreasing solvents. It also contained high levels of non-chlorinated hydrocarbons associated with cleaning solvents. Sample 3-A, from the manway area between Tanks 3 and 4, contained lower levels of chlorinated and non-chlorinated solvents. Both samples also contained low levels of fuel (gasoline or JP-4) compounds. The memorandum indicated that two sets of water samples dated December 1990 and June 1992 had been collected for analysis. Sample Manhole 1 reportedly contained low levels of three VOCs typically associated with cleaning and degreasing solvents. The 1992 sample indicated high levels of seven of these VOC compounds. Low levels of semi-volatile organic compounds (SVOC) and high levels of total petroleum hydrocarbons (TPH) were also reported (USACE 1992).

The memorandum indicates that the Omaha District of the USACE met with Everco in June 1992. In this meeting, it was reported that plating wastes (lead, chromium, and solvents) may have been dumped into the tanks. The USACE concluded that the contamination found at this site was not consistent with Department of Defense (DoD) usage, but with the industrial uses of the present owner, Moog, and its predecessor, Everco. The USACE concluded that Everco (or Moog) should have notified IDNR upon becoming aware of the contamination at the site (USACE 1992). A March 8, 1993, letter to Iowa DNR from the USACE took the position that the contamination at the Everco/Moog facility was not the responsibility of the DoD and indicated that the USACE did not "intend to conduct or participate in the execution of any studies or remediation activities relating to the tanks located at the Everco/Moog site" (USACE 1993). The letter also indicated that Moog Inc. was a subsidiary of Everco.

An October 4, 1993, letter from Paul Hartman of Moog Temperature Control Division (Moog) to the EPA Region 7 Resource Conservation and Recovery Act (RCRA) Iowa Section stated that upon word of the USACE's position, they developed a plan for evaluating the contents of the tanks. The letter indicated that final sampling of the tanks and six monitoring wells at the facility was completed in September 1993 and they were awaiting the report. Upon receipt of the report, plans would proceed for in-place tank closure. No documentation was available regarding this tank closure (Moog 1993).

Tetra Tech prepared a Pre-CERCLIS Screening Assessment Report for the Ottumwa Tracking Acquisition Annex in May 2001. The Pre-CERCLIS investigation concluded that further pre-remedial action may be warranted based on past operations and information regarding water management activities at similar DoD Army airfields.

On February 15, 2006, Tetra Tech contacted Mr. Tom Francis at the Ottumwa Industrial Airport. Mr. Francis indicated that the USTs at Everco/Moog had been cleaned and filled with grout for in-place closure. He indicated that during attempts to acquire fill material from a hill near the sewage treatment plant, airport personnel had encountered burned waste materials, and he suspected the area may have been used as a landfill for the former NAS (Tetra Tech 2006). Mr. Francis also indicated he had maps showing the locations of specific areas of interest, such as the ammunition/pyrotechnics building and the shooting ranges. Mr. Francis also stated that the airport obtains water from the City, and that most of the residences in the area were connected to a rural water system (purchased from the City), but that some older farmsteads might still have wells (Tetra Tech 2006).

Contaminants potentially released at the site include the following:

- Metals – may be present due to various past site activities.
- Perchlorate – typically associated with solid fuel engine boosters.
- TPH – may be present due to a leaking underground fuel tank.
- VOCs – may be present from cleaning and degreasing operations.
- SVOCs – may be present from a variety of sources.
- Explosive compounds and residuals – unexploded ordnance and residuals of ammunition may be present as a result of munitions handling, including trinitrotoluene (TNT) and TNT degradation products associated with expelling charge.
- PCBs – may be present from transformers or other equipment formerly on site.
- Polynuclear aromatic hydrocarbons (PAH) – may be present from incomplete combustion at incinerators or open burn pits.

SAMPLING STRATEGY AND METHODOLOGY

Sampling is tentatively scheduled to begin in late May or early June 2006, and will require approximately three days to complete. Laboratory data obtained for all samples collected during this project will be compared to all applicable or relevant and appropriate requirements (ARAR) to assess whether further response is warranted.

Soil Sampling

Soil samples will be collected from 10 boreholes at the site. About six of the borings will be in the main facility area centered around the former rail spur, storage buildings, and former tank yard (see Appendix B, Figure 2). The remainder will be at the skeet and rifle ranges, the suspected landfill or burn area, and the ammunition/pyrotechnics storage area. All borings will be advanced 2 feet bgs using a truck-mounted direct-push technology (DPT) or Geoprobe® rig for collection of surface soils. At seven of those locations, the borings will continue to about 12 feet bgs for collection of deeper samples. The remaining three borings will be at two shooting ranges and the ammunition/pyrotechnics area. The DPT soil samples will be collected in accordance with Region 7 EPA SOP *4230.7A: Geoprobe® Operations*.

Soil cores will be collected using Geoprobe® 4-foot-long Macro-Core® samplers with disposable polyvinyl chloride (PVC) liners. A hand-held photoionization detector (PID) will be used to screen each core interval, and samples for laboratory analysis will be collected based on VOC levels recorded by the PID. Each sample for laboratory analysis will include a grab sample for analysis of VOCs collected in accordance with EPA SW-846 Method 5035, and will consist of two 40-milliliter vials preserved with sodium bisulfate, and two 40-milliliter vials packed with soil. Two other 40-milliter vials will be filled for analysis of TPH-purgeables. At all boring locations, a soil sample will be collected between ground surface and 2 feet bgs. At seven of those locations, deeper sample will be collected from about 10 to 12 feet bgs or from the zone having the highest VOC readings detected using the PID.

After collection of the grab samples, the remaining soil will be removed from the PVC liner and placed in a disposable aluminum pie pan for homogenization and then transferred to four 8-ounce jars. These containers will be submitted for analyses of SVOCs, perchlorate, TPH-extractables, metals, explosives, and PCBs. Pertinent data, including property ownership information, analyses to be performed, and exact sample locations, will be recorded on field sheets for each sample. All soil samples will be stored in coolers maintained at or below 4 degrees Celsius (°C) pending submittal to the EPA Region 7 laboratory.

Groundwater Sampling

Groundwater samples will be collected from four private drinking water wells within about 2 miles of the site to assess the impact of site activities on groundwater quality. At this time, Tetra Tech START has not received permission to sample the wells; however, the intention is to gain permission and to sample these wells. Groundwater samples from the private drinking water wells will be collected from taps/spigots located nearest the well heads, prior to any in-home treatment systems. The system lines will be purged for approximately 5 minutes before the samples are collected. Water quality parameters (pH, conductivity, and temperature) will be recorded as each well is purged until the parameters stabilize.

At three locations, collection of groundwater at Geoprobe® temporary groundwater wells will be attempted to a maximum depth of 30 feet bgs. One temporary well location will be at the possible landfill area, one will be at the operations area, and the third will be southeast of the former tank yard. These samples will be collected with a Geoprobe® Screen Point 15 sampling apparatus containing a disposable 4-foot-long PVC screen. At each location, the screen will be deployed directly below the water table, and a sample will be collected through disposable polyethylene tubing with either a peristaltic pump or using a check valve placed at the bottom of the tubing.

A field sheet will be completed for each groundwater sample location. The field sheets will include the following information: water quality parameters (private wells only), purge times or estimated purge volumes, property ownership information, exact sample locations (depths and global positioning system coordinates), and analyses to be performed. The groundwater samples will be submitted to the EPA Region 7 laboratory for analyses of perchlorate, VOCs, SVOCs, explosives, TPH-purgeables, TPH-extractables, PCBs, and metals. Groundwater samples collected for VOCs will be collected into two 40-milliliter vials preserved with hydrochloric acid (HCl). The TPH-purgeables samples will be collected in two unpreserved 40-milliliter vials. Water samples submitted for analyses of SVOCs, PCBs, explosives, and TPH-extractables will be collected in 128-ounce amber glass jugs (three per sample). Samples for perchlorate analysis will be collected in 1-liter cubitainers (one per sample). Water samples for metals analysis will be collected in 1-liter containers and preserved with nitric acid (HNO_3) to a pH <2. The samples from the Geoprobe® wells will be filtered in the field for analysis of dissolved metals, along with total metals. Samples from the private drinking water wells will be analyzed for total metals only. All water samples will be stored in coolers maintained at or below 4°C pending submittal to the EPA Region 7 laboratory.

Surface Water/Sediment Sampling

The closest perennial surface water body to the site is Comstock Creek; however, this stream receives drainage from the western portion of the airfield only. Drainage from the main portion of the facility is to Cedar Creek, with the southeastern portion first draining to Little Cedar Creek. Surface water and sediment samples will be collected from four locations (including one background location), as shown on Figure 2 in Appendix B. Two locations will be the drainage pathways to Little Cedar Creek. The third sample and the background location will be from the eastern portion of the site where drainage is to an unnamed tributary of Cedar Creek. Because the site is a topographic divide, the background sample will be collected from a drainageway receiving runoff from an undeveloped area north of the northeast-southwest runway. The samples will be collected starting at the furthest downstream location and continuing upstream. At each location, the surface water sample will be collected prior to the collection of the sediment sample. All sampling procedures will follow the guidelines established in the EPA SOPs identified in the QAPP.

Surface water samples will be submitted to the EPA Region 7 laboratory for analyses of perchlorate, VOCs, SVOCs, PCBs, total metals, explosives, TPH-purgeables, and TPH-extractables. Water samples will be collected by immersing the sample containers directly into the water, whenever possible. Water samples collected for VOCs will be collected into two 40-milliliter vials preserved with HCl. TPH-purgeables will be collected in two unpreserved 40-milliliter vials. Water samples submitted for analyses of SVOCs, PCBs, explosives, and TPH-extractables will be collected in 128-ounce amber glass jugs (three per sample). Samples for perchlorate analysis will be collected in 1-liter cubitainers (one per sample). Water samples for metals analysis will be collected in 1-liter containers and preserved with HNO_3 to a pH <2.

Sediment samples will be collected from the top 6 inches of stream sediment with a hand auger or using disposable stainless-steel spoons. Grab samples collected for analysis of VOCs will be placed in two 40-milliliter glass vials. Grab samples for TPH-purgeables will also be placed in two 40-milliliter glass vials. The remaining sediment will be placed in a disposable aluminum pie pan for homogenization, and then transferred to three 8-ounce jars. These containers will be submitted for analyses of perchlorate, SVOCs, PCBs, metals, explosives, and TPH-extractables.

Pertinent data, including analyses to be performed and sample location data, will be recorded on field sheets for each sample. All surface water and sediment samples will be stored in coolers maintained at or below 4°C pending submittal to the EPA Region 7 laboratory.

A summary of all anticipated samples for this project is in Table 1 of the attached QAPP form. The SOPs and chain-of-custody procedures referenced in the QAPP will be followed throughout the sampling activities to verify the integrity of the samples from the time of collection until they are submitted to the laboratory for analysis.

Disposal of investigation-derived wastes (IDW) and procedures for equipment and personal decontamination will be addressed in a site-specific health and safety plan prepared by Tetra Tech START. IDW is expected to consist of disposable sampling supplies (gloves, paper towels, PVC liners, pie pans, etc.) that will be disposed of off site as uncontaminated solid waste.

Quality Control Samples

Off-site locations will be selected for collecting background samples of soil, groundwater, drinking water, surface water, and sediment. To evaluate sample quality control (QC), soil and water trip blanks, a water field blank, and an equipment rinsate blank will be collected, as specified in Section 2.5 of the QAPP form. In addition, duplicate samples of soil, surface water, sediment, groundwater, and drinking water will be collected, as specified in Section 2.5 of the QAPP form.

ANALYTICAL METHODS

All samples will be submitted to the EPA Region 7 laboratory in Kansas City, Kansas, for analysis. The water samples will be analyzed for perchlorate, VOCs, SVOCs, PCBs, metals, explosives, and TPH. The samples collected from temporary Geoprobe® wells will be analyzed for both total and dissolved metals. All analyses for metals will include mercury. Soil and sediment samples will be analyzed for perchlorate, VOCs, SVOCs, PCBs, metals (including mercury), explosives, and TPH. All samples will be analyzed according to SOPs and methods referenced in the QAPP. Standard detection limits for those methods will be adequate for this project. Appropriate containers and physical/chemical preservation techniques will be employed during the field activities to help verify that representative analytical results are obtained. An Analytical Services Request form will be completed by the Tetra Tech START Project Manager and submitted to the EPA Region 7 laboratory anticipating submittal of samples to the laboratory in late May or early June 2006.

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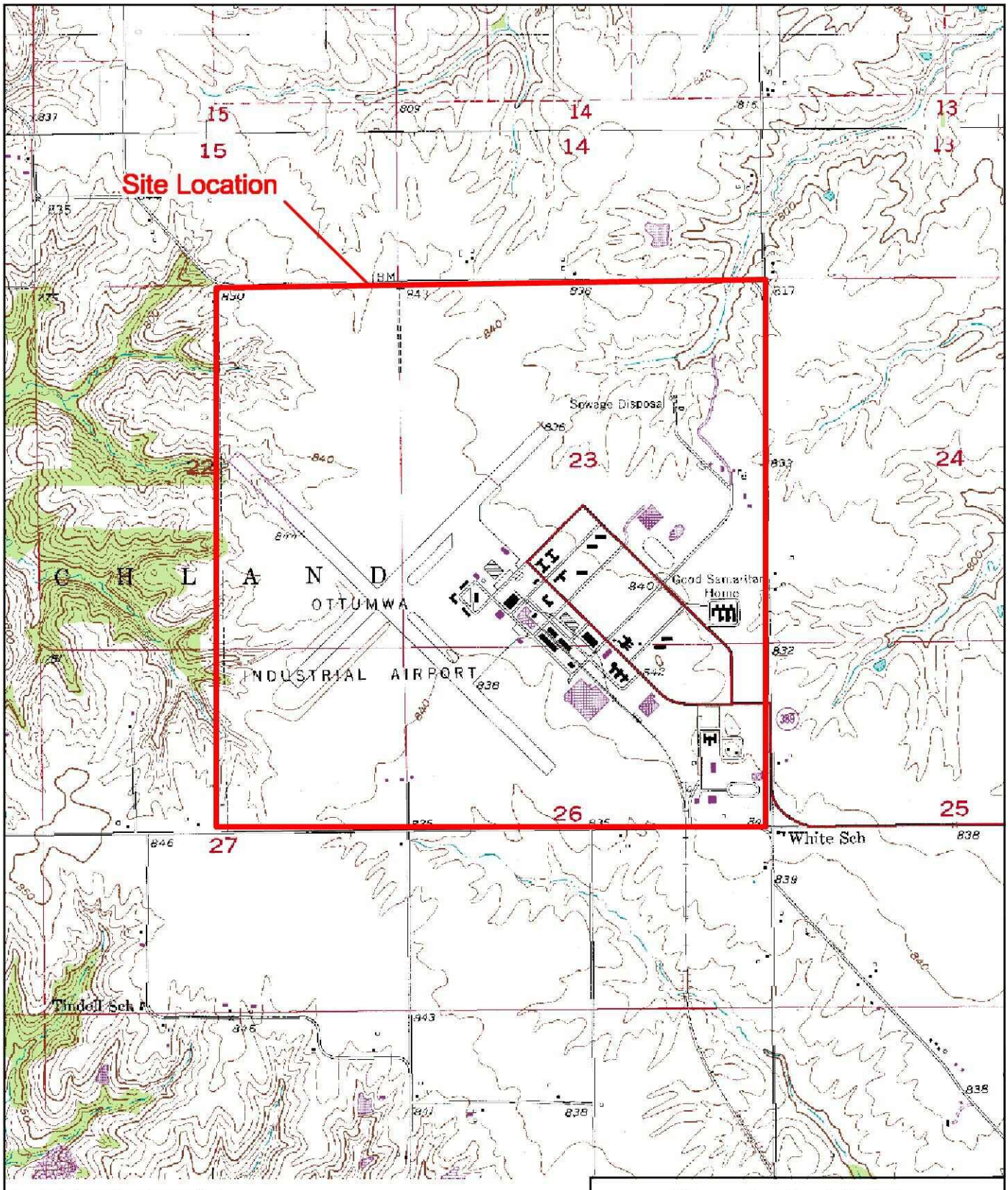
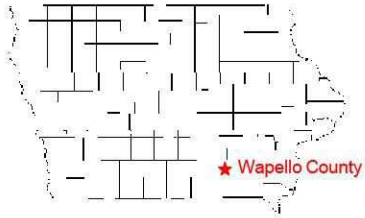
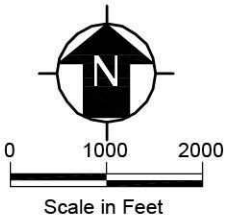
APPENDIX B

FIGURES







Source: USGS Fremont, IA 7.5 Minute Topo Quad, 1994
USGS Ottumwa North, IA 7.5 Minute Topo Quad, 1994

Ottumwa (ex) Naval Air Station
Ottumwa, Iowa

Figure 1
Site Location Map

Tetra Tech EM Inc.

Date: 03/23/06 Drawn By: Bill Spiking Project No: I9004.L06.0002.006.007

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Legend

- Soil and Groundwater Sample Location
- Soil Sample Location
- Surface Soil Sample Location
- Sediment and Surface Water Sample Location
- Subject Site Boundary

Source: Ottumwa County, Iowa Northwest and Northeast DOQQ CIR Imagery, 2002

N

0 1,000 2,000

Scale in Feet

Ottumwa (ex) Naval Air Station
Ottumwa, Iowa

Figure 2
Proposed Sampling Location Map

Tetra Tech Inc.

Date: 03/22/06 Drawn By: Bill Spiking Project No: I9004.L06.0002.006.007

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