QUALITY ASSURANCE PROJECT PLAN / SITE SAMPLING PLAN

WELCH ENVIRONMENTAL GROUP
FAIR PLAY, OCONEE COUNTY, SOUTH CAROLINA
ANDERSON, ANDERSON COUNTY, SOUTH CAROLINA

Revision 0

Prepared for:

U.S. ENVIRONMENTAL PROTECTION AGENCY
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REVIEWS AND APPROVALS

CLIENT NAME: U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 4
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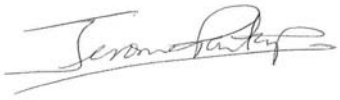
We, the undersigned, have read and approve of the quality assurance guidelines presented in this Quality Assurance Project Plan/Site Sampling Plan for work activities at the Welch Environmental Group site in Fair Play, Oconee County, Alabama.

Prepared by:



Jerry Partap
START Project Manager

Approved by:

Keely Meadows
START Quality Assurance Manager

Leo Francendese
EPA Task Monitor

DISTRIBUTION LIST

Following receipt of the appropriate approval signatures, this document will be distributed to the following project participants:

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) has tasked the Oneida Total Integrated Enterprises (OTIE), Superfund Technical Assessment Response Team (START) to perform a sampling event in support of a removal site evaluation (RSE) at Welch Environmental Group (the site), located in Fair Play, Oconee County, South Carolina, under Contract Number EP-W-05-053, Technical Direction Document (TDD) No. TNA-05-003-0122. In addition to the parcel located in Fair Play, South Carolina, operations associated with Welch Environmental Group also took place in Anderson, Anderson County, South Carolina. The purpose of this RSE is to collect information to assist in determining whether an uncontrolled hazardous source is present at the sites and subsequently, whether hazardous substances have been released into the environment. Specifically, findings will identify the need for federal intervention under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 and the Superfund Amendments and Reauthorization Act (SARA) of 1986.

Under this TDD, START has been tasked to:

- Develop a Health and Safety Plan (HASP) that includes site-specific health and safety measures for conducting the field investigation designed to identify metals contamination at the sites;
- Document site conditions and field investigation activities with written logbook notes and digital photographs;
- Develop a Quality Assurance Project Plan (QAPP)/Site Sampling Plan (SSP) that includes site-specific sampling and analysis procedures and quality assurance measures for conducting an investigation designed to identify contamination at the sites;
- Perform field investigation activities including field screening and soil sampling as outlined in the QAPP/SSP; and,
- Prepare a comprehensive report summarizing the site conditions, field sampling activities, and screening and analytical results of the RSE.

The QAPP/SSP details the tasks described in the TDD and specifically addresses the activities and procedures associated with the anticipated soil screening and sampling. This QAPP/SSP also details the quality assurance/quality control (QA/QC) measures to be followed to ensure that all Data Quality Objectives (DQOs) are fulfilled. All activities and procedures discussed and described in this QAPP/SSP will be presented and conducted in accordance with the approved OTIE QAPP and the EPA Region 4 Science and Ecosystem Support Division (SESD) *Field Branches Quality System and Technical Procedures* (FBQSTP) (Refs. 1; 2).

Field activities will include sampling and screening of surface and subsurface soils at predefined areas (grids) to identify and delineate metals contamination using an X-Ray Fluorescence (XRF) instrument, and submitting approximately 10 samples collected for field screening to a laboratory for lead confirmation analysis per parcel. In addition, approximately five samples per parcel will be analyzed for Target Analyte List (TAL) metals. Analytical services will be provided by an EPA-approved private laboratory and will comply with the laboratory's Standard Operating Procedures (SOPs) and the applicable analytical methods required for this project. The findings of this sampling event will be used to generate a RSE report that will then be used to determine the need for further federal intervention under CERCLA.

This QAPP/SSP documents the policies, the project organization, quality assurance (QA) requirements, and quality control (QC) procedures to be implemented for these sampling events to ensure that the data are valid for use. This QAPP/SSP addresses all EPA requirements for a QAPP (QA-R5) with the elements of a field SSP so that field and laboratory activities are described in one document. It defines the QA/QC methods that must be implemented to ensure that data meets the requirements of the DQOs. The HASP, which is issued as a separate document, defines the preventative and protective procedures that will be implemented during the field investigation to ensure the safety of the field team.

The following sections provide the details of this QAPP/SSP:

- Section 2: Describes the proposed project personnel and;
- Section 3: Describes the required training/certification of project personnel
- Section 4: Describes the site background;
- Section 5: Describes the project and objectives;
- Section 6: Describes the sampling design, field screening methodology, and proposed field activities supporting the sampling events;
- Section 7: Describes the site documentation and data management procedures;
- Section 8: Details the exceptions to the assignment ;
- Section 9: Summarizes the proposed field activities supporting the sampling events; and,
- Section 10: Provides references cited to support this document.

Figures and tables are provided in Appendices A and B, respectively.

2.0 PROJECT ORGANIZATION

The organizational structure for the project is presented in Figure 4 in Appendix A.

2.1 EPA START PROJECT OFFICER

The EPA assumes the overall management of this investigation on behalf of the federal government. The EPA START Project Officer represents the EPA and is responsible for:

- Ensuring that EPA guidance and policy is followed and that EPA objectives are achieved;
- Addressing contracting or funding issues if they arise;
- Providing a central repository for all TDD deliverables;
- Providing initial funding and additional funding if needed; and,
- Maintaining communication with the EPA Task Monitor (TM) and START Project Manager (PM).

The EPA START Project Officer is Ms. Katrina Jones.

2.2 EPA TASK MONITOR

The EPA TM directs the project and is responsible for ensuring that the work is completed in accordance with the requirements for the site, and for overseeing implementation of the work required under the TDD. The TM is also responsible for:

- Maintaining communications with the START PM regarding project status;
- Reviewing Monthly Progress Reports (MPRs);
- Reviewing/Approving START costs in the Removal Cost Management System (RCMS)
- Providing oversight of field efforts; and,
- Reviewing all project deliverables prepared by START.

The EPA TM for this project is Mr. Leo Francendese.

2.3 START PROJECT MANAGER

The START PM is responsible for project performance, budget, and schedule, and for ensuring the availability of necessary personnel, equipment, subcontractors, and services. The START PM will direct the development of the field sampling plan, evaluate findings, and prepare the RSE report. The START PM is selected based on technical experience, project needs, and previous START project experience. Additional responsibilities include:

- Ensuring timely resolution of project-related technical, quality, safety, or waste management issues;
- Functioning as primary interface with the EPA TM, field and office personnel, and subcontractor points-of-contact;
- Monitoring and evaluating subcontractor laboratory performance;
- Coordinating and overseeing work performed by field and office technical staff (including data validation and report preparation);
- Coordinating and overseeing maintenance of all project records;
- Coordinating and overseeing review of project deliverables;
- Preparing and issuing final deliverables to the EPA; and,
- Approving the implementation of corrective action.

The START PM is Mr. Jerry Partap.

2.4 QUALITY ASSURANCE MANAGER

The QA Manager will be responsible for ensuring that all QA/QC procedures for this project are being followed. The QA Manager will review and approve the QAPP/SSP. The QA Manager will monitor sample techniques and collection and will address any corrective action or issue that may arise with the analytical laboratory. The QA Manager will also perform internal and external performance and system audits. The audit process will include, but not be limited to, auditing field sampling techniques. The EPA Region 4 QA Manager will assure that the QA/QC procedures for this project are followed on behalf of the EPA.

The START QA Manager, Ms. Keely Meadows, is responsible for reviewing the field QA sample results to ensure that project DQOs are achieved in accordance with this QAPP/SSP.

2.5 LABORATORY RESPONSIBILITIES

Gulf Coast Analytical Laboratory (GCAL), located in Baton Rouge, Louisiana has been procured to perform the laboratory analyses for this project. The Laboratory PM will communicate directly with the START PM and will be responsible for the following:

- Efficient delivery of the daily services and support necessary to accommodate the analytical demands of this project;
- Coordination between the laboratories used for this investigation, if more than one laboratory is procured;
- Coordinating laboratory analyses;
- Supervising in-house chain-of-custody (COC);
- Scheduling sample analyses;
- Overseeing data review and completeness;
- Overseeing preparation of analytical reports; and,
- Approving final analytical reports prior to distribution.

Laboratory QA Officers will be responsible for the following:

- Overview laboratory QA;
- Overview QA/QC documentation;
- Determining whether to implement laboratory corrective actions, if required;
- Conducting detailed data review, if corrective action warrants;
- Defining appropriate laboratory QA procedures; and,
- Preparing laboratory SOPs.

Laboratory Sample Custodian responsibilities will include:

- Receiving and inspecting the incoming sample containers;
- Recording the condition of the incoming sample containers;
- Signing appropriate documents;
- Verifying COC and its correctness;
- Notifying the laboratory manager and laboratory supervisor of sample receipt and inspection;
- Assigning a unique identification number and customer number, and entering each into the sample receiving log;
- Facilitating sample transfer to analysts who are retrieving and documenting removal for use in analysis;

- Restocking of the sample when it is returned by the analysts, and documenting its arrival to keep a record of custody; and,
- Controlling and monitoring the access and storage of samples and extracts.

Laboratory Technical Staff will be responsible for sample analysis and identification of corrective actions. The laboratory will have a Level I/II review process where the analyst reviews the initial data, followed by a Level II review from a senior analyst. The Laboratory PM reviews for completeness. The QA Officer will handle any corrective action necessary.

The analytical laboratory will also be responsible for the proper disposal of unused sample aliquots.

2.6 FIELD PROJECT LEADER/START SITE SAFETY OFFICER

The Field Project Leader (FPL) is responsible for coordinating on-site personnel, making field decisions, and ensuring the overall success of the field sampling events. The FPL, or designee, will coordinate and lead all sampling activities and will ensure the availability and maintenance of all sampling materials and equipment. The FPL is a highly experienced environmental professional who will report directly to the START PM. Specific FPL responsibilities include the following:

- Function as communications link between field staff members, Site Safety Officer (SSO), the EPA TM, and the START PM;
- Oversee the mobilization and demobilization of all field equipment and subcontractors;
- Coordinate and manage the Field Technical Staff;
- Adhere to the work schedules provided by the START PM;
- Be responsible for maintenance of the field logbook and field recordkeeping;
- Initiate field task modification requests when necessary;
- Identify and resolve problems in the field;
- Resolve difficulties in consultation with the EPA TM; and,
- Implement and document corrective action procedures and provide communication between the field team and START PM.

The START SSO ensures that the HASP is prepared and implemented during the RSE field activities. The SSO is knowledgeable with Occupational Safety and Health Administration (OSHA) and EPA Health and Safety requirements. Specific SSO responsibilities include:

- Monitoring health and safety of the field sampling personnel;
- Assessing hazardous and unsafe situations;
- Developing measures to assure personnel safety during field activities;
- Correcting unsafe acts or conditions through the regular line of authority;
- Exercising emergency authority to prevent or stop unsafe acts when immediate action is required;
- Maintaining awareness of active and developing situations; and,
- Conducting on-site safety meetings.

The FPL/SSO for this site is Mr. Jerry Partap.

2.7 DATA VALIDATION MANAGER

The Data Validation Manager is responsible for ensuring that analytical laboratory data are reviewed and validated in accordance with the project objectives outlined in this QAPP/SSP. The following items summarize principle areas of responsibility:

- Reviews compliance of the analytical laboratory to methods and analytical requirements as outlined in the QAPP/SSP and laboratory specification;
- Ensures completeness of analytical deliverables both electronic and hardcopy;
- Ensures data validation qualification is conducted in accordance with the EPA National Functional Guidelines (NFG) for Inorganic analysis requirements;
- Performs a QA review of all validation reports and validated analytical data;
- Reviews and approves all validation qualifications entered into the electronic database;
- Conducts verification and accounting for all samples, analyte fractions, and analytical parameters; and,
- Approves final qualified analytical database.

All data validation activities will be performed by Ms. Keely Meadows.

2.8 FIELD TECHNICAL STAFF

The Field Technical Staff for this project will be drawn from OTIE's pool of qualified personnel. Field personnel are responsible for conducting all field activities according to the requirements presented in this QAPP/SSP. All of the designated field team members will be experienced professionals who possess the

degree of specialization and technical competence required to effectively and efficiently perform the required work. The following START personnel will involved in the field investigation as follows:

- Mr. Jerry Partap Sampler
- Mr. Douglas Fraley Sampler
- Nairimer Berrios-Cartagena Sample Coordinator

3.0 SPECIAL TRAINING/CERTIFICATION

Documented training is required for each individual performing activity in support of environmental data collection or analysis. The OTIE Human Resources (HR) Department maintains an individual file for each OTIE employee, which includes training records.

The laboratory performing analytical services must hold National Environmental Laboratory Accreditation Program (NELAP) certification under the State of South Carolina Department of Health and Environmental Control (SC DHEC) as a requirement for this project. In addition, the laboratory manager is responsible for ensuring that personnel training certification is current and documented as defined in the laboratory's SOPs. It is the laboratory manager's responsibility to determine specific training and certification needs, and for ensuring that any required training is documented.

Individuals implementing this QAPP/SSP must receive, at a minimum, orientation to the project's purpose, scope, and methods of implementation. This orientation is the responsibility of the PM or designee. Any field team members involved with sample collection or handling will have completed a 40-hour Hazardous Materials Incident Response Operations (HAZWOPER–29 CFR 1910.120) training course. The Health and Safety Officer will have completed an 8-hour Health and Safety Supervisor training course (HAZWOPER–29 CFR 1910.120). Personnel will complete any additional safety-related training as identified in the project HASP.

4.0 SITE BACKGROUND

4.1 SITE DESCRIPTION

The main parcel is located at 170 Feltman Farm Road in Fair Play, Oconee County, South Carolina. This parcel was used mainly for melting operations. The geographic coordinates are 34º 28′ 59.90″ North latitude and 82º 33′ 49.16″ West longitude (Appendix A, Figure 1). The other parcel associated with

Welch Environmental Group is located at 5043 Belton Highway in Anderson, Anderson County, South Carolina. Separate operations were carried out on this parcel. The geographic coordinates for the Anderson parcel are 34º 31′ 24.12″ North latitude and 82º 59′ 28.73″ West longitude (Appendix A, Figure 1a).

4.2 REGIONAL GEOLOGY AND HYDROGEOLOGY

The geology of the Anderson and Oconee counties are permanent structures of the Brevard fault zone that is part of the Piedmont and Blue Ridge. The Brevard Fault Zone is a linear, NE-trending, gently to moderately SE-dipping fault zone traceable some 750 kilometers from Alabama to Virginia in the crystalline southern Appalachians. The Brevard zone is usually regarded as a listric thrust fault along which the Piedmont terrains have been displaced toward the northwest onto the Blue Ridge. Southeast of the Brevard fault zones are the Sixmile and Walhalla trust sheets. Mylonitic (a compact, chert-like rock without cleavage, but with a streaky or banded structure, produced by the extreme granulation and shearing of rocks that have been pulverized and rolled during overthrusting or intense dynamic metamorphism) and phyllonitic (a rock that macroscopically resembles phyllite but that is formed by mechanical degradation of initially coarser rocks) generally make up the system. Numerous oblique slip faults make up a very complex lithologic area. Groundwater occurs and migrates through a network of interconnecting fractures and fissures in the bedrock aquifer systems in the Piedmont Province.

4.3 SITE OPERATIONS

Welch Environmental Group operated a business that recovered lead and other metals (copper primarily) from spent munitions at firing ranges located around the southeastern U.S. The recovered lead was then melted into ingots. Melting operations took place at the Fair Play parcel while separation operations were carried out on the Anderson parcel. Slag materials are still present on both parcels (Ref. 3).

4.4 PREVIOUS INVESTIGATIONS/REGULATORY HISTORY

No previous investigations/regulatory history were available for review prior to preparing this QAPP/SSP.

5.0 PROJECT DESCRIPTION

5.1 PROJECT OBJECTIVES

The scope of this RSE is to conduct soil sampling, screening, and analysis activities at the Fair Play and Anderson parcels to identify the nature and extent of metals contamination in on-site soils. Surface and subsurface soil samples will be collected from predefined grids and screened using an XRF to gain an understanding of the type and distribution of impacts present at each parcel. All sampling activities will be conducted in accordance with the SESD FBQSTP (November 2007).

On-site soils will be sampled at each parcel to assess whether metals are present at concentrations above the EPA Region 4 Regional Screening Levels (RSLs) for residential soil. Five-point composite soil samples will be screened and analyzed for total lead and TAL metals from select grid locations as designated by the EPA TM at each parcel (Appendix A, Figures 3, 3a, and 3b). The field screening and analytical data gathered during this field investigation will provide EPA with sufficient information to identify the need for further federal intervention under the CERCLA.

5.1.1 Project Target Parameters and Intended Data Usage

The target parameters, laboratory reporting limits (RLs), and RSLs for this project are included in Table 1 located in Appendix B. Table 1 in Appendix B summarizes the laboratory methods and field screening that will be conducted for soils.

All environmental data will be reported to the analyte's laboratory-specific method detection limit (MDL); i.e., positive results below the RL, but greater than the MDL, will be reported by the laboratory and flagged as estimated (J). MDLs will be adjusted on a sample-by-sample basis, as necessary, based on dilutions, sample volume, and percent moisture.

5.2 PROJECT TASKS

The following subsections discuss tasks that START will perform to complete this work assignment allowing for modifications, as needed.

- Task 1 - Perform Project Management and Reporting

- Task 2 - Develop QAPP/SSP
- Task 3 - Develop Sampling Design
- Task 4 - Perform Field Investigation Activities and Data Acquisition
- Task 5 - Prepare RSE Report
- Task 6 - Perform TDD Close-Out Activities

If the statement of work changes because of an amended work assignment, START will revise this QAPP/SSP to incorporate changes in the scope and cost.

5.2.1 Task 1 - Perform Project Management and Reporting

START will perform general TDD management activities including communications with the EPA TM, managing and tracking costs using RCMS, and attending project meetings. The anticipated period of performance for this project is from January 19, 2011 through July 19, 2011. Specifically, START will prepare MPRs in accordance with contract requirements; track costs in RCMS and submit 1900-55s as directed by the EPA TM; and, prepare and submit monthly invoices. START will report costs and level of effort for the reporting period as well as cumulative amounts expended to date.

5.2.2 Task 2 - Develop QAPP/SSP

This QAPP/SSP has been developed to outline activities to be conducted in support of the RSE. The QAPP/SSP lists the tasks to be performed; discusses the technical approach for each task, including identifying DQOs, determining sampling objectives and rationale for the field investigation activities, and ensuring that QA/QC measures are conducted to fulfill DQO; identifies key personnel to support this work assignment; and, provides a schedule for completing each task and submitting deliverables as required by the TDD. START has reviewed available background documents relevant to the investigation, as provided by EPA, in order to achieve a familiarity with the site and support the development of the tasks.

All efforts will be made to provide the most cost-effective approach to supporting EPA in this work assignment. The QAPP/SSP will be amended as necessary to incorporate unforeseen future activities or changes in the scope of the work assignment.

5.2.3 Task 3 - Develop Sampling Design

START will develop a sampling design in accordance with the EPA *Guidance on Choosing a Sampling Design for Environmental Data Collection* (QA/G-5S) to ensure that DQOs are fulfilled for the RSE (Ref. 4). Specifically, the design will take into account data needs, key decisions, and environmental variables, such as physical and site constraints, and how the spatial and temporal boundaries of the contamination and population at risk will be identified. The sampling design presented in Section 6.1 has been developed based on input from the EPA TM.

5.2.4 Task 4 - Perform Field Investigation Activities and Data Acquisition

START will perform field investigation activities including soil sampling and field screening using an XRF. The data obtained from this field investigation will be used to determine and delineate on-site contamination of metals at each parcel location. Data obtained from this field investigation will provide EPA with sufficient information to identify the need for federal intervention under CERCLA. This task will begin with EPA approval of the QAPP/SSP and will end with the demobilization of field personnel and equipment from the site.

5.2.5 Task 5 - Prepare a Final Report

START will prepare and submit a final report detailing the existing conditions at each parcel; describing the field investigation activities; and, describing the soil contamination at each parcel. The final report will provide information to assess the need for further intervention under CERCLA. Environmental and QA/QC analytical data will be evaluated and data tables will be attached to the report. Significant QA/QC issues regarding sample collection, handling, and analysis will be identified in the final report.

5.2.6 Task 6 - Perform TDD Closeout Activities

START will perform the necessary activities to closeout the TDD in accordance with the contract requirements including packaging and returning documents to the U.S. government and duplicating, distributing, and storing files, as necessary.

5.3 DELIVERABLES AND INVESTIGATION SCHEDULE

The schedule by which START anticipates submitting the associated deliverables under this work assignment is listed in Table 4 located in Appendix B.

5.4 DATA QUALITY OBJECTIVES AND CRITERIA

START has identified DQOs for the site in accordance with the EPA Guidance for the DQO Process, (U.S. EPA QA/G-4, 2000b), that will define study objectives, decisions to be made, and the criteria by which the data will be assessed. These data will then be used for decision making. Upon completion of the work described throughout the QAPP/SSP, the data collected will be compared to the established DQOs to ensure that the information collected meets the intended goal of the work. DQOs have been developed following these seven steps:

- Problem statement
- Identify the decisions
- Identify the inputs into the decision
- Define the boundaries of the study
- Develop decision rules
- Specify tolerable limits on decision errors
- Optimize the design for obtaining data

The information presented in the next several sections describes the DQOs identified for this investigation.

5.4.1 Problem Statement

Previous site investigations indicate that on-site soils at both parcels are contaminated with lead and other metals. Lead is a highly toxic compound that could potentially present a human and ecological exposure risk. This RSE will focus on sampling surface (0 to 6 inches below ground surface [bgs]) and subsurface soils, up to a maximum depth of 24 inches bgs, at each parcel location to determine whether on-site contamination exists due to historic site operations and will attempt to delineate the extent of contamination.

5.4.2 Identify the Decisions

On-site soils are known to be impacted and a decision on whether a time-critical removal action is warranted is pending based on the results of this RSE. This investigation will focus on identifying contaminants of concern in the surface soils (less than 6 inches bgs) and subsurface soils (6 to 24 inches bgs) at each parcel location. Therefore, the following primary decisions have been identified: (1) Are metals present in on-site soils at each parcel? (2) Are there significant source areas at each parcel which require further assessment and delineation? (3) Do releases of hazardous substances at each parcel constitute an immediate threat to human health and/or the environment? (4) Does the level of contamination at each parcel warrant further EPA involvement?

5.4.3 Decision Inputs

The primary input needed to support the decision making process is reported analytical and field screening concentrations of metals in soils located within the predefined grids at each parcel. Analytical results used in the decision-making process will come from field screening for metals using an XRF instrument and laboratory analyses for total lead by SW846-6010 and TAL metals by SW846-6010/7471. Laboratory analysis of soils collected at each parcel will be performed by GCAL, an EPA-approved private laboratory.

5.4.4 Study Boundaries

The media of interest includes on-site soils up to a maximum depth of 24 inches bgs. The study boundaries include the study area, sample depth, and temporal boundaries such as field investigation dates and turnaround times on analytical results.

- The study area is the boundary of each parcel as shown in Figures 3, 3a, and 3b located in Appendix A.
- Five-point composite surface soil samples will be collected from the 0 to 6 inch depth interval throughout each parcel at predefined grids at the discretion of the EPA TM. If necessary, subsurface soil composite samples will be collected from the 6 to 24 inch depth interval. All samples collected will be screened for metals using an XRF. Approximately 10 of the samples screened will be submitted to the laboratory for lead confirmation analysis and 5 samples will be submitted for TAL metals.
- Field investigation activities are scheduled to commence after approval of this QAPP/SSP and the HASP by EPA. The investigation is scheduled for the week of January 31, 2011. A 14-day turnaround time from the sample submittal date will be requested of GCAL.

5.4.5 Decision Rule

The primary decisions in the DQO process for the site relating to soils are: (1) Do soils located within each grid at each parcel indicate metals contamination? (2) What soils, if any, exceed the associated RSLs?

All soil samples collected will be screened for metals using an XRF. Field screening results will be used to target source areas at each parcel. A subset of the samples collected and screened (approximately 10 samples) will be submitted to an EPA-approved laboratory for total lead analysis. In addition, 5 samples at the discretion of the EPA TM will be submitted for TAL metals. Analytical results will be used to determine whether contaminants of concern exist on site at each parcel and whether federal invention under CERCLA is needed.

5.4.6 Error Limits

Sections 6.2.4 and 6.2.5 will describe the error limits introduced through soil sample collection, mixing, storage, transportation, and analysis.

5.4.7 Optimize Sampling Design

Section 6.1 will describe the soil sampling design in detail.

5.5 MEASUREMENT QUALITY OBJECTIVES

Measurement quality objectives can be expressed in terms of accuracy, precision, completeness, and sensitivity goals. Accuracy and precision are monitored through the analysis of QC samples (Section 6.4.2). Completeness is a calculated value. Sensitivity is monitored through instrument calibration and the determination of MDLs and reporting limits (see Appendix B, Table 1). Qualitative quality objectives, expressed in terms of comparability, are not addressed as part of this sampling design since sampling locations are biased and not random.

5.5.1 Accuracy

Accuracy is defined as the degree of agreement between an observed value and an accepted reference value.

Field Accuracy Objectives

Accuracy of the field sample collection procedures ensures that samples are not affected by sources external to the sample, such as sample contamination by ambient conditions or inadequate equipment decontamination procedures. Accuracy will be ensured by adhering to all sample handling procedures, sample preservation requirements, and holding time periods.

Accuracy acceptance criteria for field measurements obtained during the field activities are located in the operations manual of the various field measurement devices that will be used during the project.

Laboratory Accuracy Objectives

Laboratory accuracy is assessed through the analysis of Laboratory Control Samples (LCS), Matrix Spikes (MS), Matrix Spike Duplicates (MSD), and the determination of percent recoveries (%R). The data generated demonstrate acceptable compound recovery by the laboratory at the time of sample analysis. The %R is calculated according to the following formula:

$$\%R = [(\text{Spiked Sample Conc.} - \text{Unspiked Sample Conc.})/\text{Conc. of Spike Added}] \times 100$$

SOPs for laboratory analyses will contain the required accuracy, precision, sensitivity of the analyses.

5.5.2 Precision

Precision is defined as degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves.

Field Precision Objectives

Field precision is assessed through the collection and measurement of field duplicates at a rate of one duplicate per 10 analytical samples or, at a minimum, one per parcel location. Duplicate field measurements will be collected at a 10% frequency for lead analysis and TAL metals analysis in soil samples. These analyses measure both field and laboratory precision. The results, therefore, may have more variability than laboratory duplicates that measure only laboratory performance. It is also expected that soil duplicate results will have a greater variance due to difficulties associated with collecting identical field samples.

Precision will be assessed through the calculation of the relative percent difference (RPD) for two replicate samples. RPD is calculated according to the following formula:

$$RPD = (S - D)/[(S + D)/2] \times 100$$

Where: S = Original sample value
D = Duplicate sample value

The acceptance criteria for RPD will be less than or equal to 50%.

Laboratory Precision Objectives

Precision in the laboratory is also assessed through the calculation of RPDs. The collection and use of these replicate samples is discussed in Section 6.4.2. RPDs of 50% for soil field duplicates will be used as advisory limits for analytes detected in both the RSE and field duplicate samples at concentrations greater than or equal to five times its quantitation limit. Precision control limits are included in the laboratory's SOPs.

5.5.3 Completeness

Completeness is the amount of data collected as compared to the amount needed to ensure that the uncertainty or error is within acceptable limits. It is the ratio of the number of valid sample results to the total number of samples analyzed with a specific matrix and/or analysis. Following completion of the analytical testing, the percent completeness will be calculated by the following equation:

$$Completeness = (number\ of\ valid\ measurements/number\ of\ measurements\ planned) \times 100$$

The goal for data completeness is 100%. However, the project will not be compromised if 95% of the samples collected are analyzed with acceptable quality.

5.5.4 Representative

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population. This is a qualitative assessment and is addressed primarily in the sample design, through the selection of sampling sites and procedures that reflect the project goals and environment being sampled. It is ensured in the laboratory through (1) the proper handling, homogenizing, compositing, and storage of

samples and (2) analysis within the specified holding times so that the material analyzed reflects the material collected as accurately as possible.

5.5.5 Sensitivity

Sensitivity is the capability of a test method or instrument to discriminate between measurement responses representing different levels (e.g., concentrations) of a variable of interest. Sensitivity is addressed primarily through the selection of appropriate analytical methods, equipment, and instrumentation. The methods selected for this assessment were chosen to provide the sensitivity required for the end-use of the data. This is a quantitative assessment and is monitored through the instrument calibrations and calibration verification samples and the analysis of procedural blanks with every analytical batch.

Field Sensitivity Objectives

The field teams will monitor each of the field instruments to ensure that the readings are within the limits of the instrument as provided by the manufacturer. If a field instrument yields readings that seem to be erroneous, then field team members will notify the FPL and steps will be taken to remedy the situation. This may result in re-calibrating the instrument or replacing the instrument if necessary.

Laboratory Sensitivity Objectives

The laboratory selected for analyzing the samples collected during this RSE will evaluate and monitor its method and instrument sensitivity through the development of the laboratory MDLs and RLs. RLs for all analysis are based on a low calibration standard and are described in the laboratory's SOPs. A laboratory fortified blank, a blank that is spiked at the quantitation limit, is used in the development of the MDLs. Sensitivity is measured by calculating the percent recovery of the analytes at the quantitation limit. MDL studies shall be conducted by the laboratory on an annual basis at a minimum, a standard in the laboratory industry.

Sample-specific reporting limits will be calculated and reported with the final data. There may be numbers reported that are below the RL. These numbers must be flagged appropriately. When the analysis demonstrates a non-detect at the MDL, the data shall be flagged with a "U." The value reported is the MDL, adjusted by any dilution factor used in the analysis. When an analyte is detected between the lower quantitation limit and the MDL, the data shall be flagged with a "J." The value reported is an estimate.

5.5.6 Level of Quality Control Effort

Several QC samples will be analyzed for this project to provide a means of assessment for field and laboratory performance. Field QC samples consist of field duplicates and temperature blanks. These QC checks are described in Section 6.4.2 of this QAPP/SSP. Each type of field QC sample undergoes the same preparation, analysis, and reporting procedures as the related environmental samples. Frequencies of field QC sample collection and analysis are presented in Table 2. Laboratory QC encompasses a host of other checks performed during sample preparation and analysis.

The level of QC effort provided by the laboratory will be equivalent to the level of QC effort specified under the Contract Laboratory Program (CLP) for the Routine Analytical Service parameters to be tested. All data packages submitted to START will be Level II, CLP equivalent. Please note that CLP is simply referenced as such. SW-846 methodologies will be utilized for the scope of work for this project.

The QC procedures for use of field instruments for field screening will include calibrating the instruments as described in the manufacturer user's guide, measuring duplicate samples, and checking the reproducibility of the measurements by taking multiple readings on a single sample or reference standard.

5.6 DATA AND DOCUMENT CONTROL

START will maintain logbook notes and collect digital photographs during the sampling event. START will use this information to complete the RSE Report summarizing the existing conditions at each parcel; describing the field sampling activities; and describing the nature and extent of contamination at each parcel. Environmental and QA/QC analytical data will be evaluated and data tables will be attached to the report. Significant QA/QC issues regarding sample collection, handling, and analysis will be identified in the report.

The OTIE internal QC process requires that all project deliverables be reviewed to promote technical adequacy and completeness. The OTIE QA manager or designee will perform internal QC checks of work assignment activities. Internal QC checks will address adherence to this QAPP/SSP and the OTIE QAPP/SSP for START.

START will retain all file information related to the site in the Marietta, Georgia, OTIE office. Upon EPA request, the entire site file, including all documents generated under the work assignment, will be

inventoried and submitted to EPA or to an EPA-designated location within three weeks of the request. In addition, START will provide digital copies of all documents generated under the work assignment, including reports, e-mails, and figures if requested by EPA. All documents generated for the work assignment are the property of EPA and will be retained as part of EPA files. All EPA files will be delivered to EPA at the conclusion of the START contract.

A draft version of the report will be available for review and commenting by EPA within six weeks following receipt of final analytical results from the laboratory. A final version of the report will be available within two weeks following receipt of comments by EPA. Laboratory data will be released to the EPA TM as it becomes available, if desired. Table 4 in Appendix B lists the schedule for the deliverables and the removal investigation.

6.0 SAMPLE DESIGN, DATA GENERATION, AND ACQUISITION

6.1 SAMPLE DESIGN

START will use an XRF to screen on-site soils for metals contamination to a maximum depth of 24 inches bgs. Initially, each parcel will subdivided into sampling grids measuring 50 by 50 feet each. Five-point discrete surface soil samples (0 to 6 inches bgs) will be collected from each grid location and screened using the XRF. The grid will be complete if screening reveals metals levels below the residential RSLs. If detectable levels of metals in the surface soil samples meet or exceed the associated RSLs, then a five-point composite subsurface soil sample (6-12 inches bgs and/or 12-24 inches bgs) will be collected from the impacted grid and screened using the same process.

Grids for the Fair Play parcel are shown on Figures 3 and 3b. A total of 597 50 by 50 foot grids have been calculated. However; not all the grids will be screened and/or sampled. The EPA TM will dictate which grids will be screened and/or sampled once field activities commence.

Grids for the Anderson parcel are shown on Figure 3a. A total of 58 50 by 50 foot grids have been calculated. Again, not all the grids on this parcel will be screened and/or sampled. The EPA TM will dictate which grids will be screened and/or sampled once field activities commence.

Soil screening results will be recorded electronically in the XRF instrument and documented in the field logbook.

The established grid systems for each parcel will be geographically referenced using ArcView and uploaded to a hand-held Trimble® Global Positioning (GPS) system. Field sampling personnel will navigate to the center point of each grid using the preprogrammed GPS unit.

START anticipates submitting approximately 20 samples for total lead analysis by SW846 Method 6010 (10 samples from each parcel) and 10 samples for TAL metals analysis by SW836 Method 6010/7471 (5 samples from each parcel), excluding QA/QC samples, to a private laboratory. Additional QA/QC samples including blanks, spikes, and split duplicates will be collected as required in FBQSTP SESDPROC-011-R2.

6.2 FIELD SAMPLING METHODS AND PROCEDURES

6.2.1 Mobilization

START will provide the necessary personnel, equipment, supplies, materials, and facilities for execution of the field investigation. Activities may include the mobilization of equipment and vehicles and site access coordination with federal, state, local, and private entities.

6.2.2 Site Control and Access

If, at any time, field investigation activities cannot, in the opinion of the FPL/SSO, or sample team members, be conducted due to the proximity of unauthorized persons or other unforeseen conditions or situations, then operations will cease until such time as they can be safely resumed.

During the RSE, field vehicles will be located such that they do not interrupt or impede traffic flow through the area. Keys to each vehicle will be located with the team leaders, as appropriate. Each field vehicle will maintain a copy of this QAPP/SSP and the site specific HASP during all removal investigation activities.

6.2.3 Site Mapping

The location of each sampling station will be collected using a Trimble® GPS instrument. GPS coordinates will be collected at each sampling location during the field event. As specified in FBQSTP GPS procedure (SESDPROC-110-R2), stations will be located with one meter accuracy. If a location is

in an area where a GPS signal cannot be received, the GPS of sampling locations will be collected from the nearest point where a signal is received and any deviations noted in the field logbook.

6.2.4 Sample Collection

START will collect one composite surface soil sample at grids specified by the EPA TM for field screening. Surface soil samples will also be collected on a select number of locations from each parcel from 0 to 6 inch bgs and from 6 to 24 inches bgs if necessary. Five-point composite soil samples will be collected in accordance with SESDPROC-300-R1. Soils will be screened for metals using an XRF during the field sampling events in accordance with SESDPROC-107-R1. Soil samples will be collected using stainless steel spoons, homogenized in stainless steel bowls, placed in zip top bags, and screened using the XRF. At each parcel, approximately 10 of the samples screened will be containerized, placed on ice, processed (see below), packaged for shipment in accordance with FBSQTP Packing, Marking, Labeling, and Shipping of Environmental and Waste Samples (SESDPROC-209-R1), and submitted to GCAL for analysis of total lead for verification. In addition, the EPA TM will choose 5 samples to be submitted to GCAL for analysis of TAL metals at each parcel.

All field observations and descriptions will be recorded in the logbook.

6.2.5 Equipment Decontamination Procedures

All field sampling equipment will be cleaned and decontaminated accordance with the FBQSTP Field Equipment Cleaning and Decontamination procedures (SESDPROC-205-R1). Spoons, bowls, and hand augers (if used) will be decontaminated in accordance with FBQSTP SESDPROC-205-R1 prior to mobilization to each parcel and during the sampling event as necessary.

6.2.6 Field Sampling Equipment Cleaning Procedures/ Investigation-Derived Waste Management

All investigation derived waste (IDW) will be managed according to the procedures found in the FBQSTP Management of Investigation-Derived Waste procedure (SESDPROC-202-R1). The following identifies the types of IDW that could be generated during the RSE. IDW will generally consist of personal protective equipment (PPE) including disposable latex gloves and boot covers. PPE is used mainly to prevent cross contamination, provide personnel protection, and provide sanitary conditions during sampling activities.

6.2.7 Sample Processing and Custody

All samples will be collected, containerized, preserved, handled, and documented in accordance with the EPA FBQSTP.

Both hard and electronic copies of the referenced procedures, in addition to the site-specific HASP, will be maintained by the FPL for reference during all phases of the field sampling activities. Any deviations in sampling procedures specified in this QAPP/SSP will be documented, including the reason for the deviation, in the field logbooks.

Chain of Custody

All COC and record keeping procedures will be in accordance with FBQSTP Sample and Evidence Management (SESDPROC-005-R1). COC procedures are comprised of the following elements: 1) maintaining sample custody and, 2) documentation of samples for evidence. The field COC Record is used to record the custody of all samples sent to the laboratory. All samples shall be accompanied by a COC Record, completed and maintained as specified in FBQSTP SESDPROC-005-R1. The COC Record documents the transfer of custody of samples from the sample custodian to another person, the laboratory, or other organizational elements. To simplify the COC Record and eliminate potential litigation problems, as few people as possible will have custody of the samples or physical evidence during the investigation.

The COC Record also serves as a sample logging mechanism for the laboratory sample custodian. A separate COC Record will be used for each final destination or laboratory utilized during the RSE.

Station and Sample Identification

Station IDs will be assigned based on the grid from which the sample was collected at each parcel as follows:

- FP01 – FP##, where FP stands for Fair Play parcel site and the stations are numbered sequentially.
- A01 – A##, where A stands for Anderson parcel site and the stations are numbered sequentially

Sample identification numbers will be assigned using the grid format as shown on Figures 3, 3a, and 3b.

Sample Labels

Sample labels will be prepared and affixed to each sample container sent to the private laboratory. The labels will be prepared using waterproof, non-erasable ink as specified in FBQSTP SESDPROC-005-R1.

Sample Custody Seals

The samples collected and containerized will be sealed as soon as possible following collection as specified in the FBQSTP SESDPROC-005-R1. The sample custodian will write the date and their signature or initials on the seal.

Sampling Equipment and Sample Containers

Sampling equipment used during the field investigation will include hand augers (if required), stainless steel spoons, stainless steel bowls, and disposable zip top bags. Hand augers, spoons, and bowls will be decontaminated in accordance with FBQSTP SESDPROC-205-R1 prior to mobilization to the site. All associated non-dedicated/reusable (augers, spoons, and bowls) equipment will be decontaminated as necessary during the sampling events in accordance with FBSQTP. All equipment will be handled in accordance with the FBQSTP Equipment Inventory and Management procedure (SESDPROC-108-R2).

Sample containers used for sample collection will be provided by the private laboratory and will be prepared according to the procedures contained in the EPA *Specifications and Guidance for Obtaining Contaminant-Free Sample Containers (OSWER Directive 93240.0-05)*. This document specifies the acceptable types of containers, the specific cleaning procedures to be used before samples are collected, and QA/QC requirements relevant to the containers and cleaning procedures.

Custody Procedures

Documented sample custody is one of several factors that is necessary for the admissibility of environmental data as evidence in a court of law. Custody procedures help to satisfy the two major requirements for admissibility: relevance and authenticity. Sample custody is addressed in three parts: field sample collection, laboratory analysis, and final evidence files. A sample file is under custody when any one of the following conditions is satisfied:

- The item is in the actual physical possession of an authorized person.
- The item is in view of the person after being in his or her possession.
- The item was placed in a secure area to prevent tampering.

- The item is in a designated and identified secure area with access restricted to authorized personnel only.

Field Custody Procedures

The FPL (or designee) is responsible for the care and custody of the samples collected until they are relinquished to the laboratory or entrusted to a commercial courier. Custody procedures apply to all environmental and associated field QC samples obtained as part of the data collection system. When transferring samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the COC record. The original record will accompany the shipment and the field sampler will retain a copy. This record documents the sample custody transfer from the sampler to the laboratory, often through another person or agency (common courier). After COC records have been placed within sealed shipping coolers, the signed courier airbills will serve to document COC. Upon arrival at the laboratory, internal laboratory sample custody procedures will be followed (see below).

Laboratory Custody Procedures

Laboratory custody procedures will ensure that sample integrity is not compromised from the time of receipt at the laboratory until final data are reported to EPA and START. This requires that the laboratory control all sample handling and storage conditions and circumstances.

Laboratory custody procedures for sample receiving and log-in; sample storage and numbering; tracking during sample preparation and analysis; and storage of data are described in laboratory SOPs. In general, upon laboratory receipt of a sample shipment, the laboratory's sample custodian will verify that the correct number of coolers has been received. The custodian will examine each cooler's custody seal to verify that it is intact and that the integrity of the environmental samples has been maintained. The custodian will then open each cooler and measure its internal temperature by measuring the temperature of the temperature blank. The temperature reading will be documented in the "comments" column of the COC form or on an internal laboratory form. The sample custodian will then sign the COC form and examine the contents of the cooler. Identification of broken sample containers or discrepancies between the COC form and sample labels will be recorded. The laboratory will retain the original field COC forms, providing copies of the forms with the final data package deliverable. All problems or discrepancies noted during this process will be promptly reported to the START PM. Samples will be logged into the laboratory information management system.

6.2.8 Demobilization

START will remove all equipment and restore all site sampling locations which may have been disturbed during the RSE.

6.3 ANALYTICAL PROCEDURES

The Analytical Procedures section of this report discusses the analytical procedures associated with field and laboratory methodologies.

6.3.1 Field Analytical Methods

The following instruments will be used to collect field measurements while collecting soil samples:

- Metals will be measured using a Niton® XRF.

The calibration and QA information for field measurements are described user's manual for the XRF instrument.

6.3.2 Laboratory Analytical Methods

Soil samples will be submitted to GCAL for analysis of total lead and TAL metals. All samples will be analyzed according to the methods outlined in Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW-846).

6.4 QUALITY ASSURANCE

QA procedures must begin in the planning stage and continue through sample collection, analyses, reporting, and final review. The methods used to ensure data quality objectives are discussed below.

6.4.1 Organization and Responsibilities

The FPL has overall responsibility for field QA. Off-site laboratory analyses for samples collected will be conducted by a private laboratory.

6.4.2 Field QA Samples

The following sections describe the number and types of QC samples that will be collected and submitted to the private laboratory during the removal investigation. Appendix B, Table 2 details the QA/QC samples to be collected and Table 3 presents the appropriate sample containers and preservatives to be used per sample type. Approximately one QA/QC sample per parcel will be collected as required in the FBQSTP SESDPROC-011-R2. All samples will be preserved as needed and immediately be placed on ice in accordance with the FBQSTP SESDPROC-011-R2.

Temperature Blanks

A temperature blank will be placed in a cooler so that the temperature of each cooler can be measured accurately upon receipt at the laboratory without compromising sample integrity. Temperature blanks are not assigned a unique field sample identification number.

Metals Blank

Metals Blanks are pre-prepared samples provided by the EPA Sample Management Office prior to sampling activities. Metals blank samples will not be opened and will be shipped to the laboratory with the field samples. These samples are only required when samples are submitted to CLP participating laboratories. Metals blanks are not required for private laboratories, and will not be submitted for this field investigation.

Matrix Spike/Matrix Spike Duplicate

Samples for laboratory QC analyses such as the MS/MSD will be designated as specified in SESDPROC-011-R2. One MS/MSD sample will be designated for every 20 samples submitted to the private laboratory.

Duplicate Samples

Field duplicates will be collected and analyzed for chemical constituents to measure the cumulative uncertainty (i.e., precision) of the sample collection, splitting, handling, storage, preparation and analysis operations, as well as natural sample heterogeneity that is not eliminated through simple mixing in the field. Field duplicates are two samples prepared by mixing a volume of sample and splitting it into two separate sample containers that are labeled as individual field samples. Co-located duplicate samples will be collected at 10% of the soil sample locations. Following collection of the initial sample, the duplicate sample will be re-collected from the same location using clean equipment. Field duplicates are labeled as

individual environmental samples and are not identified to the laboratory as duplicate samples. The duplicate sample will be identified with a sequential sample number and identified in the logbook notes so that there is no indication to the laboratory that the sample is a duplicate. The sample will be submitted to the private laboratory for analysis along with the other soil samples collected during the RSE. START anticipates collecting two soil duplicate samples at each parcel (one for total lead only and one for TAL metals).

6.4.3 Field QC Requirements

QC procedures for the XRF instrument will include checking the instrument's calibration according to the manufacturer's specifications included in the Operations Manual. Additionally, measuring duplicate samples and checking the reproducibility of the measurements by taking multiple readings on a single sample or reference standard will be completed. Assessment of field sampling precision and bias will be made by collecting field duplicates for laboratory analysis.

6.4.4 Laboratory QC Requirements

The analytical laboratory will have a QC program to ensure the reliability and validity of the analyses performed at the laboratory. The laboratory's QC Plan will describe the policies, organization, objectives, QC activities, and specific QA functions used by the laboratory. All analytical procedures are documented in writing as SOPs and each SOP will include a QC section that addresses the minimum QC requirements for the procedure. The internal QC checks might differ slightly for each individual procedure but in general the QC requirements include the following elements:

- Method blanks
- Reagent/preparation blanks (applicable to inorganic analysis)
- Instrument blanks
- Calibration verifications
- MS/MSDs
- Analytical spikes
- Field duplicates
- Laboratory duplicates
- Laboratory control standards

Data obtained will be properly recorded. The data package will include a Level II deliverable package capable of allowing the recipient to reconstruct QC information and compare it to QC criteria. The laboratory will reanalyze any samples analyzed in nonconformance with the QC criteria, if sufficient volume is available. It is expected that sufficient volumes/weights of samples will be collected to allow for reanalysis when necessary.

6.5 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

Laboratory and field equipment will be calibrated in accordance with laboratory SOPs or the manufacturers' recommendations. Field equipment refers to articles used for on-site screening and testing, whereas laboratory equipment refers to articles used in the laboratory in support of data collection (e.g., refrigerators). Laboratory instruments are units used for sample analysis (e.g., ICP).

6.5.1 Field Equipment

The following instrument will be utilized in the field: XRF.

Field instrumentation will be operated and calibrated according to the manufacturers' specifications. Field equipment calibration will be completed according to the frequency schedule outlined by the equipment manufacturer. The calibration for the XRF will be checked at the beginning of each day and the check results will be recorded in the field logbook. If this identification is not feasible, then calibration records for the equipment will be readily available for reference. Should any of the field equipment become inoperable, it will be removed from service and tagged to indicate that repair, recalibration, or replacement is needed. Calibration check documentation procedures, at a minimum, will include the following:

- Entries to the field logbooks will be made at least daily whenever the instrument is in use; and,
- Calibration records will include the calibrator's name, standard(s) used, date/time of calibration, and any corrective actions taken;
- Additionally, multiple readings on one sample or standard, as well as readings on replicate samples, will likewise be documented.

The Marietta, Georgia START office will be notified so that prompt service or substitute equipment can be obtained. Backup systems will be available for each instrument in use and will be calibrated prior to use in the field.

6.5.2 Laboratory Instrument Calibration

Calibration procedures for a specific laboratory instrument will consist of initial calibration (3- or 5-points), initial calibration verification (ICV) and continuing calibration verification (CCV). The SOP for each analysis performed in the laboratory describes the calibration procedures, their frequency, acceptance criteria and the conditions that will require recalibration. In these cases, the initial calibration will be verified using an independently prepared calibration verification solution. The laboratory maintains a sample logbook for each instrument which will contain the following information: instrument identification, serial number, date of calibration, analyst, calibration solutions run and the samples associated with these calibrations. Calibration of laboratory equipment will be based on approved written procedures. Records of calibration, repairs, or replacement will be filed and maintained by the designated laboratory personnel performing QC activities. These records will be filed at the location where the work is performed and will be subject to QA audit. For the applicable instruments, the laboratory will maintain a factory-trained repair staff with in-house spare parts or will maintain service contracts with vendors. The records of calibration will be kept as follows:

- A label will be affixed to each instrument showing description, manufacturer, model numbers, date of last calibration, by whom calibrated (signature), and due date of next calibration reports and compensation or correction figures will be maintained with instrument;
- A written stepwise calibration procedure will be available for each piece of test and measurement equipment;
- Any instrument that is not calibrated to within the manufacturer's original specification will display a warning tag to alert the analyst that the device carries only a "Limited Calibration"; and
- Calibration dates are recorded on logsheets or electronically by data processing systems.

All analyses will be governed by the appropriate laboratory SOPs, and appropriate calibration procedures and frequencies can be found in each SOP.

Metals Analysis by Method 6010B

The Inductively Coupled Plasma (ICP) emission spectrophotometer instruments are calibrated by use of a minimum of three calibration standards prepared by dilution of certified stock solutions. An analysis blank is prepared with one calibration standard at the quantitation limit for the metal. The other standards bracket the concentration range of the samples. Calibration standards will contain acids at the same concentration as the digestates. A continuing calibration standard, prepared from a different stock solution than that used for preparation of the calibration standards, is prepared and analyzed after each ten samples or each two hours of continuous operation. The value of the continuing calibration standard

concentration must agree with + 10% of the initial value or the appropriate corrective action is taken which may include recalibrating the instrument and reanalyzing the previous ten samples. For the ICP, linearity near the quantitation limit will be verified with a standard prepared at a concentration of two times the quantitation limit. This standard must be run at the beginning and end of each sample analysis run or a minimum of twice per 8-hour period.

6.6 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

All supplies and consumables that may directly or indirectly affect the quality of the project must be clearly identified and documented by field personnel. Acceptance criteria are based on the individual characteristics of the supply or consumable to be used. Typical examples of supplies and consumables include sample bottles, calibration gases, materials for decontamination activities, deionized water, and potable water. For each item identified, field personnel shall document the inspection, acceptance testing requirements, or specifications (i.e., concentration, purity, source of procurement) in addition to any requirements for certificates of purity or analysis. All acceptance certificates will be retained on file.

Acceptance criteria must be consistent with overall project technical and quality criteria. If special requirements are needed for particular supplies or consumables, a clear agreement should be established with the supplier (i.e., particular concentration of calibration gas).

The FPL is responsible for insuring that consumables are properly inspected and that the documentation procedures stated above have been accomplished.

6.7 VALIDATION PROCEDURES

Data validation is the process of verifying that qualitative and quantitative information generated relative to a given sample is complete and accurate. Data validation procedures shall be performed for both field and laboratory operations as described below. Validation of analytical data will be conducted by OTIE START. OTIE START will perform data assessment on laboratories' hardcopy and electronic deliverables based on contractual and technical requirements outlined in the analytical method and in accordance with the NFGs. The FPL will review the data qualifier report to determine any data limitations and the impact of any qualified data on overall data usability for the project. Detailed guidance for data assessment may be found in the *Guidance for Data Quality Assessment* (EPA QA/G-9 2000).

6.7.1 Procedures Used to Evaluate Field Data

Procedures to evaluate field data for this project primarily include checking for transcription errors and review of field logbooks/field data sheets, on the part of field crewmembers. Further, results of all instrument calibration will be reviewed by the START QA Manager to ensure that all criteria that are specified in this QAPP/SSP are followed. Data collected from instruments not meeting calibration standards will be re-measured once the calibration problem has been solved. The FPL will be the responsible for ensuring that these measurements are re-taken.

The evaluation of field QC samples will provide definitive indications of the data quality. If a problem arises, it should be isolated via the complete sample tracking and documentation procedures that will be performed. If such a problem does arise, corrective action can be instituted, documented, and reported to the agencies via the Quality Control Summary Report. If data are compromised due to a problem, appropriate data qualifications will be used to identify the data.

The handling, preservation and storage of samples collected during the sampling program will be monitored on an on-going basis. The project laboratories will document sample receipt including proper containers and preservation at the time samples are logged into their individual laboratory. The sample receipt records (a required data package deliverable) as well as the COC documentation will also be assessed during data validation. Sample handling, storage or preservation problems identified during data validation will result in appropriate qualification of data.

6.7.2 Procedures Used to Validate Laboratory Data

The purpose of chemistry data validation is to verify that the data are of known quality, are technically valid, are legally defensible, satisfy the project objectives, and are usable for their intended purpose. The objectives of the data validation process will be to:

- Assess compliance to project specific procedures and programs.
- Evaluate system process control through review of control charts (if applicable).
- Verify that no systematic errors exist within the data sets.
- Assess field QC samples to determine if sampling has adversely impacted the reported results and, therefore, usability.
- Assess both method and laboratory performance through tabulation of QC outliers.

Provide measures of data quality in terms of precision, accuracy, and completeness so that overall usability can be determined. The following guidance documents shall serve as the basis for data validation:

- USEPA National Functional Guidelines for Inorganic Data Review, (OSWER 9240.1-45, EPA 540-R-04-004, October 2004).

7.0 DOCUMENTATION AND RECORDS

This section defines the specific records and data that must be maintained for each field activity to ensure that samples and data are traceable and defensible. Field data reporting shall be conducted principally through the transmission of the information written in bound, paginated field logbooks to provide a secure record of field activities; and data sheets containing tabulated results of measurements made in the field. All field records and documentation must comply with the documentation requirements defined in the SESD FBSQTP Logbooks (SESDPROC-010-R3).

7.1 FIELD DATA

Site conditions during sampling and the care with which samples are handled may factor into the degree to which samples represent the media from which they are collected. This, in turn, could affect the ability of decision makers to make accurate and timely decisions concerning the contamination status of the site. As appropriate, logbooks are assigned to, and maintained by, key field team personnel.

Information to be recorded and retained in the logbook during this assessment includes:

- Name of laboratory and contacts to which the samples were sent, turnaround time (TAT) requested, and data results, when possible
- Termination of a sample point or parameter and reasons
- Unusual appearance or odor of a sample
- Measurements, volume of flow, temperature, and weather conditions
- Additional samples and reasons for obtaining them
- Eliminated samples and reasons for elimination
- Levels of personal protection equipment used (with justification)
- Meetings and telephone conversations held with regulatory agencies, project manager, or supervisor
- Details concerning any samples split with another party
- Details of QC samples obtained

- Sample collection equipment and containers, including their serial or lot numbers
- Field analytical equipment, and equipment utilized to make physical measurements
- Calculations, results, and calibration data for field sampling, field analytical, and field physical measurement equipment
- Property numbers of any sampling equipment used, if available
- Sampling station identification
- Date and time of sample collection
- Description of the sample location
- Description of the sample
- Sampler(s) name(s) and company
- How the sample was collected
- Diagrams of processes
- Maps/sketches of sampling locations
- Weather conditions that may affect the sample (e.g., rain, extreme heat or cold, wind, etc.)

Field logbook assignments shall be recorded in the Site Logbook or other central file whose location is known by the FPL and the PM.

Together, field logbooks and sample documentation including COC forms provide a record that should allow a technically qualified individual to reconstruct significant field activities for a particular day without resorting to memory.

7.2 LABORATORY DATA

Case narratives will be prepared which will include information concerning data that fell outside laboratory acceptance limits and any other anomalous conditions encountered during sample analysis. The CLP equivalent Level II data package shall include the following data elements:

Case Narrative:

- Any deviations from intended analytical strategy
- Laboratory lot number/sample delivery group (SDG)
- Numbers of samples and respective matrices
- QC procedures utilized and also references to the acceptance criteria
- Laboratory report contents

- Project name and number
- Condition of samples 'as-received'
- Discussion of whether or not sample holding times were met
- Discussion of technical problems or other observations which may have created analytical difficulties
- Discussion of any laboratory QC checks which failed to meet project criteria
- Signature of the laboratory QA Manager

Chemistry Data Package:

- Case narrative for each analyzed batch of samples
- Summary page indicating dates of analyses for samples and laboratory QC checks
- Cross referencing of laboratory sample to project sample identification numbers
- Data qualifiers to be used should be adequately described
- Sample preparation and analyses for samples
- Sample results
- MS and MS duplicate recoveries, laboratory control samples, and method blank results

For this investigation, laboratory will provide a standard or 14-day TAT for the analytical data package and EDD. The 14-day timeframe begins the day the laboratory receives a given sample for analysis.

7.3 ELECTRONIC DATA DELIVERABLES

The laboratory shall prepare and verify an EDD. The format of the EDD will comply with the approved Region 4 format.

8.0 EXCEPTIONS TO THE ASSIGNMENT OR ANTICIPATED PROBLEMS

This QAPP/SSP details the tasks described in the TDD, the anticipated deliverable and schedule. Additionally, this QAPP/SSP specifically addresses activities and procedures associated with anticipated soil sampling; and QA/QC measures to be adhered to in order to ensure that DQOs are fulfilled. START will notify EPA as quickly as possible if exceptions or problems are foreseen or occur. START can modify this QAPP/SSP or the schedule at the request of EPA.

9.0 FIELD WORK SUMMARY

START anticipates performing field activities on beginning the week of January 31, 2011 following EPA approval of the QAPP/SSP and HASP and anticipates sampling activities to take approximately 5 days. EPA is responsible for acquiring site access. EPA reserves the right to conduct oversight during field activities.

START will conduct sampling activities after EPA approval of the QAPP/SSP and site access has been obtained. Field activities will be conducted and QA samples will be collected in accordance with procedures documented in the FBQSTP SESDPROC-011-R2, SESDPROC-209-R1, SESDPROC-205-R1, and SESDPROC-300-R1. The proposed START health and safety protocol to be followed during the RSE is described in the site HASP, which will be submitted under separate cover.

10.0 REFERENCES

1. Oneida Total Integrated Enterprises (OTIE). Quality Assurance Program Plan (QAPP). January 2006.

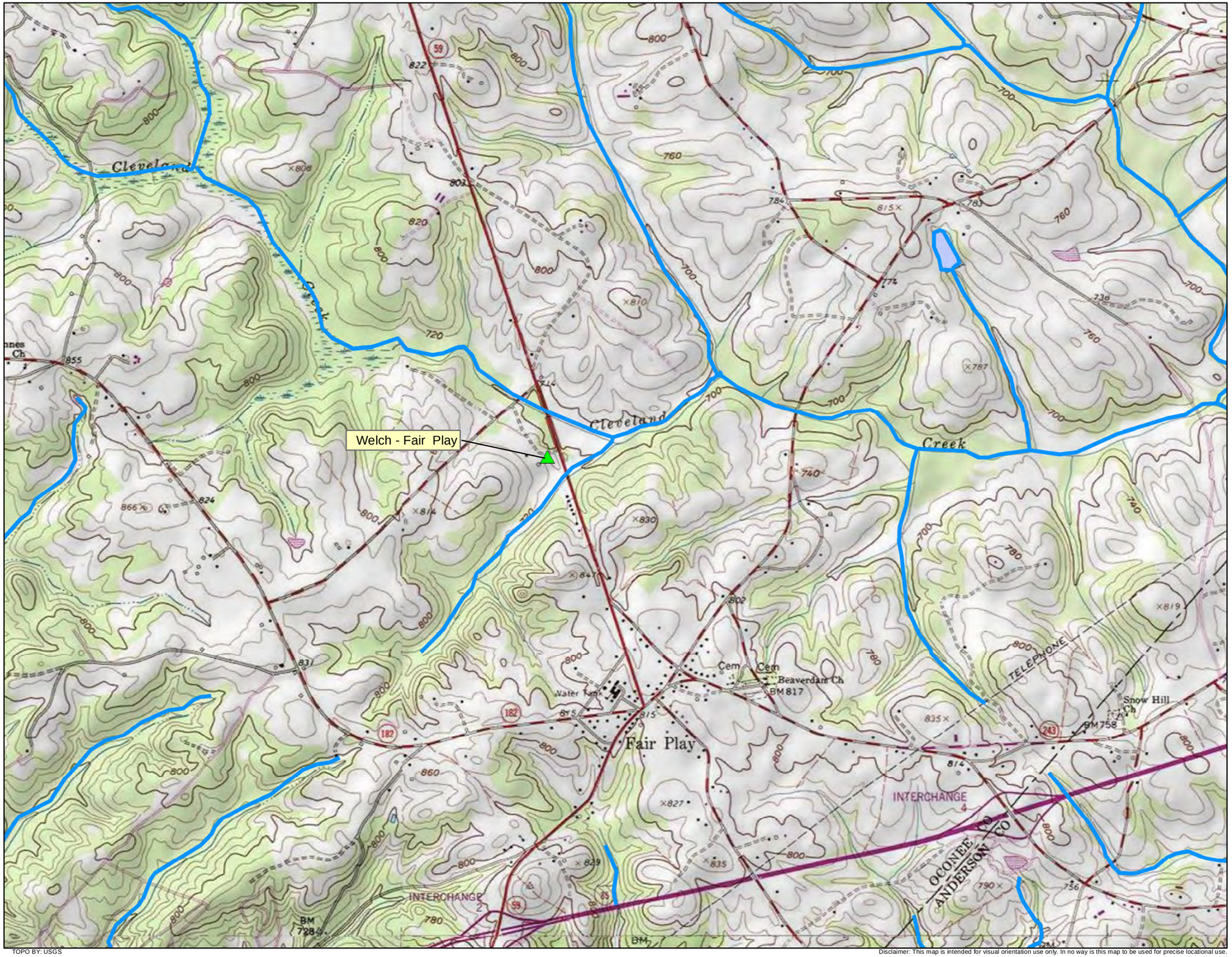
2. U.S. Environmental Protection Agency (EPA), Science and Ecosystem Support Division (SESD), Region 4. *Field Branches Quality System and Technical Procedures* (FBQSTP). November 2007.

3. South Carolina Department of Health and Environmental Control (SC DHEC). Letter to Mr. Jim McGuire of EPA Regarding Welch Environmental Group Sites. December 22, 2010.

4. EPA. Guidance on Choosing a Sampling Design for Environmental Data Collection. EPA QA-G5S. December 2002.

APPENDIX A

FIGURES

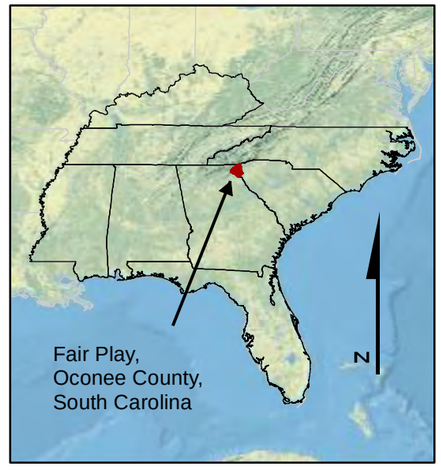


TOPO BY: USGS

Legend

▲ Site Location

Feet
0 1,500 3,000



United States Environmental Protection Agency

WELCH ENVIRONMENTAL GROUP
FAIR PLAY,
OCONEE COUNTY,
SOUTH CAROLINA
TDD NO. TNA-05-003-0122

FIGURE 1
TOPOGRAPHICAL MAP

OTIE
Oneida Total Integrated Enterprises

E:\GIS Workspace\Welch-Fair Play

Legend

▲ Site Location

Feet
0 1,500 3,000

United States Environmental Protection Agency

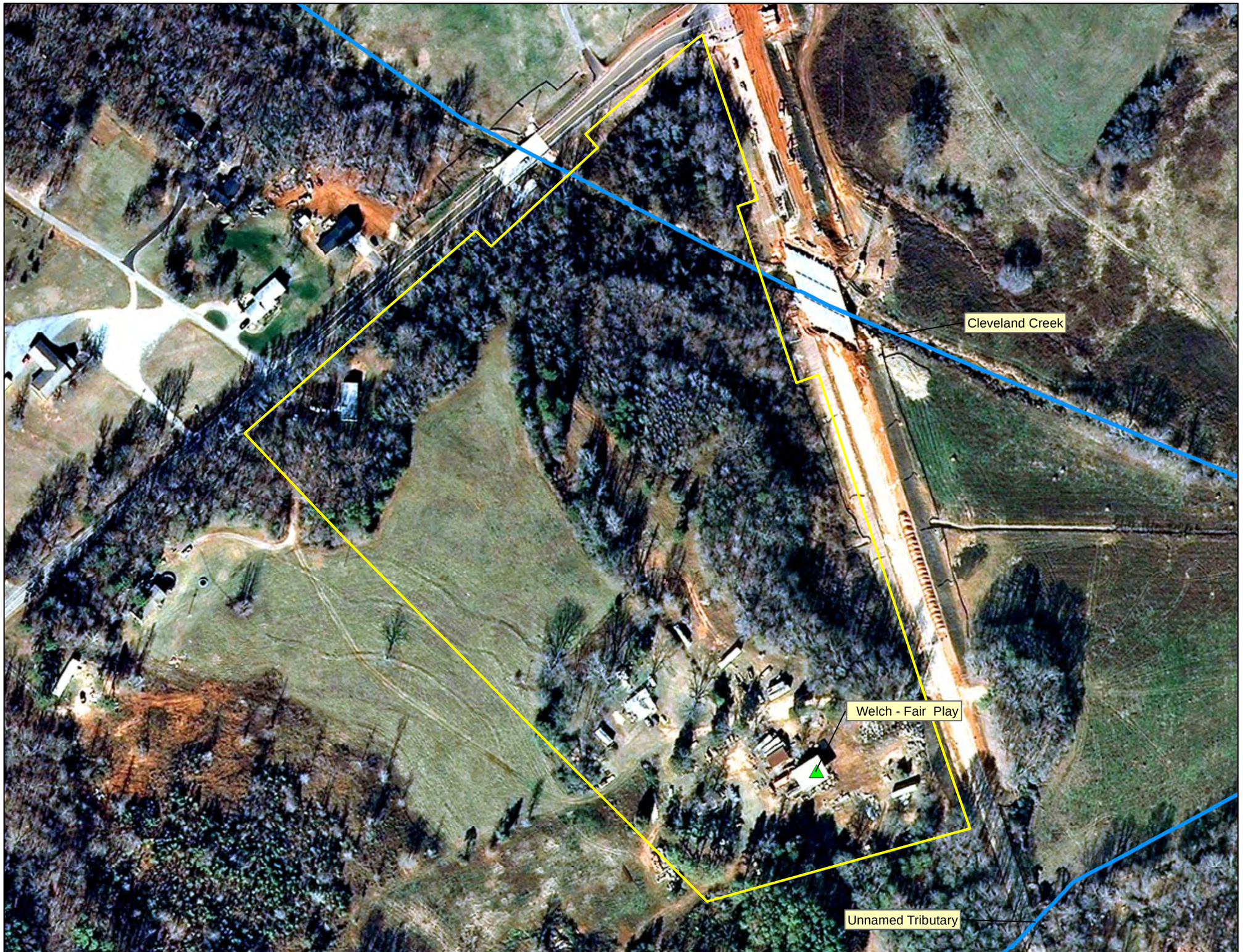
WELCH ENVIRONMENTAL GROUP
ANDERSON,
ANDERSON COUNTY
SOUTH CAROLINA
TDD NO. TNA-05-003-0122

FIGURE 1a
TOPOGRAPHICAL MAP

OTIE
Oneida Total Integrated Enterprises

E:\GIS Workspace\Welch-Fair Play

TOPO BY: USGS



AERIAL BY : BING

Disclaimer: This map is intended for visual orientation use only. In no way is this map to be used for precise locational use.

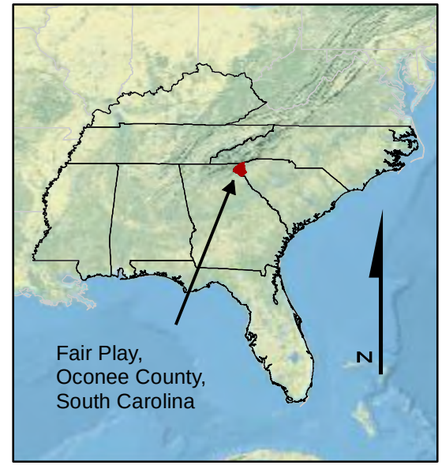
Legend

Welch - Fair Play Parcel

Creek / Tributary

Feet

0 150 300



United States Environmental Protection Agency

WELCH ENVIRONMENTAL GROUP
FAIR PLAY
OCONEE COUNTY,
SOUTH CAROLINA
TDD NO. TNA-05-003-0122

FIGURE 2
AERIAL MAP

OTIE
Oneida Total Integrated Enterprises

E:\GIS Workspace\Welch-Fair Play

AERIAL BY: BING

Disclaimer: This map is intended for visual orientation use only. In no way is this map to be used for precise locational use.

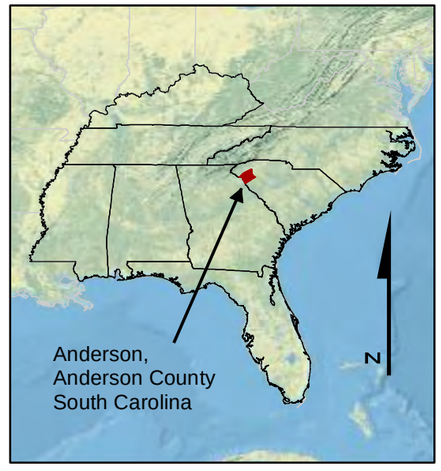
Legend

Welch - Anderson Parcel

Site Location

Note:
Parcel ID is 2030001001

Feet
0 75 150



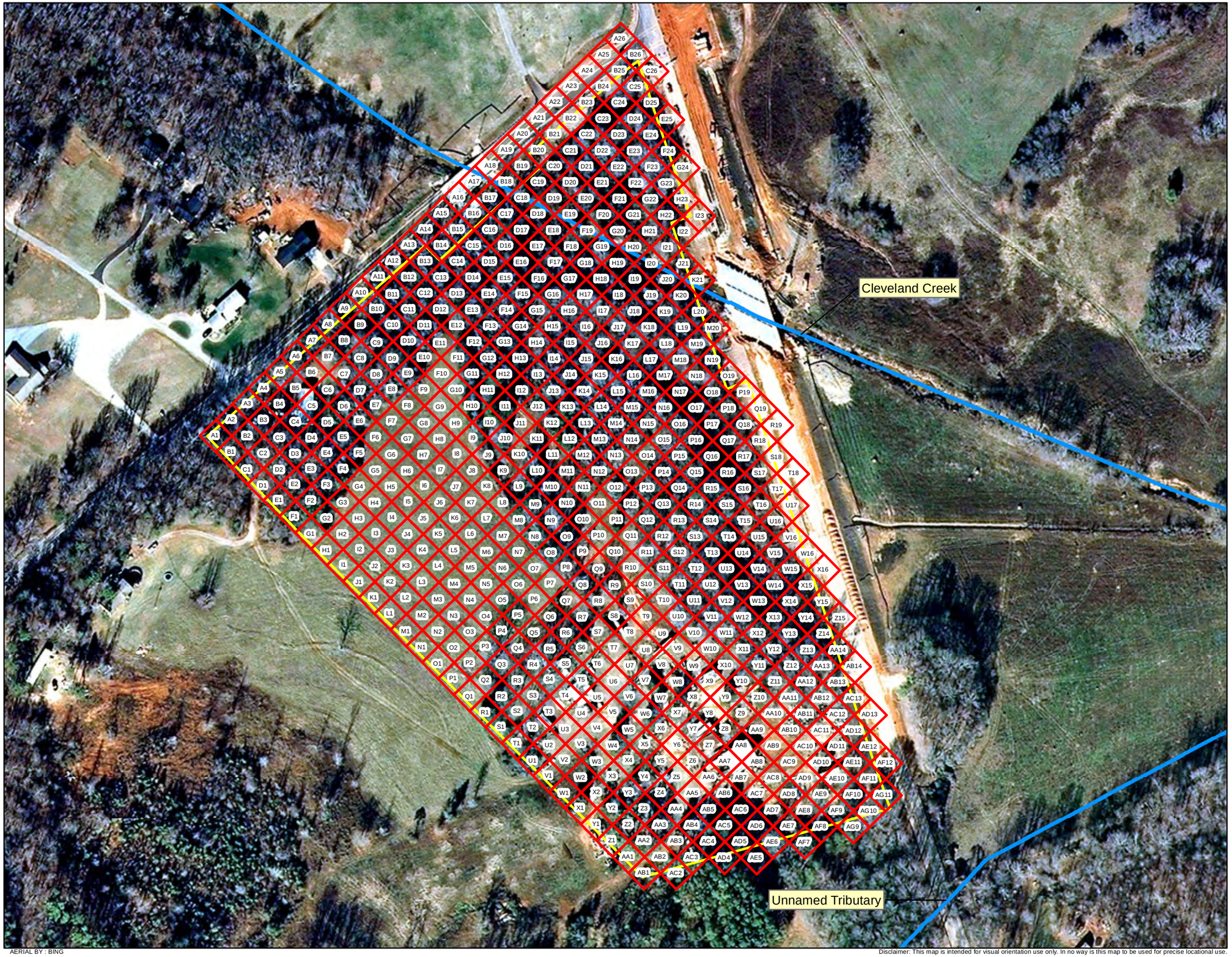
United States Environmental Protection Agency

WELCH ENVIRONMENTAL GROUP
ANDERSON,
ANDERSON COUNTY
SOUTH CAROLINA
TDD NO. TNA-05-003-0122

FIGURE 2a
AERIAL MAP

OTIE
Oneida Total Integrated Enterprises

E:\GIS Workspace\Welch-Fair Play



AERIAL BY : BING

Disclaimer: This map is intended for visual orientation use only. In no way is this map to be used for precise locational use.

Legend

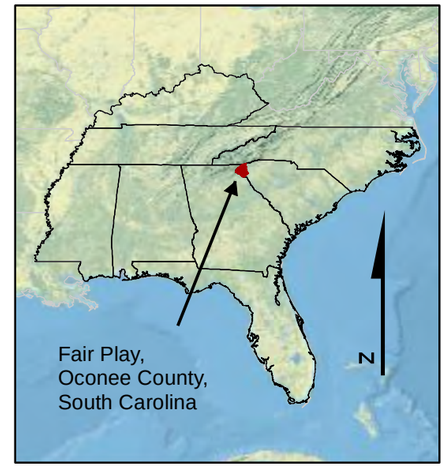
Welch - Fair Play Parcel

50 x 50 Grid - Fair Play

Creek / Tributary

Feet

0 150 300



United States Environmental Protection Agency

WELCH ENVIRONMENTAL GROUP
FAIR PLAY
OCONEE COUNTY,
SOUTH CAROLINA
TDD NO. TNA-05-003-0122

FIGURE 3
50 X 50 GRID MAP

OTIE
Oneida Total Integrated Enterprises

E:\GIS Workspace\Welch-Fair Play

AERIAL BY: BING

Disclaimer: This map is intended for visual orientation use only. In no way is this map to be used for precise locational use.

Legend

Welch - Anderson Parcel

Site Location

Note:
Parcel ID is 2030001001

Feet

0 75 150

United States Environmental Protection Agency

WELCH ENVIRONMENTAL GROUP
ANDERSON,
ANDERSON COUNTY
SOUTH CAROLINA
TDD NO. TNA-05-003-0122

FIGURE 3a
50 x 50 GRID MAP

OTIE
Oneida Total Integrated Enterprises

E:\GIS Workspace\Welch-Fair Play

Legend

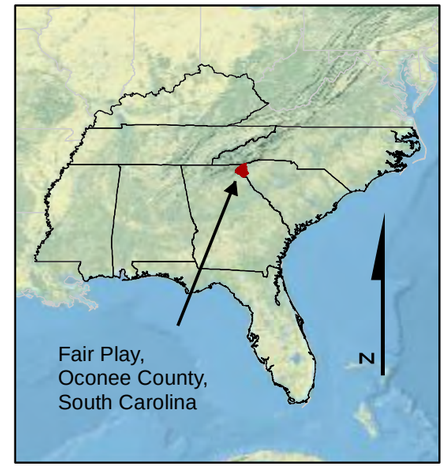
Welch - Fair Play Parcel

50 x 50 Grid - Fair Play

Creek / Tributary

Feet

0 75 150



United States Environmental Protection Agency

WELCH ENVIRONMENTAL GROUP
FAIR PLAY
OCONEE COUNTY,
SOUTH CAROLINA
TDD NO. TNA-05-003-0122

FIGURE 3b
50 X 50 GRID MAP
(ZOOM-VIEW)

OTIE
Oneida Total Integrated Enterprises

E:\GIS Workspace\Welch-Fair Play

Unnamed Tributary

AERIAL BY : BING

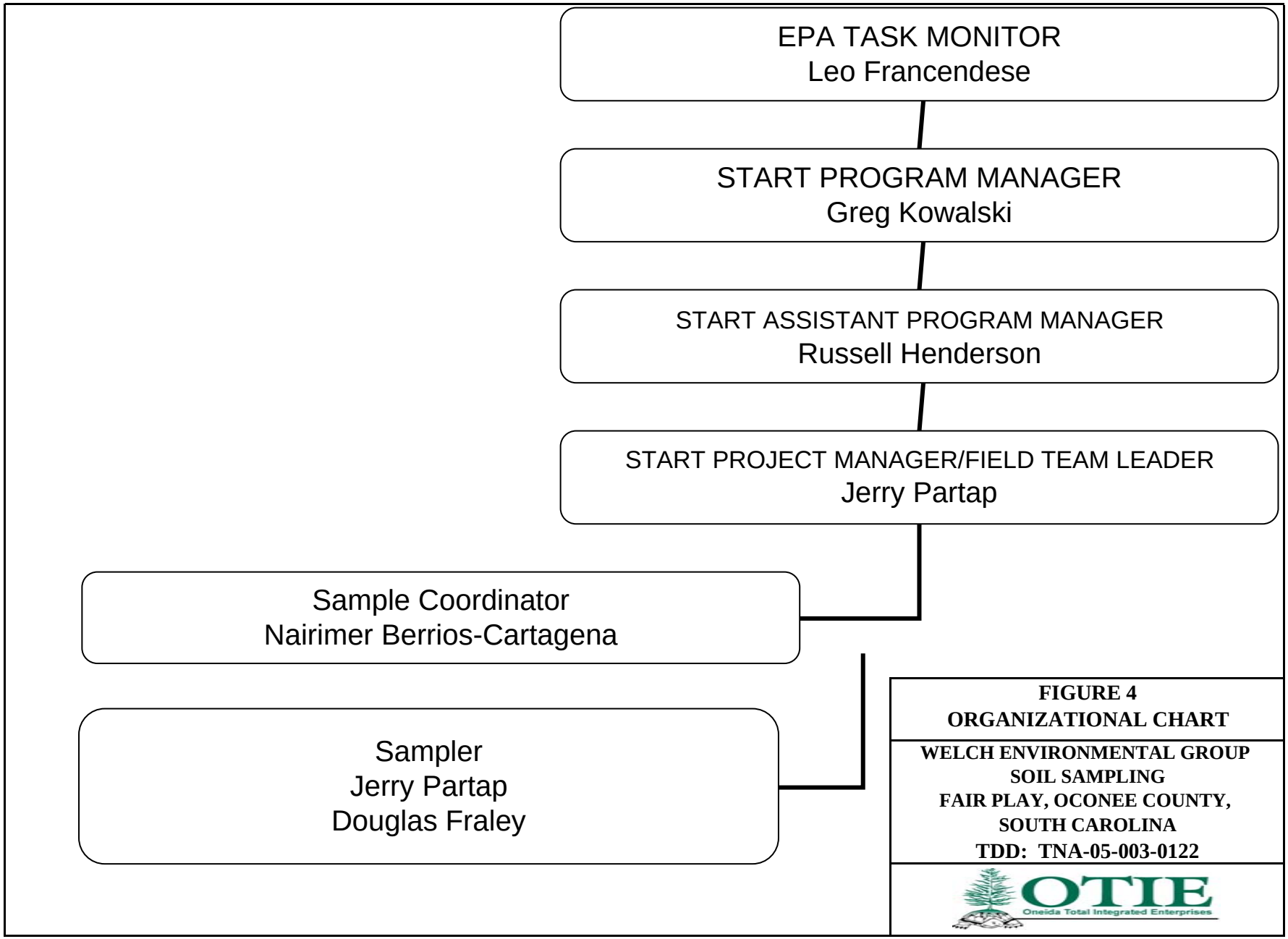


FIGURE 4
ORGANIZATIONAL CHART

WELCH ENVIRONMENTAL GROUP
SOIL SAMPLING
FAIR PLAY, OCONEE COUNTY,
SOUTH CAROLINA
TDD: TNA-05-003-0122

OTIE
Oneida Total Integrated Enterprises

APPENDIX B

TABLES

TABLE 1
REGIONAL SCREENING LEVEL AND METHOD DETECTION LIMITS
WELCH ENVIRONMENTAL GROUP

Analyte	Region 4 Regional Screening Level (mg/kg)	SW846-6010 Detection Limit (mg/kg)
Aluminum	77,000	8
Antimony	31	2.4
Arsenic	22	1.6
Barium	15,000	0.4
Beryllium	160	0.2
Cadmium	70	0.2
Calcium	NL	30
Chromium	NL	0.4
Cobalt	23	0.4
Copper	3,100	0.4
Iron	55,000	4
Lead	400	0.6
Magnesium	NL	4
Manganese	1,800	0.6
Mercury	5.6	0.01
Nickel	1,500	1.6
Potassium	NL	8
Selenium	390	1.6
Silver	390	0.4
Sodium	NL	40
Thallium	NL	0.8
Vanadium	390	0.8
Zinc	23,000	0.8

Notes:
mg/kg – Milligrams per kilogram
NL – Not listed

TABLE 2
QUALITY ASSURANCE/QUALITY CONTROL SAMPLES
WELCH ENVIRONMENTAL GROUP

Station ID	Sample Number	Location	Rationale
Station ID for parent sample	FP-FD-100	Duplicate soil sample; To be determined in the field	Verify laboratory precision
Station ID for parent sample	A-FD-100	Duplicate soil sample; To be determined in the field	Verify laboratory precision

Notes:
FP – Fair Play Parcel
A – Anderson Parcel
FD – Field Duplicate

TABLE 3
ANALYTICAL METHODOLOGY, SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIME FOR SOIL SAMPLES
WELCH ENVIRONMENTAL GROUP

Matrix	Analysis	EPA Method	Sample Container	Preservative	Holding Time
Soil	Total Lead	SW846-6010	One 4-oz jar	Cool to 4 ^{o}C	6 months
Soil	TAL Metals	SW846-6010/7471	One 4-oz jar	Cool to 4 ^{o}C	28 days Hg; all others 6 months

Notes:
^{o}C - Degree Celsius
Hg - Mercury
oz - Ounce
SW846 - Solid Waste 846 Methods
TAL - Target Analyte List

TABLE 4
SCHEDULE OF DELIVERABLES
WELCH ENVIRONMENTAL GROUP

DELIVERABLE	DUE DATE
MPR	25th of every month
QAPP/SSP, Rev. 0	January 28, 2011
Removal Site Evaluation Report, Rev. 0	Six weeks after receipt of analytical results
Removal Site Evaluation Report, Rev. 1	Two weeks after receipt of EPA comments

Notes:
MPR – Monthly Progress Reports
QAPP/SSP – Quality Assurance Project Plan/ Site Sampling Plan
Rev. – Revision