Sampling and Analysis Plan

Remedial Investigation/Feasibility Study
Odessa Chromium #1 Superfund Site
Odessa, Ector County, Texas
EPA Identification No. TXD980867279

Remedial Action Contract 2 Full Service
Contract: EP-W-06-004
Task Order: 0148-RICO-0682

Prepared for

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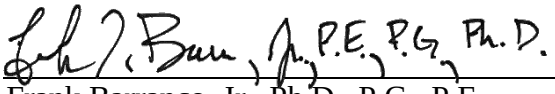
16 November 2017

Beth Liu — Date
EA Project Manager



16 November 2017

Frank Barranco, Jr., Ph.D., P.G., P.E. — Date
EA Program Quality Assurance Officer

Stephen Pereira — Date
U.S. Environmental Protection Agency Region 6 Task Order Monitor

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Microgram(s) per liter
AST	Aboveground storage tank
bgs	Below ground surface
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CRDL	Contract-required Detection Limit
CRQL	Contract-required Quantitation Limit
CUS	Conceptual understanding of the site
DESR	Data Evaluation Summary Report
DPT	Direct-push technology
DQA	Data quality assessment
DQO	Data quality objective
DU	Decision unit
EA	EA Engineering, Science, and Technology, Inc., PBC
EDD	Electronic data deliverable
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
FSP	Field Sampling Plan
ft	Foot (feet)
GPS	Global Positioning System
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessment
IDW	Investigation-derived waste
in.	Inch(es)
LCS	Laboratory control sample
MCL	Maximum Contaminant Level
MD	Matrix duplicate
MDL	Method detection limit
MS	Matrix spike
MSD	Matrix spike duplicate
OSHA	Occupational Safety and Health Administration
OS	Original sample

LIST OF ACRONYMS AND ABBREVIATIONS (CONTINUED)

OU	Operable unit
PARCC	Precision, accuracy, representativeness, completeness, and comparability
QA	Quality assurance
QAPP	Quality Assurance Project Plan
QC	Quality control
RAC	Remedial Action Contract
RAO	Remedial action objective
RI	Remedial Investigation
RL	Reporting limit
ROD	Record of Decision
RPD	Relative percent difference
SAP	Sampling and Analysis Plan
site	Odessa Chromium #1 Superfund Site
SLERA	Screening Level Ecological Risk Assessment
SOP	Standard operating procedure
SOW	Statement of Work
TOM	Task Order Monitor

DISTRIBUTION LIST

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1. PROJECT DESCRIPTION AND MANAGEMENT

EA Engineering, Science, and Technology, Inc., PBC (EA) has been authorized by the U.S. Environmental Protection Agency (EPA), under Remedial Action Contract (RAC) No. EP-W-06-004, Task Order 0148-RICO-0682 to conduct a phased Remedial Investigation (RI) and Feasibility Study (FS) at the Odessa Chromium #1 Superfund Site (site). EA has prepared this Sampling and Analysis Plan (SAP) in accordance with: (1) the specifications provided in the EPA Statement of Work (SOW), dated 20 March 2017 (EPA 2017a); (2) EPA responses to a Request for Clarification, received on 27 March 2017; (3) EPA Task Order SOW Revision 01, dated 7 July 2017 (EPA 2017b); (4) EPA responses to a Request for Clarification on the SOW Revision 01, received on 21 July 2017; and (5) the EPA-approved Work Plan and Cost Estimate, dated 18 August 2017 (EA 2017a). The Task Order activities will be conducted under the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act.

This SAP specifically addresses Phase 1 of the RI/FS, which includes review of historical information and data and development of an updated conceptual understanding of the site (CUS) as it relates to the field program described within SOW Revision 01 (EPA 2017b). The updated CUS and investigative data collected during each of up to five mobilization events will form the basis for each subsequent data collection effort (or mobilization event).

This SAP is a combination Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP). It details data collection methods, proposed sample locations and frequency, sampling equipment and procedures, and analytical methods required to collect sufficient data during a RI for the site. Combining the QAPP and FSP into the SAP allows for a streamlining of the planning process, while ensuring that the data collected are of sufficient quality for the intended use.

Upon implementation, this SAP should be used in conjunction with the site-specific Health and Safety Plan (HASP) (EA 2017b), which specifies employee training, protective equipment, personal air monitoring procedures, medical surveillance requirements, standard operating procedures (SOPs), and contingency planning procedures.

This SAP was prepared in accordance with EA's Quality Management Plan (EA 2014) and meets requirements set forth in *EPA Requirements for Quality Assurance Project Plans (QA/R-5)* (EPA 2001) and *Guidance for Quality Assurance Project Plans (QA/G-5)* (EPA 2002).

This SAP details the project specific data quality objectives (DQOs) and describes procedures to ensure that the DQOs are met and that the quality of data (represented by precision, accuracy, completeness, comparability, representativeness, and sensitivity) is known and documented. The SAP presents the project description, project organization and responsibilities, and quality assurance (QA) objectives associated with the sampling and analytical services to be provided in support of the RI. Table 1 demonstrates how this SAP complies with elements of a QAPP currently required by EPA guidance (EPA 2001, 2002). DQOs were prepared in accordance with *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA 2006a).

The overall QA objectives are as follows:

- Attain quality control (QC) requirements for analyses specified in this SAP
- Obtain data of known quality to support goals set forth for this project.

The EPA Region 6 Task Order Monitor (TOM), Mr. Stephen Pereira, is responsible for the project oversight. The Contracting Officer for EPA Region 6 is Mr. Brian Delaney. The Project Officer for EPA Region 6 is Mr. William G. Johnson, Jr. Upon direction, including an approved Work Plan, EA will perform RI tasks in accordance with this SAP. The EA Project Manager, Ms. Beth Liu, and the Alternate Project Manager, Ms. Teri McMillan, are responsible for implementing activities required by this Task Order. Figure 1 presents the proposed project organization for this Task Order.

1.1 PROBLEM DEFINITION AND BACKGROUND

This section describes the purpose of the investigation, site background and previous site investigations.

1.1.1 Purpose of the Investigation

Chromium concentrations in ground water indicate that contaminant mass flux from the vadose zone below the former source area is providing an ongoing release to the ground water. Therefore the purpose of this RI is to: (1) address the data gaps for the soil and vadose zone below the source area; and (2) address the ground water conditions below the source area as outlined in the 2016 Optimization Review Report (EPA 2016a). The data collected from the RI will be used to update the conceptual site model for the site as well as develop remedial alternatives to address the soil, vadose zone, and ground water beneath the former source area.

Under Phase 1 of this RI/FS, EA will review historical reports, compile historical data, and develop and update site maps and cross sections focusing on the source area. A CUS is included in Appendix A of this plan that summarizes the site historical data, identifies the data gaps, and reviews the site conditions. This CUS may be updated with the new data to be collected from the RI activities under this Task Order.

1.1.2 Site Background

The site is located in Odessa, Ector County, Texas (Figure 2). The site is located in a mixed commercial, residential, and industrial area with many private and industrial water supply wells. Historical chrome-plating activities conducted between 1965 and 1979 resulted in releases of chromium-contaminated waste to surface soil, subsurface soil, and ground water. The primary source of contamination has been identified as chrome-plating operations at 4318 Brazos Avenue (Figure 3). Chrome-plating operations were conducted under several business names at this location.

During the early years of operation, wastewater generated during metal plating and cleaning operations was discharged directly on the ground. During later years of operation, contaminated waste was discharged to septic drain field. Elevated concentrations of chromium were detected in private water supply wells in the vicinity of 4318 Brazos Avenue in the late 1970s.

The Odessa Chromium #1 Superfund Site was placed on the National Priorities List in September 1984. EPA published two RODs for the site in 1986 and 1988. The 1986 Record of Decision (ROD) for Operable Unit (OU) 1 addressed ingestion of contaminated ground water through private drinking water supply wells. The remedial action objective (RAO) for OU 1 is elimination of human exposure to contaminated drinking water through extension of municipal water supply lines to properties with affected drinking water supply wells. The RAO addressed in the 1988 ROD for OU 2 is restoration of ground water to beneficial use as a source of drinking water. The remedial goal for total chromium in ground water was identified as 50 micrograms per liter (µg/L), and the applicable or relevant and appropriate requirement is based on the 1988 EPA Primary Drinking Water Standard Interim Maximum Contaminant Limit (MCL). The ROD stated that the MCL was under review at the time of publication and that, should the standard be revised before implementing the design phase of the project, the revised standard would become the target remedial concentration. The MCL for total chromium in drinking water was revised to 100 µg/L in 1991. Site soils were determined not to pose a significant threat to human health via ingestion or inhalation. Risks assessed for the 1988 ROD indicated that remedial action was only required to reduce potential exposure through human consumption of contaminated ground water. An Explanation of Significant Differences was published in 1999 adding *in situ* treatment of residual chromium contamination in soil and ground water to the remedy selected in the 1988 ROD. The selection of additional treatment was based on evidence of continuing secondary sources of mobile chromium in the vadose zone and underperformance of the pump-and-treat system in treating the chromium contamination in ground water.

By February 2007, all active remedies were terminated. Since 2007, site activities have included ground water monitoring and private water well surveys. The 1988 ROD stipulates that if future migration of contamination occurs during the subsequent 30-year monitoring period, appropriate remedial actions will be evaluated.

An Optimization Review Report by EPA in 2016 (EPA 2016a) summarized the findings after all the remedies were terminated, presented an updated conceptual site model, and made recommendations for a possible alternative water source, collection of data to fill data gaps in the soil, vadose zone, and ground water characterization, and expansion of the ground water monitoring network.

1.1.3 Summary of Previous Site Investigations

The site history and previous investigations are detailed in the Technical Memorandum on the CUS that is included as Appendix A.

1.2 DESCRIPTION OF PROJECT OBJECTIVES AND TASKS

This section describes the project objectives and tasks for this SAP.

1.2.1 Project Objectives

The primary objectives of the RI are to characterize and determine the nature and extent of contamination at the former source area. Ultimately, the goal is to gather sufficient information to address the data gaps for the soil and vadose zone; and confirm the former source area is still contributing to the ground water dissolved plume. The following components are considered key to conducting a RI for the site:

- Data collection for media characterization to define nature and extent of contamination at the source area

- Preparation of a report of this additional investigation to identify and confirm the source area, and define the nature and extent of contamination at the source area. The RI provides information to support the development, evaluation, and selection of appropriate response alternatives.

1.2.2 Project Tasks

The following RI components will be completed upon EPA direction:

- Project planning and support
- Field investigation/data acquisition
- Sample analysis
- Analytical support and data validation
- Data evaluation, including preparation of technical memorandum
- Task order closeout.

Phase 1 investigation/data acquisition activities will be conducted at the site over a series of mobilization events. Currently, up to five mobilization events are anticipated.

The tasks associated with each mobilization event are summarized below:

- Mobilization Event 1 – Incremental sampling of the former septic drain field

- Mobilization Event 2 – Advancement of three shallow soil borings and collection of soil core samples

- Mobilization Event 3 – Installation of two monitoring wells, geophysical logging, and well development

- Mobilization Event 4 – Deployment of dual membrane samplers

- Mobilization Event 5 – Ground water sampling of two new monitoring wells and investigation-derived waste (IDW) disposal at a suitable location in compliance with local, state, and federal regulations.

Further details of tasks to be completed during each mobilization event are provided in Section 2, Data Generation and Acquisition.

Based on the observations during the site visit on 15 November 2017, the treatment building currently is occupied with treatment vessels, tanks, piping, and an office. The incremental sampling proposed would be conducted at the locations where the office, a piping, and equipment are located inside the building. It is not possible for a drilling rig to access to the sample locations without removing the building or equipment because of the low celling of the office and presence of the piping and equipment. However, this SAP describes the incremental sampling approach and will be revised after EPA's review.

1.3 DATA QUALITY OBJECTIVES

The purpose of defining the DQOs is to support decision-making by applying a systematic planning and statistical hypothesis-testing methodology. The goal is to develop an analytical approach and data collection strategy that is effective and efficient.
The SOW issued by EPA (EPA 2017b), the EPA-approved Work Plan (EA 2017a), and the CUS (Appendix A) form the basis for the DQO assessment. Table 2 presents the DQOs. DQOs represent project-wide objectives (i.e., all planned mobilization events); and this edition of the SAP only addresses source area investigation (Phase 1). DQOs will be updated during each SAP revision. This DQO assessment follows EPA's 7-step DQO process (Table 3), which is outlined in *Guidance on Systematic Planning Using the Data Quality Objectives Process (QA/G-4)* (EPA 2006a) and *Systematic Planning: A Case Study for Hazardous Waste Site Investigations (QA/CS-1)* (EPA 2006b).

1.4 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

A well-defined QA/QC process is integral to the generation of analytical data of known and documented quality. The QC process includes those activities required during data collection to produce data of sufficient quality to support the decisions that will be made based on the data (e.g., decisions to be made prior to, during, and after site remedial actions) (EPA 2006a). After environmental data are collected, QA activities focus on evaluating the quality of the data to determine the data usability with respect to support for remedial or enforcement decisions. Table 4 presents the acceptance criteria for definitive onsite and offsite laboratory data for chemical analyses of investigation samples only.

1.4.1 Data Categories

To produce data suitable for decision-making, an appropriate analytical technique must be selected. The EPA Superfund program has developed two descriptive categories of analytical techniques: (1) field-based techniques and (2) fixed-laboratory techniques. The type of data

generated depends on the qualitative and quantitative DQOs developed for a project. Regardless of whether the data were analyzed utilizing field or laboratory techniques, the data must be of adequate quality for the decision-making process for which the data were collected. For this project, data from both types of techniques will be collected. Section 2 discusses the methods that will be used to analyze the samples. Both field-based and definitive analytical data will be used to support decisions made for this project.

Rigorous analytical methods (e.g., EPA Contract Laboratory Program (CLP) methods or third-party laboratory, if short analytical turnaround time is necessary) are used to generate analyte-specific, definitive data. The definitive quality of the data are assured by: (1) using SOPs and QC processes during data collection; (2) documented control and traceability of reference standards, calibrations, and instrument performance; and (3) acceptable performance of field and laboratory QC procedures within the defined limits established for these procedures.

The majority of the fixed-laboratory analyses for samples collected during the RI sampling events will be conducted by the EPA Region 6 Laboratory and/or an EPA-designated CLP laboratory. Quick Reference Fact Sheets for relevant analytical methods are included in Appendix B. The EA subcontracted commercial laboratory will provide analytical support for analyses that the EPA Region 6 Laboratory and CLP laboratories cannot analyze due to method requirements (e.g., hexavalent chromium), due to schedule requirements, or due to elevated concentrations of contaminants. In addition, a third-party analytical laboratory will be employed to generate data within a short turnaround time. The analytical methods employed will be either EPA-issued or EPA-approved.

1.4.2 Measurement Quality Objectives

The analytical results will be evaluated in accordance with precision, accuracy, representativeness, completeness, and comparability (PARCC) parameters to document the quality of the data and to ensure that the data are of sufficient quality to meet the project objectives. Of these PARCCs parameters, precision and accuracy will be evaluated quantitatively with analytical results from the QC samples.

The sections below describe each of the PARCC parameters and how they will be assessed within this project.

1.4.2.1 Precision

Precision is the degree of mutual agreement between individual measurements of the same property under similar conditions. Usually, combined field and laboratory precision is evaluated by collecting and analyzing field duplicates and then calculating the variance between the samples, typically as a relative percent difference (RPD).
RPD is calculated as follows:

$$\text{RPD} = \frac{|A - B|}{(A + B)/2} \times 100\%$$

where: A = original sample concentration
B = duplicate sample concentration.

Field sampling precision is evaluated by analyzing field duplicate samples. For every 10 samples collected, one duplicate sample will be collected.

Laboratory analytical precision is evaluated by analyzing laboratory duplicates (also called matrix duplicates [MDs]) or matrix spikes (MSs) and matrix spike duplicates (MSDs). For this project, MS/MSD and original sample [OS]/MD samples will be generated for analytes. The results of the analysis of each MS/MSD or OS/MD pair will be used to calculate the RPD as a measure of lab precision. In addition, laboratory control samples (LCS) and LCS duplicates are also used for laboratory precision.

1.4.2.2 Accuracy

A program of sample spiking will be conducted to evaluate laboratory accuracy. This program includes analysis of the MS and MSD samples, LCSs or blank spikes, surrogate standards, and method blanks. MS and MSD samples will be prepared and analyzed at a frequency of 5 percent for project samples. LCSs or blank spikes will also be analyzed at a frequency of 5 percent or one per batch. Surrogate standards, where applicable, are added to every sample analyzed for organic constituents. The results of the spiked samples are used to calculate the percent recovery for evaluating accuracy.

$$\text{Percent Recovery} = \frac{S - C}{T} \times 100\%$$

where: S = measured spike sample concentration
C = sample concentration
T = true or actual concentration of the spike.

The objective for accuracy of field measurements is to achieve and maintain factory specifications for the field equipment.

1.4.2.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represent the characteristics of a population, variations in a parameter at a sampling point, or an environmental condition that they are intended to represent. For this project, representative data will be obtained through careful selection of sampling locations and analytical parameters. Representative data will also be obtained through proper collection and handling of samples to avoid interference and minimize contamination.

Representativeness of data will also be ensured through the consistent application of established field and laboratory procedures. Field blanks (if appropriate) and laboratory blank samples will be evaluated for the presence of contaminants to aid in evaluating the representativeness of

sample results. Data determined to be non-representative, by comparison with existing data, will be used only if accompanied by appropriate qualifiers and limits of uncertainty.

1.4.2.4 Completeness

Completeness is a measure of the percentage of project-specific data that are valid. Valid data are obtained when samples are collected and analyzed in accordance with QC procedures outlined in this SAP, and when the QC criteria that affect data usability are not grossly exceeded. When data validation is completed, the percent completeness value will be calculated by dividing the number of useable sample results by the total number of sample results planned for this investigation.

Completeness will also be evaluated as part of the data quality assessment (DQA) process (EPA 2006c, 2006d). This evaluation will help determine whether limitations are associated with the decisions to be made based on the data collected.

1.4.2.5 Comparability

Comparability expresses the confidence with which one data set can be compared with another. Comparability of data will be achieved by consistently following standard field and laboratory procedures and by using standard measurement units in reporting analytical data. Standard EPA analytical methods and QC will be used to support the comparability of analytical results with those obtained in previous testing. Calibrations will be performed in accordance with EPA or manufacturer's specifications and will be checked with the frequency specified in the EPA CLP SOW(s) or applicable methods.

1.4.3 Detection and Quantitation Limits

The analytical parameters and their quantitation limits for use on this project are determined under the EPA CLP SOW(s) or applicable method. The Contract-required Detection Limit (CRDL), for CLP methods, or Method Detection Limit (MDL), for non-CLP methods, are the minimum concentrations of an analyte that can be reliably distinguished from background noise for a specific analytical method. The Contract-required Quantitation Limit (CRQL) represents the lowest concentration of an analyte that can be accurately and reproducibly quantified in a sample matrix. The CRQL, for CLP methods, or reporting limit (RL) for non-CLP methods, are the contractually specified maximum quantitation limits for specific analytical methods and sample matrices, such as soil or water, and are typically several times the CRDL or MDL, to allow for matrix effects. Quantitation limits for non-CLP methods are typically referred to as the method RL.

For this project, analytical methods have been selected so that the CRQL or RL for each target analyte is below the applicable screening criteria, wherever practical. Samples results will be reported as estimated values if concentrations are less than the CRQL/RL but greater than CRDL/MDL. The CRDL or MDL for each analyte will be listed as the detection limit in the laboratory's electronic data deliverable (EDD).

Laboratory analysis methods were selected to obtain the lowest CRQLs and RLs. Data collected during the RI will undergo an evaluation of the CRQLs and RLs in conjunction with screening criteria to ensure that the data are adequate.

- If one-half the lowest CRQL or RL for a chemical is greater than its respective screening level, then it will be evaluated in the uncertainty section of the risk assessment.

- If a chemical is reported in a field sample and in a method blank or field blank, it will be considered as a positive identification if the field sample concentration is present at a concentration greater than 10 times the maximum blank concentration for common laboratory contaminants or 5 times the maximum blank concentration for other analytes. Common laboratory contaminants include acetone, methylene chloride, methyl ethyl ketone, phthalate esters, and toluene.

- Concentrations designated as estimated (e.g., J-qualifier) will be considered detected.

1.5 SPECIAL TRAINING AND CERTIFICATION

This section outlines the training and certification required to complete the activities described in this SAP. The following sections describe the requirements for the EA team and subcontractor personnel working onsite.

1.5.1 Health and Safety Training

EA field team personnel who work at hazardous waste project sites are required to meet the Occupational Safety and Health Administration (OSHA) training requirements defined in 29 Code of Federal Regulations (CFR) 1910.120(e). These requirements include: (1) 40 hours of formal offsite instruction, (2) a minimum of 3 days of actual onsite field experience under the supervision of a trained and experienced field supervisor, and (3) 8 hours of annual refresher training. Field personnel who directly supervise employees engaged in hazardous waste operations also receive at least 8 additional hours of specialized supervisor training.

Copies of the field team's health and safety training records, including course completion certifications for the initial health and safety training, refresher training, and specialized supervisor training are maintained in project files.

Additional health and safety details can be found in EA's site-specific HASP (EA 2017b).

1.5.2 Subcontractor Health and Safety Training

Subcontractors who work onsite will certify that their employees have been trained for work on hazardous waste project sites. Training will meet OSHA requirements defined in 29 CFR 1910.120(e). Subcontractors will attend a safety briefing and complete the Safety Meeting Sign-Off Sheet before they conduct onsite work (EA 2017b). This briefing is conducted

by the EA Site Health and Safety Officer or other qualified person. Alternatively, the subcontractors may elect to conduct their own safety briefings, which EA personnel may audit.

Before work begins at the project site, subcontractors will submit copies of the training certification for each employee assigned to the project. Copies of the subcontractor's health and safety training records will be maintained in project files.

1.6 DOCUMENTS AND RECORDS

The following sections discuss the requirements for documenting field activities and for preparing laboratory data packages. This section also describes reports that will be generated as a result of this project.

1.6.1 Field Documentation

Field personnel will use permanently bound field logbooks with sequentially numbered pages to record and document field activities and will follow EA SOP 016 (Appendix C) for completing field logbooks. The logbook will list the contract name and number, the site name, and names of subcontractors, service client, and EA Project Manager. At a minimum, the following information will be recorded in the field logbook:

- Date and time
- Name and affiliation of onsite personnel or visitors
- Weather conditions during the field activity
- Other non-weather-related conditions at the time of sampling
- Purposes of the field activities on the date
- Summary of daily activities and significant events
- Make and model of field instruments used and any calibration(s) or bump-tests performed
- Notes of conversations with coordinating officials
- References to other field logbooks or forms that contain specific information
- Discussions of problems encountered and their resolution
- Discussions of deviations from the SAP or other governing documents
- Description of high resolution photographs taken. Photographs will be taken using cameras or personal cell phones using highest resolution settings.
- Specific volumes of materials used to plug holes, wells, etc.
- Global Positioning System (GPS) data.

1.6.2 Laboratory Documentation

This section describes the data reporting requirements for EA field personnel and laboratories (e.g., EPA CLP laboratories, EPA Region 6 Laboratory, or subcontracted commercial

laboratories) that submit field and laboratory measurement data under the EPA Region 6 RAC II program.

EA will require fixed offsite, subcontracted private commercial laboratories to prepare and submit data packages in accordance with the EPA CLP protocols (EPA 2016b) for hardcopy and EDD format of data. Data packages will include applicable documentation for independent validation of data and verification of the DQOs. The following documentation will be required for full data validation, if applicable:

- Case narratives, which will describe QC non-conformances that are encountered during the analysis of samples in addition to corrective actions that are taken:

  — Statement of samples received
  — Description of deviations from the specified analytical method
  — Explanations of data qualifiers that are applied to the data
  — Other significant problems that were encountered.

- Tables that cross-reference field and laboratory sample numbers.

- Chain-of-custody forms, which pertain to each sample delivery group or sample batch that is analyzed.

- Laboratory reports, which must show traceability to the sample analyzed and must contain specified information:

  — Project identification
  — Field sample number
  — Laboratory sample number
  — Sample matrix description
  — Dates and times of sample collection, receipt at the laboratory, preparation, and analysis
  — Description of analytical method and reference citation
  — Results of individual parameters, with concentration units, including second column results, second detector results, and other confirmatory results, where appropriate
  — Quantitation limits achieved
  — Dilution or concentration factors.

- Data summary forms and QC summary forms showing analytical results, if applicable:

  — Samples
  — Surrogates
  — Blanks
  — Field QC samples
  — LCS
  — Initial and continuing calibrations

  - Other QC samples.

- Laboratory control charts:

  - Raw data
  - Instrument printouts
  - Laboratory bench sheets for preparation of samples.

- MDL study results.

EA's Project Manager, in cooperation with the EA QA Officer, will define site-specific requirements for data reporting. Requests for analytical services define these requirements, the turnaround time for receipt of the data deliverables specified, and requirements for retaining samples and laboratory records. Laboratory QA Managers are responsible for ensuring that laboratory data reporting requirements in this SAP are met.

1.6.3 EPA Level IV Type Data Package

The laboratory will prepare EPA Level IV type data packages in accordance with the instructions provided in the EPA CLP SOWs (EPA 2016b). Commercial laboratories conducting non-CLP analyses will be required to prepare Level IV type data packages. Data packages are due to EA within 45 days after the last samples in the sample delivery group is received by the laboratory. In the case where a non-CLP subcontract laboratory is used, full data packages are due to EA within 35 days after the last sample in the sample delivery group is received. Unless otherwise requested, the laboratory will deliver one copy of the Level IV type data package.

1.6.4 Reports Generated

Following the completion of the RI field program and receipt of validated data, the following reports associated with the site RI will be completed:

- Data Evaluation Summary Reports (DESR)
- Project Planning Technical Memorandum
- Phase 1 RI/FS Technical Memorandum
- Task Order Closeout Report.

2. DATA GENERATION AND ACQUISITION

This section describes the requirements for the following:

- Sampling process design (Section 2.1)
- Sampling methodology (Section 2.2)
- Sample processing (Section 2.3)
- Decontamination (Section 2.4)
- Management of investigation-derived waste (IDW) (Section 2.5)
- Sample designation (Section 2.6)
- Sample container, volume, preservation, and holding time requirements (Section 2.7)
- Sample handling and custody (Section 2.8)
- Analytical method requirements (Section 2.9)
- QC requirements (Section 2.10)
- Instrument calibration and frequency (Section 2.11)
- Requirements for inspection and acceptance of supplies and consumables (Section 2.12)
- Data acquisition requirements (Section 2.13)
- Data management (Section 2.14).

2.1 SAMPLING PROCESS DESIGN

For the activities associated with this SAP, the main elements of the sampling design include the numbers and types of samples to be collected, sampling locations, sampling frequencies, and sample matrices as appropriate to resolve data gaps in the source area. To complete this objective, the field program has been developed using multiple mobilization events as discussed in Section 1.2.2. The sample design discussed in this section outlines the following field activities associated with each mobilization event.

Mobilization Event 1:

- Incremental soil sampling to evaluate subsurface soil below the former septic drain field.

Mobilization Event 2:

- Advancement of three soil borings and collection of soil cores to assess contaminant impact to shallow and deeper soils, including the caliche layer in the former septic drain field area and the area near the aboveground storage tank (AST).

- Plugging of the installed boreholes to prevent the development of preferential flow pathways.

Mobilization Event 3:

- Installation and development of two monitoring wells to assess impacts to ground water: one near the former septic drain field and another in the area adjacent to the AST. Well installation will also include soil sampling.

- Geophysical logging to support an understanding of the subsurface of the site and to comply with state requirements for monitoring well installation.

Mobilization Event 4:

- Deployment of dual membrane samplers within the newly-installed monitoring wells to be sampled at a subsequent mobilization event (Mobilization Event 5).

Mobilization Event 5:

- Ground water sampling of the two new monitoring wells via the dual membrane samplers to evaluate impacts to ground water in the former septic drain field and near the AST.

- IDW disposal at a suitable location in compliance with local, state, and federal regulations.

2.2 SAMPLING METHODOLOGY

This section describes the field activities, including field preparation and procedures for sample collection, that may occur during the five anticipated mobilization events. Table 5 lists the SOPs that will be implemented during the field program at the direction of EPA. The SOPs are provided in Appendix C. Tables 6 and 7 summarize the type and quantities of soil and ground water samples that are planned for collection, as well as the tools to be used during sampling. The tables are organized according to the medium being investigated. Figures 4 and 5 present the soil and ground water investigation locations.

Sample collection and handling procedures will follow CLP protocols in accordance with EPA's *Contract Laboratory Program Guidance for Field Samplers* (EPA 2014). Table 8 describes the required sample volume, containers, preservatives, and holding times for sample analyses.

2.2.1 Site Reconnaissance

Site reconnaissance is not required at this time.

2.2.2 Site Preparation, Utilities and Permits

EA will mobilize to the site and set up field office at the Sprague Road Ground Water Plume Superfund Site in Odessa, Ector County, Texas, and establish a command post for the field phase of the investigation. This facility is secure and conveniently located approximately 7 miles (5

minutes by car) from the site. It may be possible to coordinate with the existing TCEQ contractor for the site and use the existing treatment building as field office.

Utilities will be cleared before any subsurface activities are performed. Proposed drilling locations will be staked, and clearances will be obtained to prevent underground utilities from being damaged by drilling activities. If underground utilities are present in the proposed drilling locations, drilling locations will be relocated to avoid the utility.

The driller will be responsible for completing all permits associated with installation of monitoring wells and/or boreholes with the Texas Department of Licensing and Regulation and Texas Commission on Environmental Quality.

2.2.3 Source Area Soil Investigation

EA will conduct subsurface investigations during Mobilization Events 1 and 2. Mobilization Event 1 will consist of incremental soil sampling, and Mobilization Event 2 will consist of the installation of three soil borings extending through the caliche layer below the site. The location for the proposed incremental sampling is depicted in Figures 4 and 5, pending utility clearance. The locations for three soil borings with coring through the caliche layer will be at MRC-4, approximately 30 feet to the east of MRC-4, and near the water well at the southeastern corner of the treatment building.. The proposed field soil investigation is summarized in Table 6 and detailed below.

2.2.3.1 Incremental Sampling – Mobilization Event 1

The area of the former septic drain field forms the “decision unit” (DU), which is the smallest volume of soil about which a decision is to be made with respect to human health risk and/or remediation (Figure 4). The spatial boundaries for the incremental sampling study are defined by the former septic drain field and the caliche layer underneath the site. The horizontal boundary for incremental sampling is 20 feet (ft) in width by 50 ft in length, with a surface area of 1,000 square feet (Figure 4). The vertical boundary will be defined by the top of caliche layer, which is expected to be at 10 to 15 ft below ground surface (bgs).

Four soil depth intervals (sampling units) will be evaluated in the former septic drain field or DU:

- 2-3 ft bgs
- 5-6 ft bgs
- 9-10 ft bgs
- Total depth (which is refusal).

Incremental soil samples will be collected in accordance with SOP 057 (Appendix C) and the Interstate Technology and Regulatory Council (ITRC) Incremental Sampling Methodology (ISM) Guidance (ITRC 2012). Each sampling unit (depth interval) will be composed of 30 grid cells, from each of which one increment sample will be collected. Grid cells and sample increment locations are depicted in Figure 5. Increment sample locations include primary,

duplicate, and triplicate locations; and duplicate and triplicate increments are only collected from the shallowest sampling unit (2-3 ft bgs). The increment sample locations will be designated using pin flags.

At each of the 30 grid cells, the direct-push technology (DPT) core barrel (containing a dedicated acetate sleeve) will be advanced into the undisturbed soil to refusal. Soil cores making up each sample increment will remain in their respective acetate sleeves, and each sleeve will be capped. The sampling team will clearly mark the top and bottom of each sleeve and label it with pre-printed field labels of the appropriate sample designation. The pre-printed labels will show replicate designation (primary X, duplicate Y, or triplicate Z), depth, and number of grid cell. During processing of the individual cores, the soil cores will be cut in half vertically along the longitudinal axis, a soil increment sample will be collected from the half of the soil core for the entire length of the sampling unit (depth interval) and placed in the appropriate resealable bag (labeled with the appropriate replicate designation [X, Y, or Z] and depth interval) (one bag per sample replicate designation per depth interval). This process will be repeated for four sampling units (depths) to form the four primary samples. The same process will be used to form the duplicate and triplicates samples from their respective DPT rig paths and pushes. A total of six samples will be collected using the incremental sampling method.

A laboratory may have a threshold of 5 kilograms per soil sample, beyond which, a waste disposal fee may be charged. Therefore, to reduce amount of soil to be sent to the laboratory, the soil cores will be cut in half vertically along the longitudinal axis as mentioned above, and one half is used for sampling and the other half will be placed in a marked resealable bag for logging and reference purposes, and eventually disposed of as IDW.

Because the former septic drain field is partially located beneath the current treatment building, the concrete slab will be cut at the boring locations by a concrete coring subcontractor after the grid layout has been established. Based on a construction diagram of the building, the concrete slab is expected to be a minimum of 8 inches (in.) thick with 2 in. of compacted sand below the slab (Appendix G).

The DPT rig path for the primary incremental samples may begin in the northeast corner of the grid, then move down, then move left and up (Figure 5). The primary samples will be collected from locations in the center of the grid cells. One duplicate and one triplicate samples will be collected only from the sampling unit of 2-3 ft bgs, using the same sampling and processing procedures as the primary samples. DPT borings will be located in the northeast and southwest corner of each grid cell for the duplicate and triplicate samples, respectively.

The six incremental soil samples (four primary and two QC samples [duplicate and triplicate samples]) will be analyzed for total and hexavalent chromium. A pre-printed sample label will be affixed to each of the six resealable bags, and each bag will be placed in a second resealable bag (double-bagged) for shipment to the analytical laboratory.

All non-dedicated DPT sampling equipment will be decontaminated between collection of the primary sample and the duplicate sample, and between the collection of the duplicate and triplicate samples.

Upon completion of the DPT sampling effort, all the soil borings will be plugged and abandoned in accordance with SOP 028 (Appendix C), and the concrete slab of the treatment facility will be restored. The thickness, type, and method of reinforcement of the concrete slab is unknown at this time, but it will be restored such that the quality is matched with minimal impact to the remaining concrete slab.

The treatment building currently is occupied with the treatment system and an office with a low celling. Access to the sample locations inside building by a DPT rig is likely to be restricted due to the presence of the equipment, tanks, and piping, and low celling of the office. The incremental sampling herein will be revised after the EPA review.

Proposed Alternative for Soil Sampling at Source Area

If the incremental soil sampling is not conducted due to the restrictions of the office celling and presence of equipment inside the treatment building, soil samples from different depth intervals above the caliche layer may be collected at the historical hot spots along the north and northwest footprint of the treatment building and analyzed for total and hexavalent chromium. These soil samples may assist evaluation of the septic drain field contamination although they are not collected directly underneath the building. However the soil contamination under the treatment building would still be unknown under this proposed alternative.

2.2.3.2 Soil Boring Installation and Sampling – Mobilization Event 2

For Mobilization Event 2, three soil borings will be installed, and soil samples will be collected using the rotosonic drilling method. It is expected that one of the borings will be located in the former septic drain field near former well MRC-4 and RI boring B-123 (Figure 4). The second location may be at the southeast corner of the treatment building where a water well is located, and third boring can be located to the north of the treatment building and approximately 20-30 ft to the east of MRC-4. The locations are proposed based on the recommendations from the 2016 Optimization Review Report (EPA 2016a) and the hot spots identified in the historical documents (IT Corporation, et al 1987). The borings will be cored to approximately 30 ft bgs through caliche layer. All drilling will be performed by licensed drillers.

During drilling, continuous soil cores will be collected. A field geologist will log the material types within each core to assist in the understanding of site geology and for the nature and extent of contamination. Soil borings will be logged on standard boring log forms (Appendix D) using the Unified Soil Classification System methodology. During logging the field team will make olfactory and visual observations, and record this data on the boring log form.

Caliche Sampling

The core will be sampled through the caliche layer, which is expected to be from approximately 10 ft to 30 ft bgs. Five samples per location will be collected from the caliche, at depths of approximately 10-14 ft bgs, 14-18 ft bgs, 18-22 ft bgs, 22-26 ft bgs, and 26-30 ft bgs. A total of 15 samples will be collected from the three locations and analyzed for total and hexavalent

chromium. Additional soil samples above the caliche layer may also be collected at these three locations if strong visible stains are observed.

Other Metal Sampling

Three soil samples in one soil boring location will be collected for laboratory analysis of total arsenic, iron, and manganese. Three grab samples will be collected along the total depth of 30 ft. The arsenic, iron, and manganese concentrations will provide information of the site oxidation reduction potential in support of remedial alternative development.

Permeability Testing

One soil sample from the vadose zone (from 15 ft bgs to the ground water table) will be collected for geotechnical/permeability analysis to be used for hydrogeological characterization and support possible additional site modeling efforts. Soil samples will be analyzed by a private laboratory.

Table 6 shows a summary of soil sampling. Soil samples will be utilized to identify whether the caliche layer has been contaminated and its impact on the plume vertical migration. The data collected from the soil and caliche layer may also be used to evaluate potential exposure risks, if needed.

Following completion of sampling activities, soil borings will be abandoned in accordance with SOP 028 (Appendix C). Soil waste generated during boring installation will disposed of as IDW (Section 2.5).

2.2.4 Ground Water Monitoring Well Installation – Mobilization Event 3

For Mobilization Event 3, EA will install, develop, and surface complete two ground water monitoring wells. Based on the recommendations from the Optimization Review Report (EPA 2016a), one well will be located near the former septic drain field, and the other will be located in the area adjacent to the existing AST. The monitoring wells will be installed using air-rotary drilling methodology. The wells will be constructed of 4-in.-diameter polyvinyl chloride casing with 15 to 20 ft of screen. The wells will be installed to an approximate total depth of 145 ft bgs. The wells will be surveyed by a professional land surveyor to determine top of casing elevation and locations. Soil samples will not be collected from the monitoring well borings.

Table 7 summarizes sampling and field activities associated with the monitoring well installation. Monitoring wells will be installed in accordance with SOP 019. Proposed monitoring well locations are provided in Figure 3.

Soil and water generated during monitoring well installation and development will be collected and managed as IDW (Section 2.5).

2.2.4.1 Well Drilling

The monitoring wells will be drilled using the air rotary drilling method and as outlined in Table 7. All borings/monitoring wells will be logged by the field geologist. New well IDs will continue the sequential order of existing and historic wells at the site.

2.2.4.2 Geophysical Logging

Prior to installing the well casings of the two new monitoring wells, the wells will be geophysically logged for resistivity, gamma, spontaneous potential, and caliper to determine the well screen intervals. The logging will be completed by a private subcontractor.

2.2.4.3 Surface Completions

Surface completions for the monitoring wells will consist of 12-in.-diameter traffic-rated vaults set in 4-ft by 4-ft by 6-in.-thick concrete pads (4,000 pounds per square in.-rated concrete mix [Sackrete No. 10360 or equivalent, mixed to manufacturer's specifications]) with a mat of No. 3 rebar on 12-in. centers. Concrete pads will slope away from the vault cover such that the vault cover elevation is 0.5 in. higher than the edges of the pad to allow for drainage of precipitation. A water-tight locking cap will be installed on each monitoring well.

At the completion of well construction, the licensed driller will file a Well Report in accordance with the Texas Department of Licensing and Regulation.

2.2.4.4 Well Development

Monitoring wells will be developed following the completion of each well. The wells will be allowed to set 48 hours prior to initiating development. Downhole equipment, including surge blocks and/or pumps, will be decontaminated before first use at the site as well as in between wells. Water derived from decontamination will be collected and temporarily stored at the staging area near the treatment building at the site for characterization.

Monitoring wells will be developed by surging and bailing, followed by pumping in accordance with SOP No. 019 (Appendix C). This process will continue until the wells yield relatively sediment-free ground water and field parameters have stabilized.

2.2.5 Ground Water Gauging and Sampling – Mobilization Events 4 and 5

A minimum of 2–3 weeks after well development, Mobilization Event 4 will include ground water depth measurements, and deployment of dual membrane samplers in the two new monitoring wells. Up to five dual membrane samplers will be deployed per well at five different depths within the screened interval. One additional sampler may be deployed for QA/QC sample purposes

Three weeks after deployment of the dual membrane samplers, ground water samples will be collected from the dual membrane samplers from the two new monitoring wells, after measuring

depths to ground water table. Field documentation, including water quality parameters, will be recorded on field forms (Appendix D). Collected samples will be submitted to EPA or a subcontracted laboratory. Ground water samples will be analyzed for total chromium and hexavalent chromium, as listed in Table 7.

2.2.6 GPS and Professional Surveys

GPS equipment will be used to survey incremental sample points and soil borings. The survey will be performed using hand-held Real-Time Kinetic GPS equipment. After field activities are complete, the survey data will be used to generate accurate maps illustrating the information collected.

The following GPS data attributes for each location will be logged:

- Latitude and longitude
- Elevation
- Survey method
- Datum
- Maximum Positional Dilution of Precision
- GPS date and time
- Total positions collected at each well location.

The new monitoring wells will be surveyed by a Texas licensed surveyor. The survey will be to Texas State Plane Coordinates and North American Datum of 1983. Wells will be located to within ±0.1 ft horizontal and ±0.01 ft vertical.

2.3 SAMPLE PROCESSING

Samples for fixed laboratory analysis will be processed and packaged in accordance with the *Contract Laboratory Program Guidance for Field Samplers* (EPA 2014) and/or SOP 004 (Appendix C), as applicable.

2.4 DECONTAMINATION

All drilling equipment will be steam-cleaned or cleaned using high-pressure water at between sampling locations, and the completion of the project to ensure that no contamination is transported from the sampling site. Special attention will be given to the thread section of casings and drill rods. Cleaned equipment should not be handled with soiled gloves. Decontamination of the equipment will follow general practices listed in SOP 005 (Appendix C).

Re-usable field equipment utilized during the RI will be decontaminated prior to initial use and after use to collect each sample in accordance with EA SOP 005 (Appendix C). Decontamination of field equipment will occur in buckets, plastic containers, or other similar containers with sealing lids, and the resulting fluid will be transferred to properly labeled IDW containment containers (e.g., 55-gallon drums) staged in a designated staging area. The

decontamination fluids will be properly sampled and disposed of following local, State, and Federal guidelines (see Section 2.6).

2.5 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

All soil and decontamination and purge water generated during the various phases of work will be drummed, placed in roll-offs or other appropriate containers, sealed, labeled, and stored at the designated storage area near the treatment building at the site until profiled for acceptance at an approved disposal facility (EA SOP 042, Appendix C**).**

IDW samples will be submitted to the EA-subcontracted laboratory for waste characterization and profiling. The landfill disposal requirements will dictate sample quantities and analysis. EA will obtain landfill requirements and will convey the sampling requirements to the field team at the appropriate time. Sampling all generated IDW at one time will be conducted to reduce costs of multiple shipping, sampling, and analysis.

2.6 SAMPLE DESIGNATION

Each sampling location will be designated with a unique alphanumeric designation.

2.6.1 Soil and Waste Sample Designation

All soil samples collected during the RI will include the collection method identifier, as follows:

- IS – incremental sample
- SB – soil boring sample
- MW – monitoring well sample

The samples will also receive additional designation to identify the medium sampled, the sample depth (if appropriate), and other information as described in the following sections.

2.6.1.1 Soil Samples from Incremental Sampling

Soil samples collected from incremental sample borings will include the method identifier followed by depth interval for the soil sample interval (in feet): for example, identification "IS-2.0-3.0" describes the soil sample collected from incremental sample with the sample depth interval of 2.0-3.0 ft bgs. The duplicate sample will have the same identification as the primary sample followed by the letter "D", and the triplicate sample will have the identification as the primary sample followed by the letter "T": for example, identification :IS-2.0-3.0-D"describes the duplicate incremental sample. All sample intervals and QC samples are listed in Table 6.

2.6.1.2 Soil Samples from Soil Borings

Soil samples collected from borings will include the site boring designation followed by the top and bottom depth for the soil sample interval (in feet): for example, identification "SB01-5.0-

10.0" describes the soil sample collected from Boring Location No. 1 with the sample depth interval of 5.0-10.0 ft bgs.

2.6.2 New Monitoring Well Sample Designation

New wells will include "MW" for monitoring well and then sequential number of the well installed. The number of the monitoring well will be sequential with the existing monitoring wells: i.e., MW-121 (monitoring well with ID number 121). The depth of the dual membrane sampler from which the sample was collected will follow the well ID. For example, sample identification MW-121-135 would be a water sample collected from monitoring well MW-121 from the dual membrane sampler deployed at the 135 ft interval.

2.6.3 Field and Laboratory Quality Control Sample Designation

Field and laboratory QC samples will use the designations discussed below.

Field Duplicate Samples

Field duplicate samples will be identified by adding a "D" to the end of the sample designations described above; for example: MW-121-D.

Aqueous Field, Trip, and Equipment Rinsate Blank Sample Designation

Aqueous field blank (FB), trip blank (TB), and equipment rinsate blank (ER) samples will be identified sequentially beginning with FB-1, TB-1, and ER-1, respectively.

Matrix Spike/Matrix Spike Duplicate

MS/MSD samples are being prepared by the analytical laboratory using additional sample volume provided by the field team; as such, they will not have specific sample identifiers, rather the samples will be labeled as described above and will be identified on the chain-of-custody record as having additional aliquots provided for the preparation of these QC samples by the laboratory.

2.7 SAMPLE CONTAINER, VOLUME, PRESERVATION, AND HOLDING TIME REQUIREMENTS

Table 8 specifies the required sample volume, container type, preservation technique, and holding time for each analysis that is to be conducted during each phase of sampling. Required containers, preservation techniques, and holding times for field QC samples, such as field duplicates, will be the same as for investigative samples, but may require additional volumes.

2.8 SAMPLE HANDLING AND CUSTODY

Each sample collected will be traceable from the point of collection through analysis and final disposition to ensure sample integrity. Sample integrity helps to ensure the legal defensibility of

the analytical data and subsequent conclusions. Sample handling will follow CLP protocols as required in EPA's *Contract Laboratory Program Guidance for Field Samplers* (EPA 2014). The EA field team will use EPA's data management system known as Scribe to generate chain-of-custody records in the field. Applicable copies of generated Scribe files will be delivered to EPA data management personnel as required by CLP and EPA Region 6 protocols.

2.9 ANALYTICAL METHODS REQUIREMENTS

The source of analytical services to be provided will be determined in part by DQOs and the intended use of the resulting data. EA will use EPA-approved methods for laboratory analyses of the samples.

EA will follow the analytical services request procedures that are outlined in EA's Analytical Services Delivery Plan (EA 2005). If an analytical system fails, the EA QA officer will be notified, and corrective action will be taken. In general, corrective actions will include stopping the analysis, examining instrument performance and sample preparation information, and determining the need to re-prepare and reanalyze the samples.

Laboratories that are subcontracted by EA or EPA will conduct definitive laboratory analysis of samples. Table 8 lists the laboratory analytical methods for this project. Appropriate methods of sample preparation, cleanup, and analyses are based on specific analytical parameters of interest, sample matrices, and required quantitation limits. In addition, Appendix E provides the detection and quantitation limits for both CLP and non-CLP analytical methods to demonstrate that the selection of the analytical methods satisfies the project DQOs.

2.9.1 Field Analytical Methods

Water quality parameters that include pH, temperature, specific conductivity, oxidation-reduction potential, dissolved oxygen content, and turbidity will be monitored using field-based methods during the collection of ground water samples. EA will follow manufacturer-recommended procedures for operating field equipment.

2.9.2 Fixed-Laboratory Analytical Methods

Fixed laboratory analyses of ground water samples will be conducted by EPA Region 6 Laboratory, or a designated CLP laboratory. In the case of ground water and soil, the samples will be shipped to an EPA Region 6 or CLP laboratory. Geotechnical samples will be shipped to a subcontracted laboratory for analysis. Table 8 outlines the anticipated laboratory analytical methods for samples collected by EA. In all cases, appropriate methods of sample preparation, cleanup, and analyses are based on specific analytical parameters of interest, sample matrices, and required detection limits.

2.10 QUALITY CONTROL REQUIREMENTS

Various field and laboratory QC samples and measurements will be used to verify that analytical data meet the QA objectives. Field QC samples and measurements will be collected to assess the

influence of sampling activities and measurements on data quality. Similarly, laboratory QC samples will be used to assess how the laboratory's analytical program influences data quality. This section describes the QC samples that are to be analyzed during the site sampling activities for: (1) each field and laboratory environmental measurement method and (2) each sample matrix type. Table 4 shows the acceptance criteria for each type of QC sample, and Table 9 presents the frequency of QC samples to be collected in support of the sampling activities at the site.

2.10.1 Field Quality Control Requirements

Field QC samples will be collected and analyzed to assess the quality of data generated by sampling activities. These samples will include laboratory QC samples collected in the field, field duplicates, equipment rinsates, and MS/MSD/MDs. In addition, temperature blanks are included with each cooler shipped to the laboratory. Field QC samples for fixed-laboratory analysis are presented in Table 9.

Field duplicates are independent samples that are collected as close as possible, in space and time, to the original investigative sample. Field duplicates are meant to measure the influence of sampling and field procedures on the precision of an environmental measurement. They can also provide information on the heterogeneity of a sampling location. Field duplicates will be collected at a minimum frequency of one for every 10 investigative samples, as listed in Table 9. Immediately following collection of the original sample, the field duplicates are collected using the same collection method.

Field blanks are collected to assess impact from ambient air conditions during sample collection. Field blank samples consist of sample containers being filled during sampling activities with laboratory-grade, organic-free water. Field blank samples are typically associated with ground water sample collection for volatile organic compound analysis at a frequency of one field blank per each day of ground water sampling activities or one per site. Field blanks may be collected for other media and analytes as dictated by site conditions during investigative sampling activities. If a contaminant is detected in the blank samples above the method detection limit, the result for associated field samples that contain the same contaminant will be qualified as potentially not detected if the concentration of the field sample is less than five times the concentration found in the blank.

Equipment rinsate blanks are collected when non-dedicated or non-disposable sampling equipment is used to collect samples. These blanks assess the cleanliness of the sampling equipment and the effectiveness of equipment decontamination. Equipment rinsate blanks are collected by pouring analyte-free water over the decontaminated surfaces of sampling equipment that contacts sampling media. Equipment rinsate blanks are collected after sampling equipment has been decontaminated, but before the equipment is reused for sampling. If non-dedicated or non-disposable equipment is used, equipment rinsate blanks will be collected in accordance with the frequency listed in Table 9.

MS/MSD samples are laboratory QC samples that will be collected for organic methods; MS/MD samples will be collected for inorganic methods. QC samples (e.g., MS/MSD,

MS/OS/MD) typically require double or triple the normal sample volume, depending on analytical laboratory specifications. In the laboratory, MS/MSD and MS/OS/MD samples are split and MS/MSD samples are spiked with known amounts of analytes. Analytical results for MS/MSD and MS/OS/MD samples are used to measure the precision and accuracy of the laboratory's organic and inorganic analytical methods, respectively. Each of these QC samples will be collected and analyzed at a frequency of one for every 20 (5 percent) investigative samples or one per analytical batch for CLP laboratories, subcontracted commercial laboratories, or in accordance with the requirements of the EPA Region 6 Laboratory.

Trip blanks are analyzed for volatile organic compounds only, and are not anticipated to be necessary for this Phase 1 investigation.

Temperature blanks are containers of deionized or distilled water that are placed in each cooler shipped to the laboratory. The temperature blank is used to monitor sample temperature preservation upon receipt at the laboratory. The temperature blank should measure <6°C upon receipt at the laboratory; this will ascertain that the temperature during shipping was also <6°C.

2.10.2 Laboratory Quality Control Requirements

Laboratories that perform analytical work under this project must adhere to a QA program that is used to monitor and control laboratory QC activities. Each laboratory must have a written QA manual that describes the QA program in detail. The laboratory QA Manager is responsible for ensuring that laboratory internal QC checks are conducted in accordance with EPA methods and protocols, the laboratory's QA manual, and the requirements of this SAP.

Many of the laboratory QC procedures and requirements are described in EPA-approved analytical methods, laboratory method SOPs, and method guidance documents.

The EPA methods specify the preparation and analysis of QC samples, and may include, but are not limited to, the following types: (1) LCSs; (2) method blanks; (3) MS, MSD, and MD samples; (4) surrogate spikes; and (5) standard reference materials or independent check standards. The following subsections discuss the QC checks that will be required for this project.

2.10.2.1 Laboratory Control Sample

LCSs are thoroughly characterized, laboratory-generated samples that are used to monitor the laboratory's day-to-day performance of analytical methods. The results of LCS analyses are compared to well-defined laboratory control limits to determine whether the laboratory system is in control for the particular method. If the system is not in control, corrective action will be implemented. Appropriate corrective actions will include: (1) stopping the analysis, (2) examining instrument performance or sample preparation and analysis information, and (3) determining whether samples should be re-prepared or reanalyzed.

2.10.2.2 Method Blanks

Method blanks, which are also known as preparation blanks, are analyzed to assess the level of background interference or contamination in the analytical system and the level that may lead to elevated concentration levels or false-positive data. Method blanks are required for all analytical methods and prepared and analyzed at a frequency of one method blank per every 20 samples or one method blank per sample batch, if the batches consist of fewer than 20 samples.

A method blank consists of reagents that are specific to the analytical method and are carried through every aspect of the analytical procedure, including sample preparation, cleanup, and analysis. The results of the method blank analysis will be evaluated in conjunction with other QC information to determine the acceptability of the data generated for that batch of samples. Ideally, the concentration of a target analyte in the method blank will be below the reporting limit for that analyte. For certain known common laboratory contaminants, a higher concentration is allowed in the method blank sample.

If the method blank results do not meet method criteria, the source of contamination must be investigated, and appropriate corrective action must be taken and documented. This investigation includes an evaluation of the data to determine the extent of the contamination and its effect on sampling results. If a method blank is within control limits but analysis indicates a concentration of analytes that is above the reporting limit, an investigation should be conducted to determine whether corrective action could eliminate an ongoing source of target analytes.

For organic and inorganic analyses, the concentration of target analytes in the method blank must be below the CRQL or RL for that analyte for the blank to be considered acceptable. An exception may be made for common laboratory contaminants (such as methylene chloride, acetone, toluene, 2-butanone, and phthalate esters) that may be present in the blank at up to five times the reporting limit. These compounds are frequently detected at low levels in method blanks and associated with sample extraction and analysis for organic parameters.

2.10.2.3 Matrix Spikes

MSs and MSDs are aliquots of an environmental sample for organic analysis to which known concentrations of target analytes have been added. They are not anticipated to be needed as part of this Phase 1 RI/FS.

2.10.2.4 Laboratory (Matrix) Duplicates

MDs, which are also called laboratory duplicates, are prepared and analyzed for inorganic analyses to assess method precision. Two aliquots of sample material are taken from one sample and processed simultaneously without adding spiking compounds. The MD and the original sample aliquot are taken through the entire analytical procedure, and the RPD of the duplicate result is calculated. Results are expressed as RPD and are compared to control limits that have been established for each analyte.

2.10.2.5 Surrogate Spikes

Surrogates are organic compounds that are similar in nature to certain of the target analytes of

interest in chemical properties but are not normally found in environmental samples. Surrogates are added to field and QC samples, before the samples are extracted, to assess the efficiency of the extraction procedure and to assess the bias that is introduced by the sample matrix. Results are reported in terms of percent recovery. Individual analytical methods may require sample reanalysis based on surrogate criteria.

The laboratory will use surrogate recoveries mainly to assess matrix effects on sample analysis. Obvious problems with sample preparation and analysis (such as evaporation to dryness or a leaking septum) that can lead to poor surrogate spike recoveries must be eliminated before low surrogate recoveries can be attributed to matrix effects.

2.10.3 Data Quality Indicators

This section describes how QA objectives for precision, accuracy, completeness, and sensitivity are measured, calculated, and reported.

2.10.3.1 Precision

Precision of many analyses is assessed by comparing analytical results of MS and MSD sample pairs for organic analyses, field duplicate samples, laboratory duplicate samples (MDs), and field replicate measurements. If precision is calculated from two measurements, it is normally measured as RPD. If precision is calculated from three or more replicates, relative standard deviation is calculated.

2.10.3.2 Accuracy

The accuracy of many analytical methods is assessed by using the results of MS and MSD samples for organic analyses, MS samples for inorganic analyses, surrogate spike samples, LCSs, standard reference materials, independent check standards, and measurements of instrument responses against zero and span gases.

For measurements in which spikes are used, percent recovery will be calculated.

2.10.3.3 Completeness

Completeness is a measure of the percentage of project-specific data that are valid. Valid data are obtained when samples are collected and analyzed in accordance with QC procedures outlined in this SAP, and when QC criteria are met and do not affect data usability.

When data validation is completed, the percent completeness value will be calculated by dividing the number of useable results by the total number of sample results planned for this investigation. The objective for data completeness is 90 percent for the RI.

Completeness will also be evaluated as part of the DQA process (EPA 2006c, 2006d). This evaluation will help determine whether limitations are associated with the decisions to be made based on the data collected.

2.10.3.4 Sensitivity

The achievement of MDLs, CRQLs, and RLs depends on instrument sensitivity and matrix effects. Therefore, it is important to monitor the instrument sensitivity to ensure data quality and to ensure that analyses meet the QA objectives established for sensitivity.

2.10.4 Instrument and Equipment Testing, Inspection, and Maintenance Requirements

This section outlines testing, inspection, and maintenance procedures for field equipment and instruments and for laboratory instruments.

2.10.4.1 General Requirements

Testing, inspection, and maintenance methods and frequency will be based on: (1) the type of instrument; (2) the instrument's stability characteristics; (3) the required accuracy, sensitivity, and precision of the instrument; (4) the instrument's intended use, considering project-specific DQOs; (5) manufacturer's recommendations; and (6) other conditions that affect measurement or operational control. For most instruments, preventive maintenance is performed in accordance with procedures and schedules recommended in: (1) the instrument manufacturer's literature or operating manual or (2) SOPs associated with particular applications of the instrument.

In some cases, testing, inspection, and maintenance procedures and schedules will differ from the manufacturer's specifications or SOPs. This can occur when a field instrument is used to make critical measurements or when the analytical methods that are associated with a laboratory instrument require more frequent testing, inspection, and maintenance.

2.10.4.2 Field Equipment and Instruments

Leased field equipment and instruments will be used to conduct onsite media sampling and preparation. The vendor will be responsible for thoroughly checking and calibrating field equipment and instruments before they are shipped or transported to the field. Copies of testing, inspection, and maintenance procedures will be shipped to the field with the equipment and instruments.

After the field equipment and instruments arrive in the field, they will be inspected for damage. Damaged equipment and instruments will be replaced or repaired immediately. Battery-operated equipment will be checked to ensure full operating capacity; if needed, batteries will be recharged or replaced.

Following use, field equipment will be decontaminated properly before being returned to the source. When the equipment is returned, copies of field notes regarding equipment problems will be included so that problems are not overlooked and necessary equipment repairs are performed.

Table 10 lists the proposed field equipment and the prescribed calibration, maintenance, testing, and inspection protocols.

2.10.4.3 Laboratory Instruments

Laboratories that analyze samples collected under the EPA Region 6 RAC II program must have a preventive maintenance program that addresses: (1) testing, inspection, and maintenance procedures and (2) the maintenance schedule for each measurement system and required support activity. This program is usually documented by a SOP for each analytical instrument that is to be used. Typically, the program will be laboratory-specific; however, it should follow requirements outlined in EPA-approved guidelines. Some of the basic requirements and components of such a program are as follows:

- As a part of its QA/QC program, each laboratory will conduct a routine preventive maintenance program to minimize instrument failure and other system malfunction.

- An internal group of qualified personnel will maintain and repair instruments, equipment, tools, and gauges. Alternatively, manufacturers' representatives may provide scheduled instrument maintenance and emergency repair under a repair and maintenance contract.

- The laboratory will perform instrument maintenance on a regularly scheduled basis. The scheduled service of critical items should minimize the downtime of the measurement system. The laboratory will prepare a list of critical spare parts for each instrument. The laboratory will request the spare parts from the manufacturer and will store the parts.

- Testing, inspection, and maintenance procedures described in laboratory SOPs will be performed in accordance with manufacturer's specifications and the requirements of the specific analytical methods that are used.

- Maintenance and service must be documented in service logbooks (or the site-specific logbook) to provide a history of maintenance records. A separate service logbook should be kept for each instrument; however, due to the limited scope of this project, the service records will be maintained in the site-specific field logbook. Maintenance records will be traceable to the specific instrument, equipment, tool, or gauge.

- The laboratory will maintain and file records that are produced as a result of tests, inspections, or maintenance of laboratory instruments. These records will be available for review by internal and external laboratory system audits that are conducted under the EPA Region 6 RAC II program.

2.11 INSTRUMENT CALIBRATION AND FREQUENCY

This section describes the procedures for maintaining the accuracy of field equipment and laboratory instruments that are used for field tests and laboratory analyses. The equipment and instruments should be calibrated before each use or, when not in use, on a scheduled basis.

2.11.1 Field Equipment

EA will perform calibration of field equipment during the site field activities specified herein. Calibration of the field equipment (e.g., multi-parameter water quality meter) will be conducted on a daily basis following manufacturer recommendations, and will be performed prior to sample analysis activities. Should readings appear to be questionable during sample analysis, EA will recalibrate the equipment as deemed necessary. The equipment calibration procedures described below will be followed.

Equipment will be maintained and calibrated with sufficient frequency and in such a manner that the accuracy and reproducibility of results are consistent with the manufacturer's specifications and with project-specific DQOs. Upon arrival of the field equipment, EA field personnel will examine it to verify that it is in good working condition. The manufacturer's operating manual and instructions that accompany the equipment will be consulted to ensure that calibration procedures are followed. Measuring and testing equipment may be calibrated either internally—by using in-house reference standards—or externally—by agencies, manufacturers, or commercial laboratories. Calibration records will contain a reference identifying the source of the procedure and, where feasible, the actual procedure. Each piece of measuring and testing equipment will also be accompanied by an equipment use log. The equipment use log (which may be contained within the site-specific field logbook) will be kept current and may contain the following information: (1) date of use; (2) times of use; (3) operating and assisting technicians; (4) calibration status; and (5) comments.

2.11.2 Laboratory Instruments

Laboratory instrumentation that is used to analyze samples collected under the EPA Region 6 RAC II program will be calibrated on the basis of written SOPs that are maintained by the laboratory. Calibration records (including the dates and times of calibration and the names of the personnel performing the calibration) will be filed at the location at which the analytical work was performed and maintained by the laboratory personnel who performed QC activities. Subcontractor laboratories may conduct laboratory work under the EPA Region 6 RAC II program. The laboratory QA Manager is responsible for ensuring that laboratory instruments are calibrated in accordance with the requirements of this SAP.

The laboratories will follow the method-specific calibration procedures and requirements for laboratory measurements. Calibration procedures and requirements will also be provided, as appropriate, for laboratory support equipment, such as balances, mercury thermometers, pH meters, and other equipment that is used to take chemical and physical measurements.

2.12 REQUIREMENTS FOR INSPECTION AND ACCEPTANCE OF SUPPLIES AND CONSUMABLES

The EA Project Manager is responsible for identifying the types and quantities of supplies and consumables that are needed for field activities and collecting the samples for this Task Order. The EA Project Manager is also responsible for determining acceptance criteria for these items. When supplies are received, the EA field personnel will check packing slips against purchase orders and inspect the condition of supplies before the supplies are accepted for use on a project. If the supplies do not meet the acceptance criteria, deficiencies will be noted on the packing slip and purchase order. Afterward, the item will be returned to the vendor for replacement or repair.

2.13 DATA ACQUISITION REQUIREMENTS (NON-DIRECT MEASUREMENTS)

For this project, EA anticipates acquiring data from non-direct measurements such as databases, spreadsheets, and literature files.

2.14 DATA MANAGEMENT

A comprehensive data management program has been designed to assure that: (1) multiple information sources will result in similar data sets and (2) data management practices will be adequate for the types of data processing required by a Task Order. Site team members will follow these protocols to assure results will have uniform units of measure, analytical methods, and reporting forms. The Data Management Plan is provided in Appendix F.

3. ASSESSMENT AND OVERSIGHT

This section describes the field and laboratory assessments that may be conducted during this project, the individuals responsible for conducting assessments, corrective actions that may be implemented in response to assessment results, and how quality-related issues will be reported to EA and EPA.

3.1 ASSESSMENT AND RESPONSE ACTIONS

Under the EPA Region 6 RAC II program, performance and system audits of field and laboratory activities may be conducted to verify that sampling and analysis are performed in accordance with the following:

- Performance and system audits
  - Audit personnel
  - Audit scope of work
  - Audit frequencies
  - Audit reports.
- Corrective action
  - Sample collection and field measurements
  - Laboratory analyses.

Nonconforming items and activities are those that do not meet the project requirements, procurement document criteria, and approved work procedures. Nonconformance may be detected and identified by the following personnel:

- Project personnel—During field operations, supervision of subcontractors, and field inspections
- Testing personnel—During preparation for and performance of tests, equipment calibration, and QC activities
- QA personnel—During the performance of audits, surveillance, and other QA activities.

Each nonconformance that affects quality will be documented by the person who identifies or originates the nonconformance. Documentation of nonconformance will include the following components:

- Description of nonconformance
- Identification of personnel who are responsible for correcting the nonconformance and, if verification is required, for verifying satisfactory resolution
- Method(s) for correcting the nonconformance (corrective action) or description of the variance granted
- Proposed schedule for completing corrective action and the corrective action taken.

Nonconformance documentation will be made available to the EA Project Manager, EA QA Officer, and subcontractor (e.g., subcontracted commercial laboratories) management personnel, as appropriate.

The field personnel and QA personnel, as appropriate, are responsible for notifying the EA Project Manager and the EA QA Officer of the nonconformance. In addition, the EA Project Manager and the project staff, as appropriate, will be notified of significant nonconformance that could affect the results of the work. The EA Project Manager is responsible for determining whether notification to EPA is required.

The completion of corrective actions for significant nonconformance will be documented by QA personnel during future auditing activities. Significant recurring nonconformance will be evaluated by project and QA personnel, as appropriate, to determine its cause. Appropriate changes will be instituted, under corporate or project procedures, to prevent recurrence. When such an evaluation is performed, the results will be documented.

3.2 REPORTS TO MANAGEMENT

Effective management of environmental data collection operations requires timely assessment and review of measurement activities. It is essential that open communication, interaction, and feedback be maintained among project participants, including: (1) the EA QA Officer, EA Program Manager, EA Project Manager, technical staff, and laboratory subcontractors and (2) the EPA Region 6 TOM and EPA QA Officer.

During the RI field program, EA will prepare weekly reports that summarize the following elements:

- Work progress since the last weekly report
- Site observations, problems, and decisions
- Problems that may impede planned progress
- Safety-related observations, incidents, or potential safety problems and the corrective action(s) taken to mitigate the problem(s)
- Corrective measures and procedures to regain the planned schedule, if required
- QA/QC activities (e.g., number of QC samples)
- Work scheduled for the next work period.

EA prepares monthly progress reports for each Task Order that is conducted under the EPA Region 6 RAC II program. These reports address QA issues that are specific to the Task Order and facilitate timely communication of such issues. QA status reports address the following areas:

- Results of QA audits and other inspections, including quality improvement; opportunities that have been identified for further action
- Instrument, equipment, or procedural problems that affect QA
- Subcontractor performance issues
- Corrective actions
- Status of previously reported activities and quality improvement initiatives
- Work planned for the next reporting period.

At the program level, the EA QA Officer prepares quarterly status reports of QA issues that are related to EA's work on the EPA Region 6 RAC II program. These reports are distributed to EA's President, Corporate QA Officer, Program Manager, and, upon request, the EPA Region 6 Project Officer.

4. DATA VALIDATION AND USABILITY

This section describes the procedures that are planned to review, verify, and validate field and laboratory data. Procedures for verifying that the data are sufficient to meet DQOs and measurement quality objectives for the project are also discussed. Section 4.1 focuses on data review and reduction requirements for work conducted under the EPA Region 6 RAC II program. Section 4.2 addresses data validation and verification requirements. Section 4.3 addresses reconciliation with DQOs.

4.1 DATA REVIEW AND REDUCTION REQUIREMENTS

Data reduction and review are essential functions for preparing data that can be used effectively to support project decisions and achieve DQOs. These functions must be performed accurately and in accordance with EPA-approved procedures and protocol. Data reduction includes computations and data manipulations that produce the final results that are to support the investigation. Data review includes procedures that field or laboratory personnel conduct to ensure that measurement results are correct and acceptable in accordance with the QA objectives stated in this SAP. Field and laboratory measurement data reduction and review procedures and requirements are specified in previously discussed field and laboratory methods, SOPs, and guidance documents.

Field personnel will record, in a field logbook and/or on the appropriate field form (Appendix D), raw data from chemical and physical field measurements (EA SOP 016, Appendix C). The EA field staff has the primary responsibility for: (1) verifying that field measurements were made correctly, (2) confirming that sample collection and handling procedures specified in this project-specific SAP were followed, and (3) ensuring that field data reduction and review procedures and requirements are followed. The EA field staff is also responsible for assessing preliminary data quality and for advising the data user of potential QA/QC problems with field data. If field data are used in a project report, data reduction methods will be fully documented in the report.

The EPA Region 6 Laboratory, CLP laboratory, and/or subcontracted commercial laboratory will complete data reduction for chemical and physical laboratory measurements and will complete an in-house review of laboratory analytical results. The laboratory QA Manager will be responsible for ensuring that laboratory data reduction and review procedures follow the requirements that are stated in this SAP and in the laboratory QA manual. The laboratory QA Manager will also be responsible for assessing data quality and for advising the EA QA Officer of possible QA/QC problems with laboratory data.

4.2 VALIDATION AND VERIFICATION METHODS

Data that are used to support activities under the EPA Region 6 RAC II program must be valid for their intended purposes. This section outlines the basic data validation procedures that will be followed for field and laboratory measurements. The following sections identify personnel who are responsible for data validation and the general data validation process and EPA data validation guidance that will be followed.

4.2.1 Data Validation Responsibilities

When analytical services are provided by laboratories subcontracted by EA, EA is responsible for validation of the analytical data. The EA QA Officer has primary responsibility for coordinating EA's data validation activities. EA will conduct a Level III validation on 100 percent of subcontracted laboratory data for investigation samples. Data validation conducted by EA will be detailed in the DESR.

Data validation and review will be completed by one or more experienced data reviewers. When data are generated by the EPA Region 6 Laboratory, it will be used as received from the laboratory, with no further validation. Data from CLP laboratories are validated by EPA's Environmental Services Assistance Team. Data validated by EPA will be summarized in a data validation report.

4.2.2 Data Validation Procedures

The validity of a data set is determined by comparing the data with a predetermined set of QC limits and criteria. EA data reviewers will conduct a systematic review of the data for compliance with established QC limits and data quality indicators (such as sensitivity, precision, and accuracy), on the basis of spike, duplicate, and blank sampling results that are provided by the laboratory. The data review will identify out-of-control data points, discrepancies in results, inaccuracies or omissions. EA data reviewers will evaluate laboratory data for compliance using the following criteria:

- Method and project-specific analytical service requests
- Sample extraction and analysis holding times
- Initial and continuing calibration acceptance criteria
- Field, trip, and method blank acceptance criteria
- Surrogate recovery
- Internal standard recovery
- Field duplicates, MS and MSD acceptance criteria
- MD and laboratory duplicate sample precision

- LCS accuracy
- Other laboratory QC criteria specified by the method or on the project-specific analytical service request form
- Compound identification and quantitation
- Overall assessment of data and completeness in accordance with project-specific objectives.

EA will follow the most current or applicable EPA CLP National Functional Guidelines (EPA 2017c) and EPA CLP SOWs (EPA 2016b) for completing data validation for applicable test methods. Procedures in the CLP guidelines will be modified, as necessary, to fit the specific analytical method that is used to produce the data. In cases, data validation requirements will depend on: (1) DQO levels that are defined in Section 1.3, (2) reporting requirements that are defined in Section 1.4, and (3) data deliverables that are requested from the laboratory, as discussed in Section 1.6.

4.3 RECONCILIATION WITH DATA QUALITY OBJECTIVES

The main purpose of a QA system is to define a process for collecting data that are of known quality, are scientifically valid, are legally defensible, and fully support decisions that will be based on the data. To achieve this purpose, the SAP requires that DQOs be fully defined. Other parts of the QA system must then be planned and implemented in a manner that is consistent with the DQOs. QA system components that follow directly from the DQOs include: (1) documentation and reporting requirements, (2) sample process design and sampling methods requirements, (3) analytical methods and analytical service requests, (4) QC requirements, and (5) data reduction and validation and reporting methods.

After environmental data have been collected, reviewed, and validated, the data will undergo a final evaluation to determine whether the DQOs specified in this SAP have been met. EA will follow EPA's DQA process to verify that the type, quality, and quantity of data that are collected are appropriate for their intended use (EPA 2006c, 2006d).

The DQA process involves: (1) verifying that the data have met the assumptions under which the data collection design and DQOs were developed, (2) taking appropriate corrective action if the assumptions have not been met, and (3) evaluating the extent to which the data support the decision that must be made so that scientifically valid and meaningful conclusions can be drawn from the data. To the extent possible, EA will follow DQA methods and procedures that have been outlined by EPA (EPA 2006c, 2006d).

Following the conclusion of the RI field program and receipt of fixed-laboratory data, the data evaluation will include:

- Data usability evaluation and field QA/QC – The usability of the laboratory analytical data in terms of the CLP data validation summaries and field QA/QC will be evaluated.

- Data Reduction and Tabulation – Field sampling data and analytical results will be reduced and tabulated.

- Data Evaluation Summary Report – A DESR will be submitted that documents and summarizes the analytical data collected during this RI, including the data quality and usability as related to the site-specific DQOs. Field QA/QC results will be summarized in context with fixed-laboratory sample results.

The analytical and field data will be compiled into a format that is compatible with EPA Region 6 or National Electronic Data Management Network. EA will use the data to prepare the RI Report, including the SLERA and HHRA Reports. The data will ultimately also be used to support the FS and ROD for the site.

5. REFERENCES

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Tables

TABLE 1. ELEMENTS OF EPA QA/R-5 IN RELATION TO THIS SAP

EPA QA/R-5 QAPP Element	EA SAP
A1 Title and Approval Sheet	Title and Approval Sheet
A2 Table of Contents	Table of Contents
A3 Distribution List	Distribution List
A4 Project/Task Organization	1.0 Project Description and Management
A5 Problem Definition/Background	1.1 Problem Definition and Background
A6 Project/Task Description	1.2 Description of Project Objectives and Tasks
A7 Quality Objectives and Criteria	1.3 Data Quality Objectives 1.4 Quality Assurance Objectives for Measurement Data
A8 Special Training/Certification	1.5 Special Training and Certification
A9 Documents and Records	1.6 Documents and Records
B1 Sampling Process Design	2.1 Sampling Process Design
B2 Sampling Methods	2.2 Sampling Methodology 2.3 Sample Processing 2.6 Sample Designation
B3 Sample Handling and Custody	2.7 Sample Container, Volume, Preservation, and Holding Time Requirements 2.8 Sample Handling and Custody
B4 Analytical Methods	2.9 Analytical Methods Requirements
B5 Quality Control	2.10 Quality Control Requirements
B6 Instrument/Equipment Testing, Inspection, and Maintenance	2.10.4 Instrument and Equipment Testing, Inspection, and Maintenance Requirements
B7 Instrument/Equipment Calibration and Frequency	2.11 Instrument Calibration and Frequency
B8 Inspection/Acceptance of Supplies and Consumables	2.12 Requirements for Inspection and Acceptance of Supplies and Consumables
B9 Non-direct Measurements	2.13 Data Acquisition Requirements (Non-direct Measurements)
B10 Data Management	2.14 Data Management
C1 Assessment and Response Actions	3.1 Assessment and Response Actions
C2 Reports to Management	3.2 Reports to Management
D1 Data Review, Verification, and Validation	4.1 Data Review and Reduction Requirements
D2 Validation and Verification Methods	4.2 Validation and Verification Methods
D3 Reconciliation with User Requirements	4.3 Reconciliation with Data Quality Objectives

NOTES:
EA = EA Engineering, Science, and Technology, Inc., PBC
EPA = U.S. Environmental Protection Agency
QA = Quality Assurance
QAPP = Quality Assurance Project Plan
SAP = Sampling and Analysis Plan

TABLE 2. DATA QUALITY OBJECTIVES

STEP 1: State the Problem

The Odessa Chromium #1 Superfund Site is located in a mixed commercial, residential, and industrial area with many private and industrial water supply wells. Historical chrome-plating activities conducted between 1965 and 1979 resulted in releases of chromium-contaminated waste to surface soil, subsurface soil, and ground water. The primary source of contamination has been identified as chrome-plating operations at 4318 Brazos Avenue. Chrome-plating operations were conducted under several business names at this location. The 1988 Record of Decision for the site stipulated that if migration of contamination occurs during a 30-year monitoring period, remedial actions would need to be evaluated. The 2016 Optimization Review Report by the EPA recommended identifying a possible alternative water source and resolving data gaps in soil, vadose zone, and ground water.

STEP 2: Identify the Goals of the Study

- Characterize the source area by gathering sufficient information to evaluate if there is still a risk to human health or the environment remaining at the site.
- Determine the nature and extent of contamination in the source area.
- Evaluate the contaminant migration pathways at the source area.
- Characterize aquifer parameters and evaluate remedial technologies and alternatives in support of the FS.

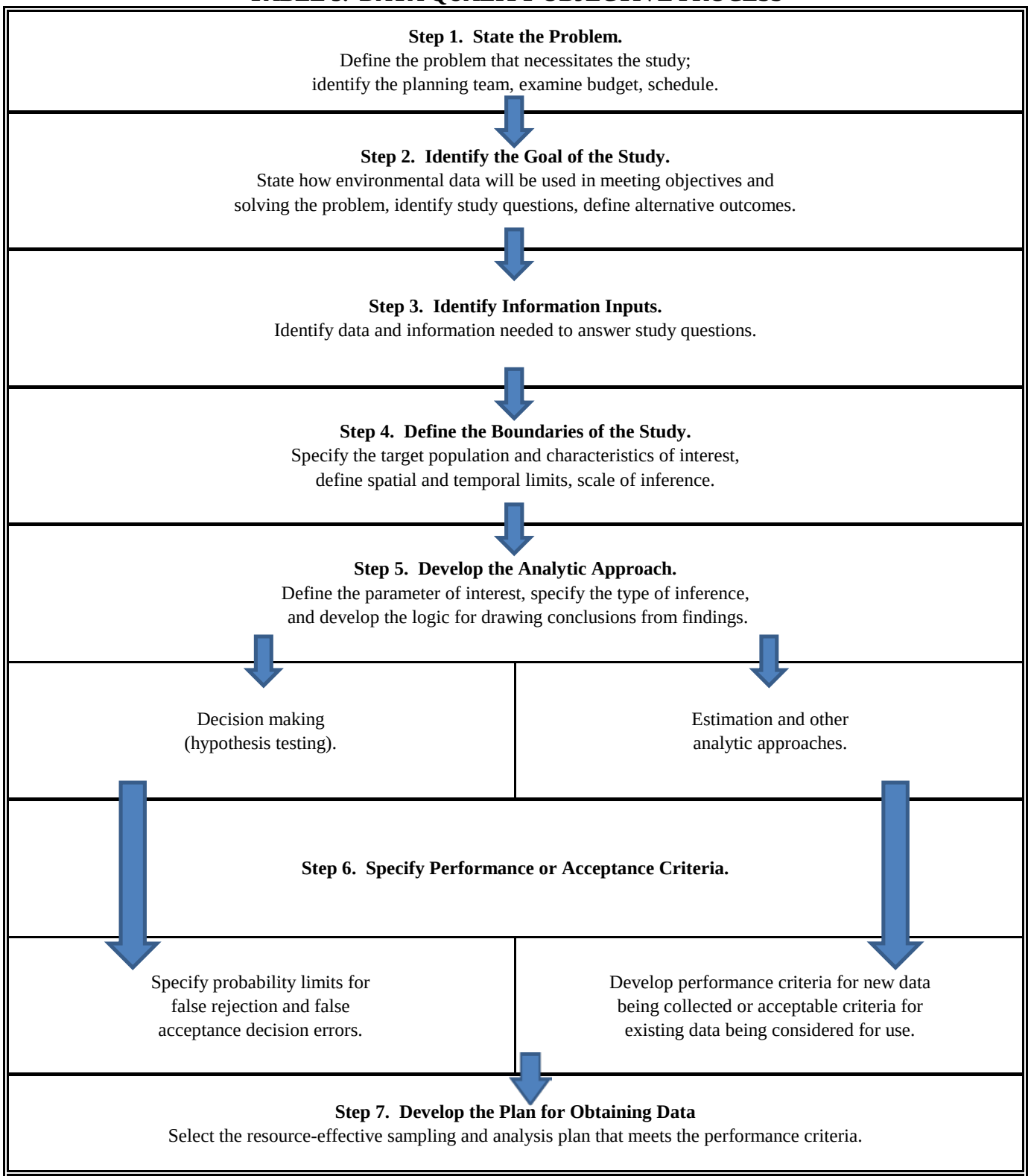
STEP 3: Identify Information Inputs

- During each of the anticipated five mobilization events, environmental, geologic, and hydrogeologic information (e.g., soil borings, soil samples, ground water samples, ground water elevations, etc.) will be collected; multimedia samples will be analyzed by laboratories to determine the nature and extent of contamination present in the source area.
- Incremental soil sampling will be conducted in the source area to determine the impact to soils at the former septic drain field.
- Soil borings will be installed at the site to determine the impact to the vadose zone, including the caliche layer, and soils above and below the caliche layer to ground water.
- Installation of two monitoring wells to determine the impact to ground water in the source area; specifically, near an AST at the site and near the former septic drain field.
- Geotechnical parameters will be collected to be used in support of future contaminant fate and transport modeling.
- Analytical results for soil and ground water samples collected will be compared to the action levels provided in Appendix E.

STEP 4: Define the Boundaries of the Study
• The lateral spatial boundaries for the source area (including the former septic drain field) are presented in Figures 3 and 4 and are based on historical data and the site visit. The lateral spatial boundaries defined for the source area are 1,000 square feet inclusive of the area of the former septic drain field. • The vertical spatial boundaries for the study are to approximately 145 feet bgs. • Depth to ground water beneath the site is dependent on the aquifer targeted. The depth to water in the Ogallala aquifer is approximately 70 feet bgs, while the Trinity formation is approximately 90 feet bgs.
STEP 5: Develop the Analytic Approach
• If ground water is contaminated and confirmed to exceed screening levels, potential remedial alternatives may be evaluated. • If contamination in soil at the source area is confirmed to exceed screening levels and continue release to ground water, potential remedial alternatives may be evaluated.
STEP 6: Specify Performance or Acceptance Criteria
• Sample collection procedures, sample processing, and field sample analysis protocols are standardized and documented in SOPs to ensure that the methodology remains consistent and limits the potential for measurement error. • Field teams will be trained to perform specific tasks (e.g., sample collection or processing) throughout the field sampling effort to limit the potential for measurement error. • Potential for measurement error in the sample analysis will be limited by the analysis of QC samples (e.g., duplicates) and the implementation of strict analytical laboratory SOPs. • Data management procedures and sample tracking software (i.e., Scribe) will limit the potential for data reduction, transmission, and storage errors.

STEP 7: Develop the Plan for Obtaining Data
• Soil samples will be collected via incremental sampling in the former septic drain field from four depth intervals to determine the vertical distribution of contaminants above the caliche layer. During soil boring activities, the soils will be visually inspected for staining/discoloration. • Three soil borings will be installed to evaluate the impact to deeper vadose zone soil, including the caliche layer. • Up to 15 soil samples will be collected during installation of the three soil borings and analyzed for total and hexavalent chromium to determine the vertical distribution of contaminants in the deeper vadose zone below the source area. • Geotechnical/permeability soil samples will be collected to support environmental fate and transport modeling. • Two new monitoring wells will be installed to assess the impact to ground water below the source area. The current Metals Remediation Compound wells do not extend into the Trinity aquifer below the site. The new monitoring wells will to be installed to a total depth of 145 feet bgs, which will extend into the Trinity aquifer. • Ground water samples will be collected via dual membrane passive samplers to determine the impact of total and hexavalent chromium in ground water.
NOTES: AST = Above ground storage tank bgs = Below ground surface EPA = U.S. Environmental Protection Agency FS = Feasibility Study QC = Quality control SOP = Standard operating procedure

TABLE 3. DATA QUALITY OBJECTIVE PROCESS



Source: U.S. Environmental Protection Agency. 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process*. (QA/G-4). EPA/240/B-06/001. Office of Environmental Information. Washington, D.C. February.

TABLE 4. QUALITY ASSURANCE INDICATOR CRITERIA

Indicator Parameter	Analytical Parameter	QC Sample[a]	Acceptance Criteria for Laboratory Analysis
Accuracy (percent recovery)	Total Chromium and Hexavalent Chromium	MS MD Blanks[b]	50 to 150 percent recovery (MS/MD) Less than CRQL (blanks)
Precision (RPD)	Total Chromium and Hexavalent Chromium	MS MD Field duplicates	30 percent RPD (MS/MD) 50 percent RPD (field duplicates - soil boring samples) 30 percent RPD (field duplicate and triplicate - incremental soil samples)
Sensitivity (quantitation limits)	Analytical tests	MS MD Field duplicates Laboratory duplicates	Not applicable
Completeness	The objective for data completeness is 90 percent.		
Representativeness	The sampling network and analytical methods for this site are designed to provide data that are representative of site conditions.		
Comparability	The use of standard published sampling and analytical methods, and the use of QC samples, will ensure data of known quality. These data can be compared to other data of known quality.		

NOTES:

[a] Not all listed QC samples apply to all analytical parameters. QC samples are analytical method specific.

[b] May include method blanks, reagent blanks, instrument blanks, calibration blanks, trip blanks, and field blanks.

CRQL = Contract-Required Quantitation Limit
MD = Matrix duplicate
MS = Matrix spike
QC = Quality control
RPD = Relative percent difference

TABLE 5. STANDARD OPERATING PROCEDURES

SOP Number	SOP Title
001	Sample Labels
002	Chain-of-Custody Form
003	Subsurface/Utility Clearance
004	Sample Packing and Shipping
005	Field Decontamination
008	pH Measurement
009	Temperature Measurement
010	Water Level and Well Depth Measurements
012	Specific Conductance Measurements
013	Collection of Monitoring Well Samples
014	Collection of Production Well Samples
016	Surface Water, Groundwater, and Soil/Sediment Logbooks
019	Monitoring Well Installation
025	Soil Sampling
028	Well and Boring Abandonment
036	Turbidity Measurements (DRT 100)
037	Dissolved Oxygen Measurements (YSI Model 57)
038	Redox Potential Measurements
039	Sample Preservation and Container Requirements
042	Disposal of Investigation-Derived Material
043	Multi-Probe Water Quality Monitoring Instruments
046	Aqueous Diffusion Samplers
047	Direct-Push Technology Sampling
053	Concrete Coring
057	Multi-Incremental Sampling
059	Field Logbook
063	Chemical Data Management

NOTES:
Redox = Reduction-oxidation
SOP = Standard operating procedure

TABLE 6. PROPOSED FIELD PROGRAM FOR SOIL INVESTIGATION

Sample Type	Sample Location	Sample Medium	Rationale	Number of Boring Locations	Sample Identification	Sampling Tool	Total Depth (ft bgs)	Sampling Depth (ft bgs)	Analysis					
									Visual Inspection	Total Arsenic	Iron	Manganese	Geotechnical Analysis	Total and Hexavalent Chromium
Incremental Sampling														
Incremental sampling (soil)	30-cell grid encompassing the former septic drain field area	Soil	Determine vertical impact to soils above the caliche layer in the former septic drain field area	30	IS-2.0-3.0	PVC/acetate sleeve	Top of caliche (estimated 10-15 ft bgs)	2.0-3.0	Yes	---	---	---	---	1
					IS-5.0-6.0			5.0-6.0	Yes	---	---	---	---	1
					IS-9.0-10.0			9.0-10.0	Yes	---	---	---	---	1
					IS-TD			Total depth (refusal)	Yes	---	---	---	---	1
Incremental Sampling QC														
Field duplicate	1 field duplicate				Same as original with "-D" added to Sample ID	PVC/acetate sleeve	3.0	2.0-3.0	---	---	---	---	---	1
Field triplicate	1 field triplicate				Same as original with "-T" added to Sample ID		3.0	2.0-3.0	---	---	---	---	---	1
MS/MD	Extra volume only; not included in total sample count				Same as original Sample ID		Same as original	Same as original	---	---	---	---	---	Not included in the sample count
Soil Boring/Rock Coring														
Soil boring/rock coring	To be determined	Soil/caliche rock core	To delineate vertical soil contamination including the influence of the caliche layer in the vadose zone	3	"Soil Boring ID" - "Sample Depth Interval" (SBXX - "Depth Interval")	Rotosonic drilling	30 ft bgs	The caliche layer, which is estimated to begin at 10-15 ft bgs and be 20-ft thick	Yes	3	3	3	1	15 (not including geotechnical sample)
Soil Boring/Rock Coring QC Samples														
Field duplicate	1 field duplicate and 1 triplicate				Same as original with "-D" added to Sample ID	Same as original	Same as original	Same as original	---	1	1	1	---	2
MS/MD	1 per 20 samples (extra volume only; not included in total sample count)				Same as original Sample ID	Same as original	Same as original	Same as original	---	1	1	1	---	2
Water QC Samples														
Equipment rinsate blank	1 per day per set of nondedicated equipment per team				EB-XX	Grab	---	---	---	---	---	---	---	TBD
Soil Investigation Investigation-derived Waste (Soil)														
Investigation-derived waste - soil	Drum or roll-off	Soil	Soil waste profile	TBD	S1-IDW-XX	Composite - grab	---	---	---	---	---	---	---	TBD
Soil Investigation Investigation-derived Waste (Water)														
Investigation-derived wastewater	Drum or tank	Water	Water waste profile	TBD	S2-IDW-XX	Composite - grab	---	---	---	---	---	---	---	TBD

NOTES:
bgs = Below ground surface
EB = Equipment blank
ft = Foot (feet)
ID = Identification
IS = Incremental sample
MD = Matrix duplicate
MS = Matrix spike
PVC = Polyvinyl chloride
QC = Quality control
SB = Soil boring
TBD = To be determined
TD = Total depth

TABLE 7. PROPOSED FIELD PROGRAM FOR GROUND WATER INVESTIGATION

Sample Type	Sample Location	Rationale	Number of Monitoring Wells	Well Diameter (inches)	Total Depth (ft)	Sample Medium	Sample Depth	Sample Identification	Sampling Tool	Analysis		
										Field Screening	Soil Analysis	Ground Water Analysis Total and Hexavalent Chromium
Monitoring well (ground water)	Near the aboveground storage tank	Source area monitoring well	1	4	15- to 20-ft screen across the water table (estimated total depth of 145 ft bgs)	Water	Up to 5 intervals per well within well screen	"Monitoring well ID" -"Dual membrane sample interval" (MWXX-"sample interval")	Dual membrane sampler	None	---	5
	Near the former septic field	Source area monitoring well	1	4						None	---	5
Total Water Samples										---	0	10
QC Samples												
Field duplicate	1 per 10 samples					Water	Same as original	Same as original with "-D" added to the Sample ID	Same as original	Yes	---	1
MS/MD	1 per 20 samples (extra volume only; not included in total sample count)					Water	Same as original			Yes	---	1
Equipment rinsate blank	1 per day per set of for non-dedicated equipment per team					Water	---	EB-XX				TBD
IDW Water Samples												
Investigation-derived wastewater	Drum or tank	Wastewater profile	---	---	---	Water	---	S2-IDW-XX	Composite - Grab	---	---	TBD
IDW Soil Samples												
Investigation-derived waste soil	Drum or roll-off	Soil waste profile	---	---	---	Soil	---	S1-IDW-XX	Composite - Grab	---	TBD	---

NOTES:
--- = Not applicable
bgs = Below ground surface
EB = Equipment blank
ft = Foot (feet)
ID = Identification
IDW = Investigation-derived waste
MD = Matrix duplicate
MS = Matrix spike
MW = Monitoring well
QC = Quality control
TBD = To be determined

TABLE 8. PARAMETERS, METHODS, REQUIRED VOLUME, CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Parameter	Method	Volume and Container [1]	Preservative	Holding Time [2]
Water Samples				
Total Chromium	SW6020A	One 1-liter HDPE bottle	HNO_3 to pH<2 Store at 4 ± 2 ℃	180 days
Hexavalent Chromium	SW7196A or SW7199	One 250-milliliter HDPE bottle	Store at 4 ± 2 °C	24 hours
Soil Samples				
Total Chromium	Incremental sample preparation and SW6010C analysis	1- or 2-gallon plastic resealable bag	Store at 4 ± 2°C	180 days
Hexavalent Chromium	Incremental sample preparation and SW3060A/SW7199 analysis		Store at 4 ± 2°C	30 days
Grain Size	ASTM Method D422	1-gallon plastic resealable bag	None	Unspecified
Fraction of Organic Carbon	Walkley-Black	One 8-ounce amber glass jar with Teflon™-lined cap	Store at 4 ± 2°C	28 days
Soil Bulk Density, Moisture Content, Total and Effective Porosity, Saturated Hydraulic Conductivity	ASTM D7263, D2216/7263, D6836, D2434M	Core barrel	None	30 days
Investigation-Derived Waste (Water and Soil)				
TCLP Metals	SW1311/6010C/7470A	One 8-ounce amber glass jar with Teflon™-lined cap	Store at 4 ± 2°C	180 days; 28 days for mercury
		One 1-liter HDPE bottle	HNO_3 to pH<2 Store at 4 ± 2 °C	180 days; 28 days for mercury
Reactivity	SW-846 Chapter 7	One 4-ounce glass jar with Teflon™-lined cap One 500-milliliter HDPE bottle	Store at 4 ± 2°C	28 days
Corrosivity (pH)	SW9045D/SW9040C	One 4-ounce glass jar with Teflon™-lined cap One 250-milliliter HDPE bottle	Store at 4 ± 2°C	Upon receipt
Ignitability/Flashpoint	SW1030/SW1010A	One 4-ounce glass jar One 250-milliliter HDPE bottle	Store at 4 ± 2°C	14 days
Total Petroleum Hydrocarbons	TX1005	One 4-ounce glass jar	Store at 4 ± 2 °C	14 days
		3 x 40-milliliter VOA vials	HCl to pH<2 Store at 4 ± 2°C	

NOTES:

[1] It will be necessary to verify container requirements with the laboratory at the time of scheduling.

[2] Holding time is measured from the time of sample collection to the time of sample extraction and/or analysis.

°C = Degrees Celsius
ASTM = American Society for Testing and Materials
HCl = Hydrochloric acid
HDPE = High-density polyethylene
HNO_3 = Nitric acid
TCLP = Toxicity Characteristic Leaching Procedure

TABLE 9. FREQUENCY OF FIELD QUALITY CONTROL SAMPLES

Field QC Sample	Frequency
Field blank	1 per day, if site conditions render this sample necessary (high winds, dust or particulates in ambient air, etc.)
Field duplicate	1 per 10 samples
Equipment rinsate blank	1 per non-dedicated equipment set per day or 1 per 20 samples; this criterion is applied for each team using and decontaminating disposable equipment
MS/MD[a] (inorganics)	1 per 20 samples or as directed by EPA
Temperature blank	1 per cooler

NOTES:

[a] MS and MD analyses are technically not field QC samples; however, they generally require that the field personnel collect additional volumes of samples and are, therefore, included on this table for easy reference. The analytical laboratory will be contacted to determine sample volume requirements.

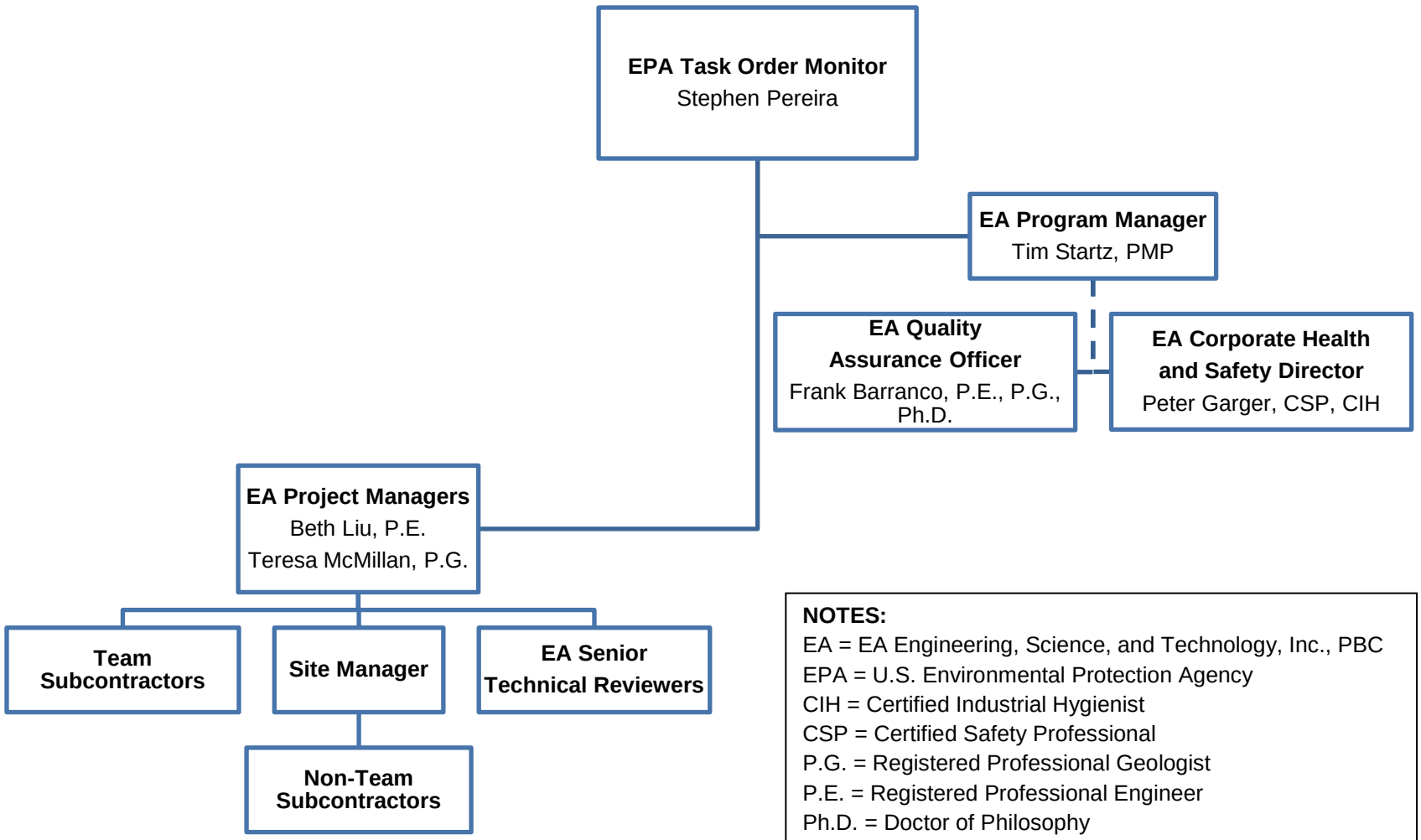
EPA = U.S. Environmental Protection Agency
MD = Matrix duplicate
MS = Matrix spike
QC = Quality control

TABLE 10. FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING AND INSPECTION

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptence Criteria	Corrective Action	Responsible Person	SOP
Turbidity Meter (Hach 2100, HF Scientific, or similar)	Calibrate with Gelex Turbidity Standards.	Keep clean and place in hard case between sampling activities	Field test in accordance with the manual	Inspect for external damage (i.e., LCD screen, etc.).	Calibrate daily, before use, and when unstable readings occur.	Within calibration standard(s) range	Recalibration	Field personnel	See equipment manual.
Water Quality Meter (QED, Troll, YSI, or Hydrolab)	Follow manufacturer's instructions. Two-point calibration for pH and Specific Conductance	Decontaminate and store in water short term Long-term storage according to the manufacturer for each sensor	Field test in accordance with the manual	Visually inspect probes for cleanliness and wear.	Calibrate daily before use. Maintain and inspect daily when used.	Within calibration standard(s) range	Cleaning and recalibration	Field personnel	SOP 43 and equipment manual
Electronic Water Level Meter or Oil/water Interface Probe	Not applicable; operate in accordance with the manufacturer's instructions.	Decontaminate between wells	Field test in accordance with the manual	Inspect tape for kinks and cuts. Inspect probe for dirt. Check batteries.	Calibrate daily.	Response	Replace battery if no response during test button check.	Field personnel	SOP 10
Trimble® GeoXT™ Global Positioning System Unit	Validate accuracy using nearby benchmark.	Charge battery and place in case at the end of each day	Field test in accordance with the manual	Inspect for external damage (i.e., LCD screen, dents, etc.).	Calibrate daily.	Refer to manufacturer's instructions.	Refer to manufacturer's instructions.	Field personnel	See equipment manual.

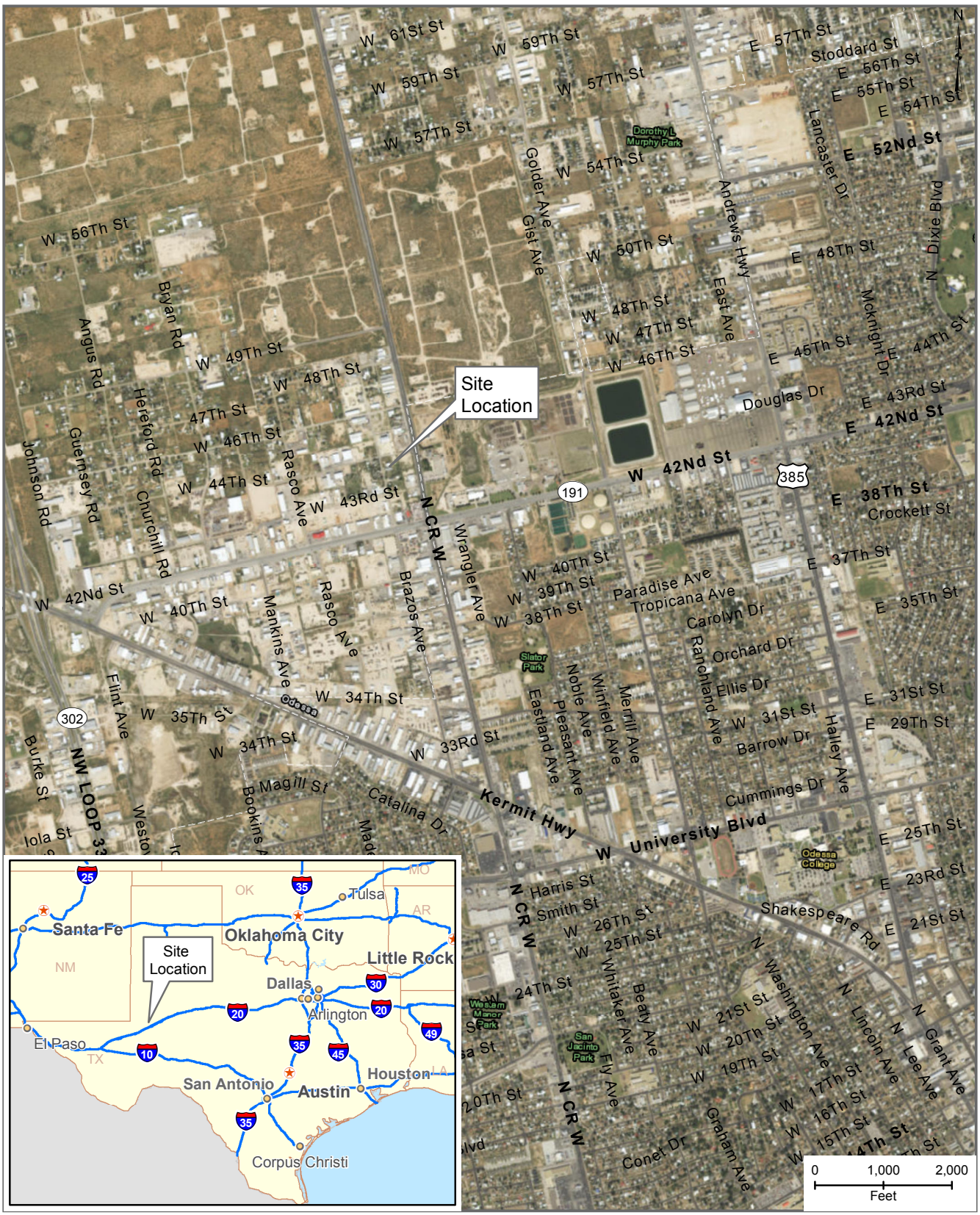
NOTES:
eV = Electron volt(s)
LCD = Liquid crystal display
SOP = Standard operating procedure

Figures



Remedial Investigation/Feasibility Study
Odessa Chromium #1 Superfund Site
Odessa, Ector County, Texas

Figure 1
Project Organization
Sampling and Analysis Plan



Source: ESRI ArcGIS Online and data partners including USGS and © 2007 National Geographic Society, 2009 Redlands, CA: Environmental Systems Research Institute

Remedial Investigation/Feasibility Study
Odessa Chromium #1 Superfund Site
Odessa, Ector County, Texas

Figure 2
Site Location Map
Sampling and Analysis Plan

2017 -10-12 M:\EPA\0148-Odessa Cr 1 RI-FS\GIS\MXDs\Figxx_SiteLoc.mxd EA-Dallas jschwertz

001943

N

0 200 400
Feet

Legend

- Metal Remediation Compound (MRC) Injection Well
- Private Well
- Monitoring Well
- Observation Well

NOTE:
AST = Aboveground Storage Tank

Figure 3

Site Layout Map
Sampling and Analysis Plan

Remedial Investigation/ Feasibility Study
Odessa Chromium #1 Superfund Site
Odessa, Ector County, Texas

001944

2017-11-10 M:\EPA\0148-Odessa Cr 1 RI-FS\GIS\MXDs\SAP\Fig02_SiteLayout.mxd EA-Dallas jschwertz

N

0 20 40
Feet

Legend

- Proposed Monitoring Well
- Metal Remediation Compound (MRC) Injection Well
- Former Septic Field
- Proposed Soil Boring / Coring of Caliche

Remedial Investigation/ Feasibility Study
Odessa Chromium #1 Superfund Site
Odessa, Ector County, Texas

Figure 4
Source Area Detail Map
Sampling and Analysis Plan

001945

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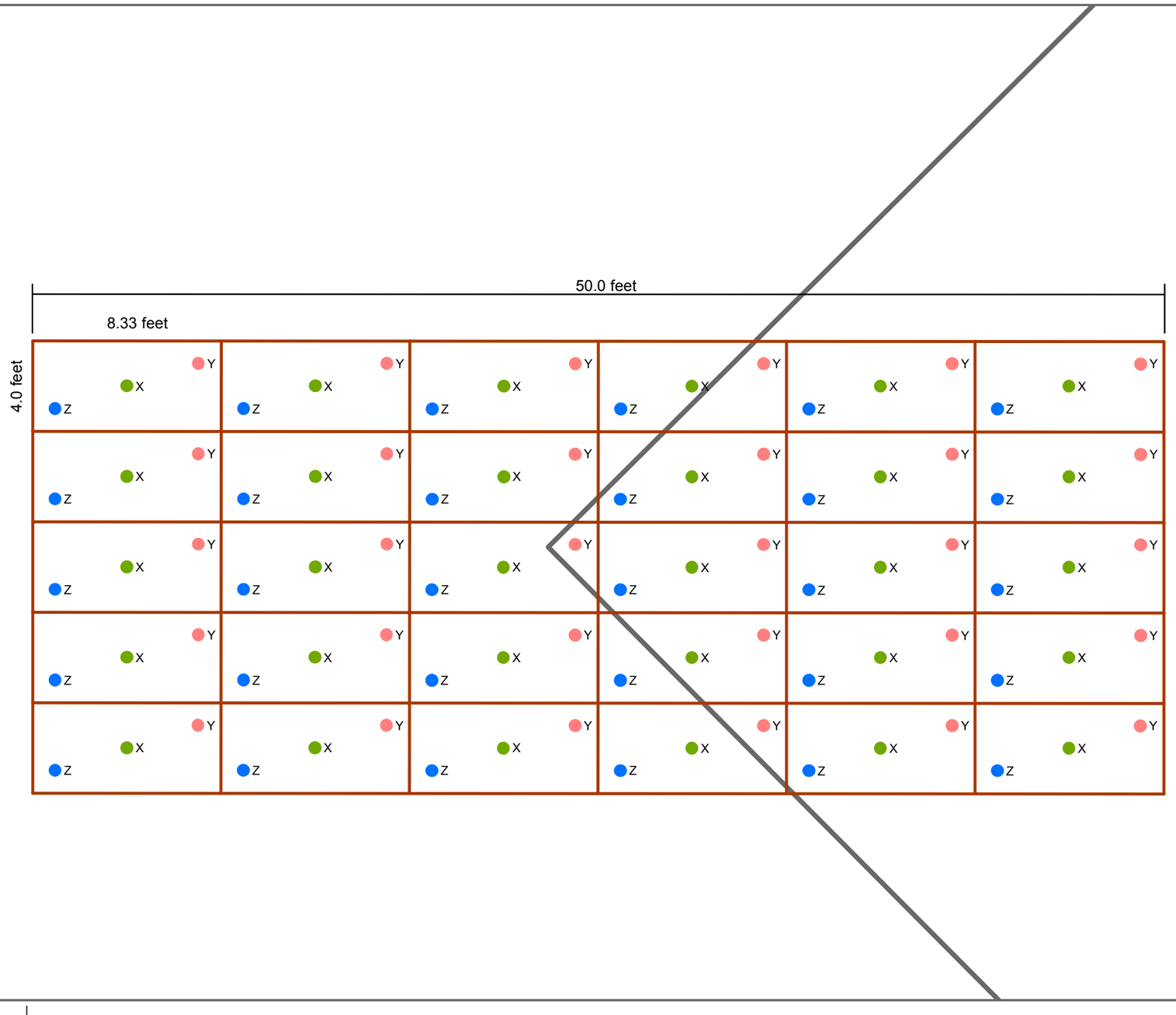


N

0 2.5 5
Feet

Legend

Soil Sample Boring Grid

- Primary Location (x)
- Duplicate Location (y)
- Triplicate Location (z)
- Sampling Grid
- Treatment Building (approximate location)

Note:
Sampling depths include 2-3 feet below ground surface (ft bgs), 5-6 ft bgs, 9-10 ft bgs and at refusal. Each depth is a sample unit which comprises to make a decision unit.

Remedial Investigation/ Feasibility Study
Odessa Chromium #1 Superfund Site
Odessa, Ector County, Texas

Figure 5
Septic Drain Field
Incremental Sampling Map

Sampling and Analysis Plan

2017-11-13 M:\EPA\00148-Odessa Cr 1 RI-FS\GIS\MXDs\SAP\Fig04_SoilGrid.mxd EA-Dallas jschwertz

001946

Appendix A

Technical Memorandum on Conceptual Understanding of the Site

(Provided Electronically via Compact Disc)

Appendix B

Analytical Method Reference Sheets

(Provided Electronically via Compact Disc)

Appendix C

Standard Operating Procedures

(Provided Electronically via Compact Disc)

Appendix D

Field Forms

Soil Collection Field Form

Exposure Area:_____ **Weather:**_____

Sampling Location:_____ **GPS Coordinates:** **Lat:**_____

Sample ID:_____ **Long:**_____

Sampling Personnel: _____ **Sample Date/Time:**_____

Depth (bgs): **Description** (soil type, color, density/consistency, plasticity, moisture, grain size, angularity/mineralogy, other):

XRF Data:

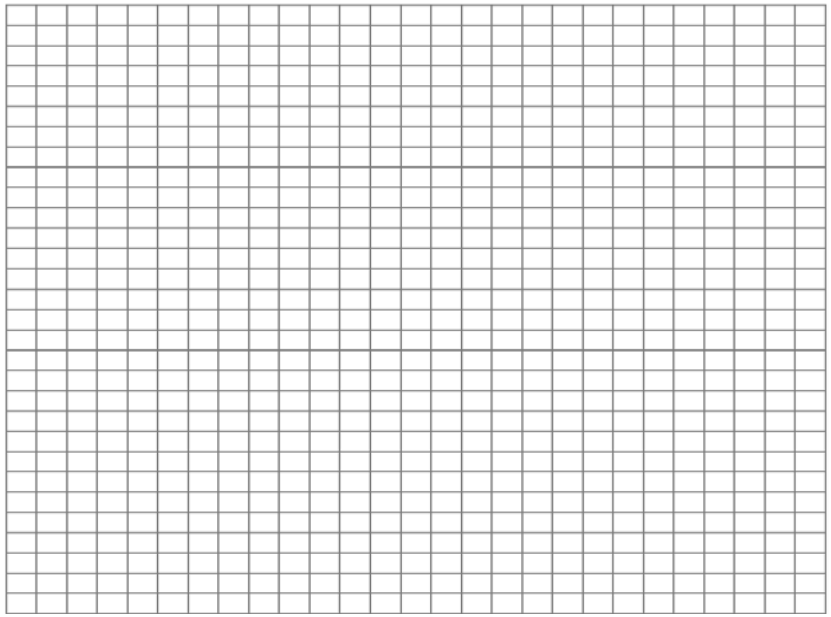
Interval: _____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

Location Map:



Sampling Method: (circle)
Geoprobe
Slide Hammer Probe
Scoop
Ponar
Core Sampler
Other

Analyses:
(circle and indicate number of containers)
VOCs
SVOCS
Metals
Hexavalent Chromium
Pesticides
Aroclors

Notes/Comments:

Recorded By: _____

Odessa Chromium #1 Superfund Site
Odessa, Ector County, Texas

Page: _____ of _____
Date: _____

Ground Water Collection Field Form

Well ID: _____ **Sample ID:** _____ **Sample Time:** _____

Casing diameter/type: | Well location: | Weather:

Screened interval(s): | Sampling personnel:

Total depth: | Sampling method:

Initial depth to water (w/o pump): | Water level indicator:

Final depth to water (w/o pump): | Water quality meter: YSI

Measuring point: **North side of casing** | Pump depth setting: | Pump type/model:

	Δ < 1° C	Δ < 3%	Δ <10%	Δ <10%	Δ < 0.1 pH	Δ < 10 mV	Δ < 0.3 ft	< 1L/min	Δ < 10 NTU		Parameter Stabilization Limits (3 consecutive readings)
Time	**Temp (°C)**	**Conductivity (mS/cm)** or **(µS/cm)**	**DO (%)**	**DO (mg/L)**	**pH**	**ORP (mV)**	**Water Level (feet btoc)**	**Flow Rate (L/min)** or **(mL/min)**	**Turbidity (NTU)**	**Purge Volume (L)** or **(mL)**	**Additional Comments**

Note:

Parameter Stabilization Limits:
(3 consecutive readings) for percent difference type parameters
Percent difference formula =
ABS[((first reading - second reading)/first reading) x 100]
Ex: Readings 12, 16, 15, 13
((12-16)/12)*100 = 33% ((16-15)/16)*100 = 6%
((15-13)/15)*100 = 13% In example, stabilization has not occurred.

Analyses: (circle those collected and indicate the number of containers)

VOCs	Metals	Pesticides
SVOCS	Hexavalent Chromium	Aroclors

Recorded By:_____

001952

BORING/WELL CONSTRUCTION LOG

EA Engineering, Science, and Technology, Inc.

Project:	Project Number:
Drilling Company:	Start Time/Date:
Drilling Rig/Bit:	Completion Time/Date:
Driller:	Final Depth:
Boring/Well ID:	Logged By: Page ____ of ____

Sample Type	Sample Recovery (inches)	Sample Interval	PID Reading (ppmv)	USCS Soil Type	Depth, ft bgs	Soil Description (soil type, color, density/consitency, plasticity, moisture, grain size, angularity/minerology, other)	Boring and/or Well Details		
					1				
					2				
					3				
					4				
					5				
					6				
					7				
					8				
					9				
					10				
					11				
					12				
					13				
					14				
					15				
					16				
					17				
					18				
					19				
					20				
					21				
					22				
					23				
					24				
					25				
					26				
					27				
					28				
					29				
					30				
					31				
					32				
					33				
					34				
					35				
					36				
					37				
					38				
					39				
					40				

Odessea Chromium #1 Superfund Site
Odessa, Ector Couty, Texas

Date: _____

Passive Ground Water Sampling Data Sheet

Well ID:

Well owner/location/residence:

Street address:

Arrival time:	Sampling personnel:
Departure time:	Weather:

Sample ID/Depth Interval:	Passive Sampler Type (circle one):			Sample Time:
	PDB	RPP	Dual-Membrane	
	PDB	RPP	Dual-Membrane	
	PDB	RPP	Dual-Membrane	
	PDB	RPP	Dual-Membrane	

Type of Analysis: VOCs Metals SVOCs
(circle all applicable) Other:

Sample QC (circle one) None Duplicate MS/MSD Designation:_____

InSitu 9500 Measurements	pH	Temp (^{o}F)	RDO (mg/L)	RDO (%)	ORP (V or mV)	Cond (µS/cm)		
Units								
Reading								

Notes/Comments:

Well Inspection Information: Please circle Yes or No. (Use additional space if explanation is needed)

Survey Mark Present?	Y	N
Standing or Ponding Water?	Y	N
Evidence of Collision Damage?	Y	N
Evidence of Casing Degradation?	Y	N
Well Plug Exists?	Y	N
Lock in Place?	Y	N
Well Labeled?	Y	N
Evidence of Well Subsidence?	Y	N
Photograph Taken?	Y	N

Recorded By:_____

Appendix E

Screening Criteria and CLP/Private Laboratory Reference Limits

APPENDIX E-1. SCREENING CRITERIA FOR SOIL AND CLP REFERENCE LIMITS

Analyte	Analytical Method	CASRN	Units	Soil Screening Level						Project Screening Level[5]	CRQL [6]		
				EPA Regional Screening Level [1]			Ecological Screening Level [2]						
				c/nc	Residential	Industrial	Lowest RAIS Screening Value [3]	EPA Eco-SSL Lowest Value [4]	EPA Eco-SSL Additional Value [4]		Low Soil by SIM	Low Soil	Medium Soil
TAL Metals ICP-MS													
Chromium	ISM02.3	7440-47-3	mg/kg	nm	120000	1800000	0.4	26	Chromium III based on avian (34 for mammalian)	0.4	--	1	--

NOTES:

1. EPA Regional Screening Levels (RSLs) for residential and industrial use scenario for hazard index = 1.0 for non-carcinogens and a 10^{-6} cancer risk level for carcinogens (May 2016).
2. Ecological screening levels for soil are only applicable to surface or shallow subsurface soil.
3. The lowest ecological risk soil screening value from the Risk Assessment Information System (RAIS) database, found at https://rais.ornl.gov/tools/eco_search.php.
4. EPA Ecological Soil Screening Levels (SSLs). http://www.epa.gov/ecotox/ecossl/
5. The project screening level was selected to satisfy the EPA requirements as the (1) the residential EPA RSL and (2) the lowest ecological risk soil screening value from the RAIS. For analytes with no SSL or RSL, the project screening level will be NS (not
6. Contract-required Quantitation Limits (CRQL) for U.S. Environmental Protection Agency (EPA) Contract Laboratory Program (CLP)

mg/kg = Milligram(s) per kilogram -- = Not provided

c = Carcinogenic; nc = Non-carcinogenic

CASRN = Chemical Abstracts Service Registry Number

Eco-SSL = Ecological Screening Level

APPENDIX E-2. SCREENING CRITERIA FOR SOIL AND PRIVATE LABORATORY REFERENCE LIMITS

Analyte	Analytical Method	CASRN	Units	Soil Screening Levels						Project Screening Level [5]	Achievable Laboratory Limits [6]	
				EPA Regional Screening Levels[1]			Ecological Screening Levels[2]					
				c/nc	Residential	Industrial	Lowest RAIS Screening Value [3]	EPA Eco-SSL Lowest Value [4]	EPA Eco-SSL Additional Values [4]		RL	DL
Hexavalent chromium	SW3060/7199A	18540-29-9	mg/kg	c	0.3	6.3	NS	130	Based on mammalian (no other values)	0.3	0.4	0.14

NOTES:

1. U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for residential and industrial use scenario for hazard index = 1.0 for non-carcinogens and a 10-6 cancer risk level for carcinogens (May 2016).
2. Ecological screening levels for soil are only applicable to surface or shallow subsurface soil.
3. The lowest ecological risk soil screening value from the Risk Assessment Information System (RAIS) database, found at http://rais.ornl.gov/tools/eco_search.php.
4. EPA Ecological Soil Screening Levels. http://www.epa.gov/ecotox/ecossl/.
5. The project screening level was selected to satisfy the requirements of the EPA as the (1) the residential EPA RSL and (2) the lowest ecological risk soil screening value from the RAIS. For analytes with no SSL or RSL, the project screening level will be NS (not specified).
6. Achievable laboratory limits were based on the ones from Eurofins Lancaster Laboratories Environmental, LLC., Lancaster, Pennsylvania.

mg/kg = Milligram(s) per kilogram

c = Carcinogenic

CASRN = Chemical Abstracts Service Registry Number

DL = Detection limit

Eco-SSL = Ecological Screening Level

NS = Not specified

RL = Reporting limit

SW = EPA SW-846 Test Methods for Evaluating Solid Waste, Third Edition

APPENDIX E-3. SCREENING CRITERIA FOR GROUND WATER AND CLP REFERENCE LIMITS

Analyte	Analytical Method	CASRN	Units	c/nc	EPA MCL[1]	EPA Tapwater RSL [2]	Project Screening Level[3]	CRQLs[4]		
								Low Water by SIM	Trace Water	Low Water
ICP-MS Metals[5]										
Chromium	ISM02.3	7440-47-3	µg/L	nc	100	22000	100	--	--	2
Hexavalent Chromium (EPA Region 6 Lab)	EPA 218.6	18540-29-9	µg/L	c	NS	0.035	0.035	--	--	--

NOTES:

1. U.S. Environmental Protection Agency (EPA) National Primary Drinking Water Regulations, Maximum Contaminant Levels (MCLs), May 2009.
2. EPA Region 6 Regional Screening Levels (RSLs) for Tapwater (May 2016) for hazard index = 1.0 for non-carcinogens and a 10-6 cancer risk level for carcinogens.
3. The project screening level was selected to satisfy EPA requirements. The EPA MCL is used.
4. Contract-required Quantitation Limits (CRQLs) for EPA Contract Laboratory Program (CLP)
5. EPA MCL and tapwater RSL apply to total metals.

µg/L = Microgram(s) per liter
-- = Not provided
c = Carcinogenic; nc = Non-carcinogenic
NS = Not specified
CASRN = Chemical Abstracts Service Registry Number
DL = Detection limit
ICP-AES = Inductively-coupled plasma and atomic emission spectroscopy
ICPMS = Inductively-coupled plasma and mass spectrometry

APPENDIX E-4. SCREENING CRITERIA FOR GROUND WATER AND PRIVATE LABORATORY REFERENCE LIMITS

Analyte	Analytical Method	CASRN	Units	c/nc	EPA MCL (1)	EPA Tapwater RSL (2)	Project Screening Level (3)	Achievable Laboratory Limits (4)	
								RL	DL
Hexavalent Chromium	SW7199	18540-29-9	mg/L	c	NS	0.000035	0.000035	0.01	0.005

NOTES:

1. U.S. Environmental Protection Agency (EPA) National Primary Drinking Water Regulations, Maximum Contaminant Levels (MCLs), May 2009.

2. EPA Region 6 Regional Screening Levels (RSLs) for Tapwater (November 2015) for hazard index = 1.0 for non-carcinogens and a 10-6 cancer risk level for carcinogens.

3. The project screening level was selected to satisfy the requirements of the EPA. The EPA MCL will be used; if no EPA MCL standard exists for any analyte, then the project screening level is lower of the EPA Tapwater RSL or other Interim regulatory standards, if available.

4. Achievable laboratory limits are based on those from Eurofins Lancaster Laboratories Environmental, LLC.

mg/L = Milligram(s) per liter

c = Carcinogenic; nc = Non-carcinogenic

-- = Not provided

CASRN = Chemical Abstracts Service Registry Number

NS = Not specified

DL = Detection limit

RL = Reporting limit

Appendix F

Data Management Plan

Data Management Plan

Remedial Investigation/Feasibility Study
Odessa Chromium #1 Superfund Site
Odessa, Ector County, Texas
EPA Identification No. TXD980867279

Remedial Action Contract 2 Full Service
Contract: EP-W-06-004
Task Order: 0148-RICO-0682

Prepared for

U.S. Environmental Protection Agency
Region 6
1445 Ross Avenue
Dallas, Texas 75202-2733

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
405 State Highway 121 (Bypass)
Building C, Suite 100
Lewisville, Texas 75067
(972) 315-3922

November 2017
Revision: 00
EA Project No. 14342.148

CONTENTS

Section **Page**

LIST OF ACRONYMS AND ABBREVIATIONS

CLP	Contract Laboratory Program
DMP	Data Management Plan
EA	EA Engineering, Science, and Technology, Inc., PBC
EDD	Electronic data deliverable
EPA	U.S. Environmental Protection Agency
ESRI	Environmental Systems Research Institute
GIS	Geographic information system
PDF	Portable document format
QA	Quality assurance
QC	Quality control
RAC	Remedial Action Contract
RI	Remedial investigation
SAP	Sampling and Analysis Plan

1. INTRODUCTION

This Data Management Plan (DMP) provides the data management process and procedures to be implemented for the field and laboratory data generated from work activities associated with a remedial investigation (RI) at the Odessa Chromium #1 Superfund Site (site) under a Remedial Action Contract (RAC) with the U.S. Environmental Protection Agency (EPA). This document is to be used in conjunction with and as part of Sampling and Analysis Plan (SAP) for the site. This DMP describes the management of both historical information and data collected in support of the current activities at the Odessa Chromium #1 Superfund Site, and is a living document that is subject to change as the project evolves.

The DMP is divided further into six sections as identified below:

- ***Section 2 – Personnel Roles and Responsibilities***—Identifies project personnel responsible for performing data management and related project activities.
- ***Section 3 – Project Data Types and Records***—Presents the methods by which data documentation and records will be handled.
- ***Section 4 – Historical and Screening Level Data***—Presents types of information that may be collected as part of the historical data collection and review.
- ***Section 5 – Data Handling and Management***—Summarizes how data will be recorded and documented.
- ***Section 6 – References***—Includes the references for this DMP.

2. PERSONNEL ROLES AND RESPONSIBILITIES

The project personnel and assigned roles associated with project data collection and management activities in support of the EPA RAC are presented in the table below:

Title/Role	EA Project Personnel
Project Manager Alternate Project Manager	Beth Liu, PE, Ph.D. Teri McMillan, P.G.
Corporate QA/QC Officer	Frank Barranco, P.E., P.G., Ph.D.
Project Geologist	Teri McMillan, P.G.
Project Chemist/Data Validator Coordinator	Pamela Moss
Data Management Lead	Amanda Smith
GIS Analyst	John Schwertz
Field Team Lead	Task-specific
NOTE: EA = EA Engineering, Science, and Technology, Inc., PBC GIS = Geographic Information System QA = Quality assurance QC = Quality control	

Project personnel will work together to ensure that project data and information collected in support of the contract are managed according to the contract and are provided to EPA as required under the contract. The responsibilities for the personnel roles listed above include the following:

- ***Project Manager—***Responsible for oversight of the daily activities for all work ongoing under the EPA RAC including project planning, field activities, subcontractors, reporting, project management and support services, and main point-of-contact for client communications for the project team.

- ***Corporate QA/QC Officer***—Responsible for the review of project plans and revisions to the plans to maintain proper QA throughout the project, performance and system audits, data processing QC, data quality review, monitoring the effectiveness of corrective actions, and coordinating the QA/QC on the project.

- ***Project Geologist—***Technical lead for ensuring appropriate technical review of project plans, implementing the scope in accordance with plans, conducting associated data collection in accordance with the project requirements, and providing oversight of technical personnel to ensure accurate and necessary data are collected and documented as required for the project.

- ***Project Chemist/Data Validation Coordinator***—Responsible for the review of sampling and analysis programs for project plans to maintain proper chemical data QA throughout the project, performance and system audits, data quality review, monitoring the effectiveness of corrective actions, and coordinating the QA/QC efforts with field personnel and analytical laboratories. Responsible for conducting data validation on data that are not analyzed by the EPA Region 6 Laboratory or Contract Laboratory Program (CLP) laboratories in accordance with current EPA National Functional Guidelines.

- ***Data Management Lead***—Responsible for transcription of field data to electronic data deliverable (EDD) format, loading of field and laboratory analytical EDDs, and running reports to provide current and historical data from the database. Also responsible for uploading the database with data validation qualifiers, edits resulting from data validation, and providing a useable data deliverable from the database to EPA.

- ***GIS Analyst***—Responsible for incorporating non-digital survey data into a GIS to display accurate locations of monitoring sites, linking the monitoring site identification to the spatial GIS points to create figures with laboratory results, and creating figures utilized in reports. Also responsible for providing GIS deliverable to EPA.

- ***Field Team Lead***—Responsible for the accuracy of all field activity-related documentation and records collected in support of project plan implementation including all information related to field sample collection; field instrumentation and measurements; equipment decontamination; and sample management and shipping documentation, field variance, and corrective action.

3. PROJECT DATA TYPES AND RECORDS

Field and analytical data will be collected, and historical data will be compiled as appropriate in support of the RI activities. The following section describes the types of records and documentation that will be included for current and historical datasets, databases that will be used, database input requirements, and how data will be maintained and archived.

3.1 PROJECT DATA AND RECORDS

Project data will be documented and recorded using various methods as outlined in Section 1.6 of the SAP.

3.2 LABORATORY TESTING DATA

Laboratory samples to be collected in support of the RI will be analyzed by either the EPA Region 6 Houston Laboratory, a CLP laboratory, or a subcontracted laboratory. Data deliverables to be provided by laboratories will be project and data type specific. Laboratory data will include:

- ***Chemical Analytical Data***—Provided in different formats based on the analytical laboratory.
  - ***EPA Region 6 Houston Laboratory***—Standard EPA data report (in portable document format [PDF]) and electronic data files in a Microsoft Excel format.
  - ***CLP Laboratory***—Data report in PDF and electronic data files in Excel format.
  - ***Subcontracted Laboratory***—EPA Level IV type data report in PDF and electronic data files in EQuIS® format.
- ***Geotechnical Soil Data***—Electronic data file in Excel and summary report in PDF.

3.2.1 Chemical Analytical Data

Chemical analytical data will include results from soil and ground water samples generated by the laboratory. These data may include both routine and non-routine analytical testing. Chemical analytical data will be provided to EA in several different formats based on the laboratory that conducted the analyses. The EPA Region 6 Houston Laboratory will provide an EPA standard data report in PDF, and analytical results in Excel format. CLP laboratories will provide chemical analytical data as per the CLP requirements, which will consist of a data report in PDF and electronic data files in Excel format. All subcontracted laboratories will provide an EQuIS® EDD and a Level IV type data package (unless otherwise specified). The PDF data deliverable will be consistent with the requirements specified in the project-specific subcontractor statement of work.

The laboratory is responsible for ensuring that all analytical data reported in the electronic copy and PDF data report are consistent and accurate in accordance with their scope. Verification of EDD formatting and completeness will be performed by the EA project chemist and data management personnel during data review and upload. EDDs and data reports received from the laboratory that contain errors will be returned to the laboratory for correction and resubmittal.

3.2.2 Geotechnical Data

Geotechnical data will include soil testing data generated by the subcontractor geotechnical testing laboratory. Geotechnical testing results will be provided in Excel format and in a PDF data report. This type of data will be reviewed by the technical lead.

3.2.3 Total and Hexavalent Chromium Data

Analytical data will be provided in Excel format and in a PDF data report. This type of data will be reviewed by the technical lead.

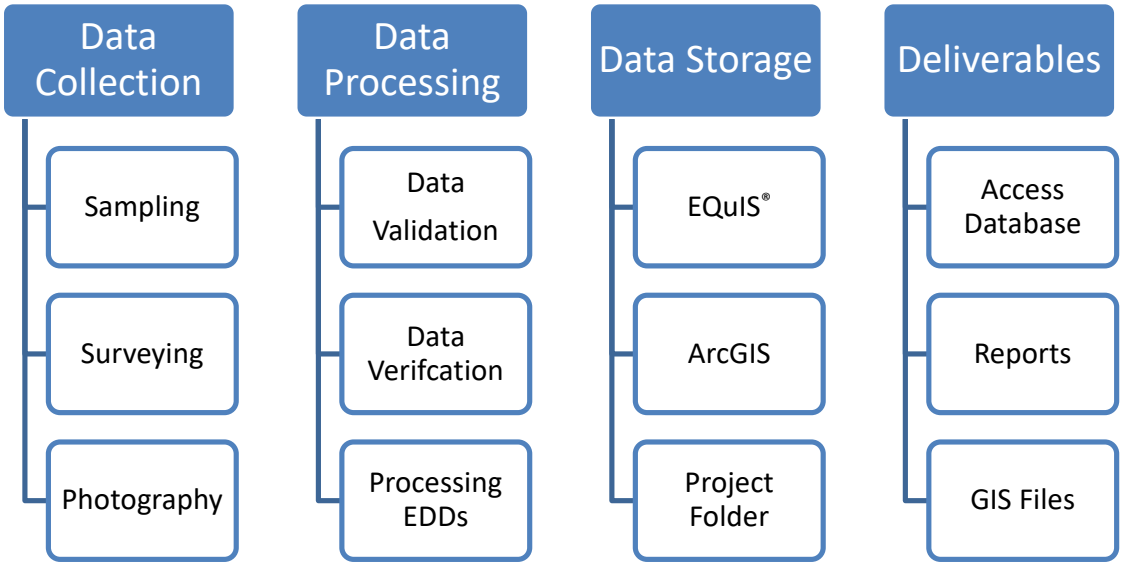
4. HISTORICAL AND SCREENING LEVEL DATA

The use of historical site-related and third-party sampling data may be necessary to achieve project objectives. The EA Project Manager will coordinate with the EPA Task Order Monitor to obtain relevant historical and third-party sampling data. The historical and third-party sampling data will be compiled and evaluated to support RI activities associated with this contract. The following is a list of the types of information that may be collected and reviewed as part of a site-specific historical data review:

- Reports (including environmental investigation, environmental monitoring, and remediation reports)
- Maps (including historical maps, land use maps, previous investigation maps, and ground water and surface water maps)
- Permits
- Other regulatory documents
- Analytical data (including EDDs and laboratory data reports and tables).

5. DATA HANDLING AND MANAGEMENT

Data handling and management procedures are established to effectively process analytical and measurement data generated during field activities such that the relevant data are readily accessible and accurately maintained. There are multiple activities involved in the recording, storage, processing, and maintenance of project datasets and systems to manage these. To ensure that data are accurately recorded and stored, data tracking systems will be implemented. Automated and manual QC checks will be conducted to verify that data have been accurately recorded and appropriately stored. Corrective actions will be taken and documented in the event data have not been properly handled. General data handling and management as well as information on naming conventions, loading, and reporting of laboratory analytical data are discussed in this section. The overall process will include the following elements:



5.1 PROJECT GENERATED DATA

The following describes the data handling and management of data collected during field activities at the Odessa Chromium #1 Superfund Site, including onsite field and measurement data and offsite laboratory data. Analytical data will be loaded into an EQuIS® database using Excel files or EDDs provided in the appropriate format per the templates developed by the data management group. Additionally, some field measurements may also be loaded into the EQuIS® database. These files will be saved and stored in project-specific folders located on a secured EA server.

5.1.1 Data Management Processes for Field-Related Data

Four general types of data will be collected and recorded in the field:

- Chain-of-custody
- Sample collection and analysis information
- Field measurements
- Field observations.

For samples that are sent to the EPA Region 6 Houston Laboratory or CLP laboratories, EPA tracking software (Scribe) will be utilized to maintain pertinent field and identification information about samples;

as such, sample labels and chain-of-custodies (or traffic reports) will be generated through Scribe. The data generated in Scribe will support the analytical data provided by the laboratories. At the end of each sampling day, PDF copies of chain-of-custody records and .xml files will be emailed to the Region 6 Houston Laboratory point of contact or the Sample Management Office Coordinator as appropriate. In addition, the .xml file(s) will be uploaded into the Sample Management Officer portal for delivery to the Sample Management Officer Coordinator of the CLP laboratory. Samples that will be analyzed by subcontracted laboratories will utilize labels and chain-of-custodies provided by the laboratory.

Project data collected during monitoring and investigation sampling activities will be managed and stored using the EQuIS® Environmental Data Management System (Version 6.4), which is a Structured Query Language database management system and allows for automatic import of EDDs. The types of field data to be managed in EQuIS® may include field sampling parameters collected during well sampling in support of treatability studies and pilot testing, water level measurements, and sample location information such as coordinates. Field data will be recorded on the appropriate forms or electronically, and reviewed and transferred to the field data EDDs as deemed appropriate. All field data that may be entered into EDDs will be reviewed for accuracy and completeness against the field records prior to loading into the database. The Data Management Lead will be responsible for all field data files uploaded into EQuIS.

Field data that cannot be integrated into the database (i.e., site photographs and field logbooks) will be stored electronically in the project-specific network folders and/or in the project files. Additionally, a photographic log will be presented within report appendixes.

5.1.2 Sample Identification

Sample naming conventions are designed to ensure that unique identifiers are created for samples collected during field activities. QC samples, including field duplicates and matrix spike samples, will have distinct naming conventions, as will specific sample types encoded in the proper database fields. While sample identifiers may be informative, they should never be parsed or used to infer information about the collected sample. Information about the sample, including composition, matrix, location, and date/time collected, will be accurately stored in relevant database fields and must be used as appropriate during data analysis.

Samples will be uniquely identified at the time of collection and in accordance with the nomenclature requirement specified in the SAP.

5.1.3 Analytical Data Management

Procedures for collecting field samples for laboratory analysis and the types of analyses to be conducted during the field activities are discussed in Section 2 of the SAP. This section provides an overview of the EDD to be used for analytical data, the EDD loading process, field data verification, and analytical data validation.

Data management staff will review data and records received from the field team, subcontractor laboratories, and other subcontractors using the following process to ensure accuracy:

- Review field notes and logbooks
- Verify field coordinates with the GIS group

- Compare laboratory report deliverables and validation reports against the EDD deliverables to confirm accuracy prior to insertion into the database

- For calculated or reported total analyte results, perform calculations on 100 percent of data to verify concentrations.

Subcontracted laboratories will be required to submit their results in EQuIS® EDD formats. As one or more delivery groups are completed, these will be transmitted electronically to the Data Management Lead or obtained from the laboratory secure website. Designated data management personnel will check and load the EDDs into the EQuIS® database. Any errors in the EDD for a given sample delivery group will prevent loading of data from that sample delivery group and the issue will be communicated to the Laboratory Project Manager for correction and resubmission. Excel files received from EPA Region 6 Houston Laboratory or CLP laboratories will be formatted into an EQuIS® EDD format and loaded into EQuIS®. Analytical data will be managed in EQuIS® for reporting purposes. Data deliverables will be created with the data stored in EQuIS® and submitted to EPA in a useable format. A Microsoft Access database, or another deliverable approved by EPA, will be created with chemical analytical data and locational information (i.e., coordinates and elevation) and provided to EPA after each phase of the RI.

5.1.4 Data Verification/Validation

Verification of analytical data is to be performed by the laboratory prior to submitting final deliverables for the project. This process ensures that laboratory EDDs and laboratory analytical data packages are reviewed for completeness and accuracy, as well as for conformance with the work requirements. Analytical data for the RI will undergo data validation using the most current EPA National Functional Guidelines (EPA 2017a, 2014b). The data validation will be completed by EPA for data generated by the EPA Region 6 Houston Laboratory and CLP laboratories. Analytical data generated by subcontracted laboratories will be validated by EA or a third-party data validation subcontractor. EA or the validation subcontractor will validate 10 percent of the investigative analytical data received from subcontract laboratories (other than the EPA Region 6 Houston Laboratory or CLP laboratories) to ensure that the confirmatory data are accurate and defensible, as described in Section 4.2 of the SAP. A partial review will be conducted on the remaining 90 percent of the data received from subcontract laboratories. All data will be evaluated for usability by EA.

The validation will include review of sample records, sampling holding times and preservation, checks with laboratory and field QC samples, checks of calibration, review of raw data and documentation (Level IV package), and data completeness. The Project Chemist will be responsible for ensuring that data verification or validation procedures are followed per EPA National Functional Guidelines (EPA 2017a, 2014b).

5.1.5 Geospatial Data Management

Geospatial data will be stored in ArcGIS formats, including shapefiles and geodatabases. Additionally, coordinates associated with sampling locations will be uploaded into the EQuIS® database. Geospatial data will be stored and displayed in the Texas State Plane projection and referenced to the North American Datum of 1983. Units will be in United States feet.

Files required to reproduce figures will be provided at project closeout. For maps, file formats will include project files, shapefiles, and geodatabases. Layers that are sourced from the Environmental Systems Research Institute (ESRI) map service (e.g., background imagery and street names) will not be provided; access to these layers is freely available to all ArcGIS users through the ESRI map service.

Additionally, locational information (i.e., coordinates and elevation) will be provided in an Access database along with the chemical analytical data.

5.2 DATA MANAGEMENT PROCESS FOR HISTORICAL DATA AND SCREENING LEVEL DATA

A variety of historical site-related data (including various technical reports, sampling results, and other relevant information) may be gathered, reviewed, and evaluated to support activities under this contract. Historical data files will be catalogued and electronically stored. Appropriate historical data will be formatted and loaded into the EQuIS® database, but flagged as historical data. In addition, analytical data that have been collected by a third party may be used as screening level data. These data may be formatted and loaded into the EQuIS® database, but flagged as screening level data.

Project-related historical data and screening level data will not undergo a verification process. If historical site data and screening level data are to be manually entered into data files, the data will be verified by the Data Management Lead once completed.

5.3 PROJECT CLOSEOUT

At the completion of the Odessa Chromium #1 Superfund Site, EA will duplicate, distribute, store, and archive the Task Order files in accordance with Federal Record Center Requirements. Closeout Files will be provided on a compact disc to EPA. The Closeout Files will include the project index, final deliverables, relevant correspondence, an Access database, and GIS files (project files, shapefiles, and geodatabases) for activities conducted under the RI at the site. A Task Order Closeout Report will be submitted to EPA, as directed in the Task Order Closeout Notification, in accordance with EPA Region 6 guidance or other procedures as specified in the Task Order. If the final hours and/or costs exceed ±10 percent of the original approved Work Plan or Task Order hours and budget, the Task Order Closeout Report will describe the circumstances for this discrepancy.

5.3.1 Data File Archives

Project files related to this project will be stored and archived as specified Section 5 of the Quality Management Plan for EPA Region 6 RAC 2 (EA 2014).

6. REFERENCES

EA Engineering, Science, and Technology, Inc., PBC (EA). 2014. Quality Management Plan for U.S. Environmental Protection Agency Region 6 Remedial Action Contract 2 Full Service, NAICS 562910 Small Business Set-Aside. Revision 07. December.

U.S. Environmental Protection Agency (EPA). 2017a. National Functional Guidelines for Organic Superfund Methods Data Review (SOM02.4). EPA-540-R-2017-002. Office of Superfund Remediation and Technology Innovation (OSRTI). Washington, D.C. January.

_____. 2017b. National Functional Guidelines for Inorganic Superfund Methods Data Review (ISM02.4). EPA-540-R-2017-001. OSRTI. Washington, D.C. January.

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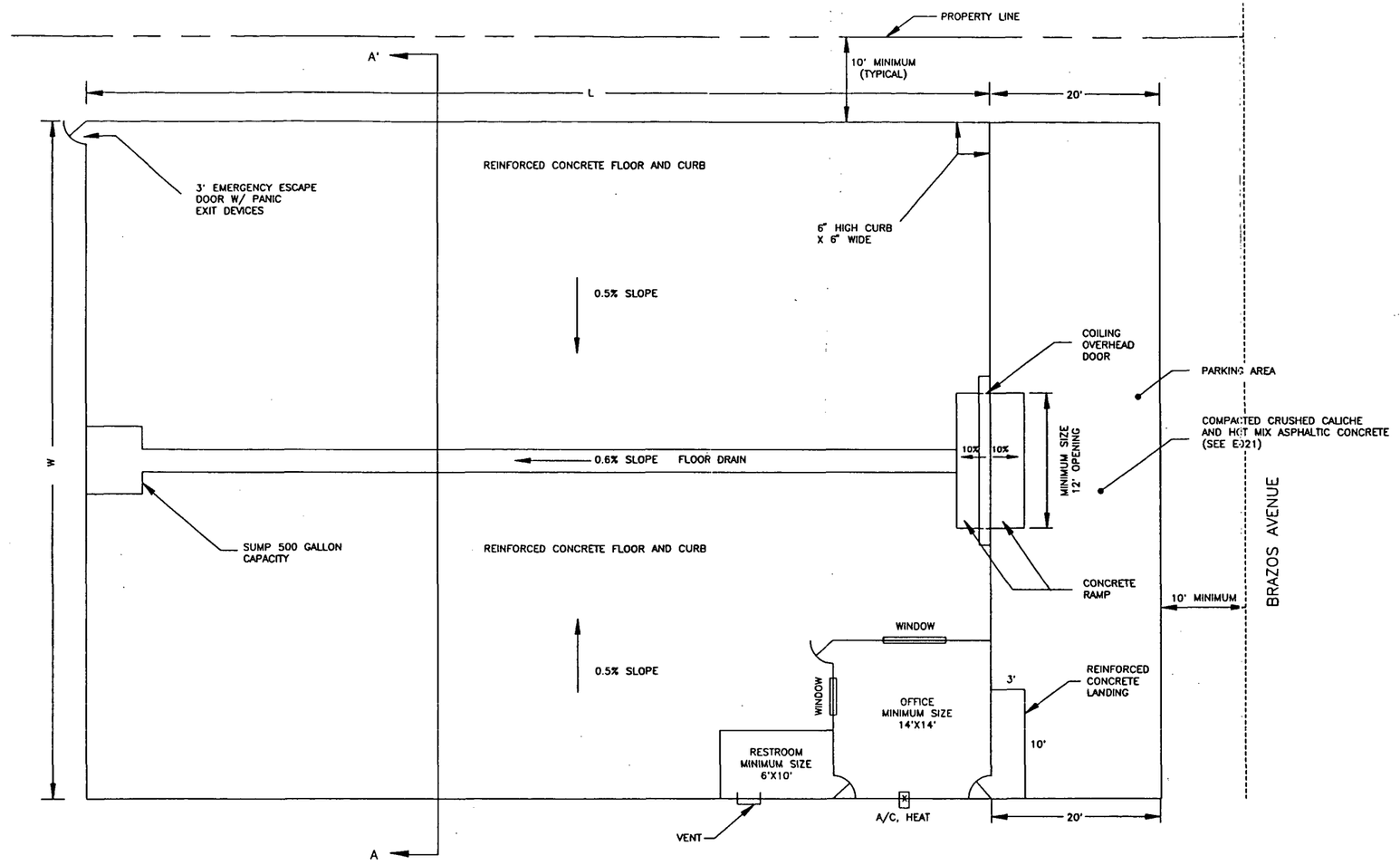
Appendix G

Treatment Building Typical Layout

(Source: IT Corporation and Howell Engineering. 1991. *Final Remedial Design, Odessa Chromium I Site, Odessa, Texas.* June)



PLAN VIEW

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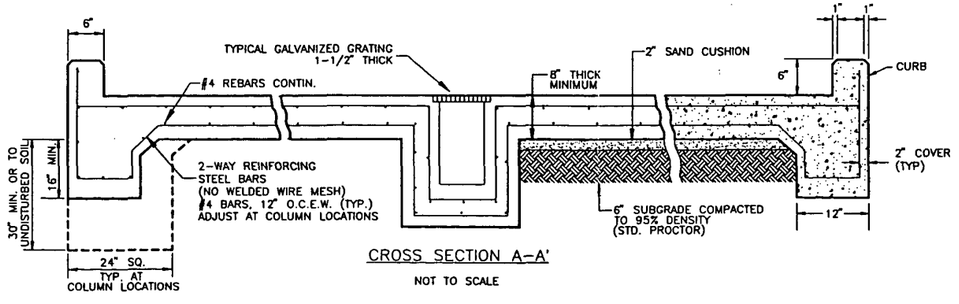

CROSS SECTION A-A'

NOT TO SCALE

NOTES

1. BUILDING DIMENSIONS L, W AND H WILL BE DETERMINED BY CONTRACTOR.
2. SKYLIGHTS WILL BE PLACED TO PROVIDE SUFFICIENT ILLUMINATION DURING THE DAYLIGHT HOURS.
3. (4) ROOF VENTILATION FANS WILL BE INSTALLED BY THE CONTRACTOR IN A MANNER TO PROVIDE MAXIMUM AIR CIRCULATION.
4. A FENCE WILL BE INSTALLED AT THE PERIMETER OF THE PROPERTY LINE. A GATE WILL BE PROVIDED ON BRAZOS AVENUE.
5. MINIMUM CONCRETE STRENGTH $f'_{c\ 28}$ = 3,000 psi STEEL GRADE 60.

STATE OF TEXAS S. W. HOWELL 6-6-91

FINAL

NO.	DATE	REVISIONS	BY	CHKD	DSGN ENGR	ENGR	PROJ ENGR	APPR

TEXAS WATER COMMISSION / U. S. ENVIRONMENTAL PROTECTION AGENCY

ODESSA CHROMIUM I SITE

TREATMENT PLANT BUILDING
TYPICAL LAYOUT

INTERNATIONAL TECHNOLOGY CORPORATION / S. W. HOWELL ENGINEERING INC.

DESIGNED BY: CCC 6/22/89	IT APPROVAL
DRAWN BY: DRS	TWC APPROVAL
CHECKED BY: MRD	EPA APPROVAL
PROJECT NO. 42-1349 / DWG. NO. E110	SCALE: NONE

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