11451 Katy Freeway, Suite 400
Houston, Texas 77079
United States
www.ghd.com

Our ref: 11215131-Poulos-24

October 25, 2022

Ms. Lauren Poulos
Remedial Project Manager
United States Environmental Protection Agency (EPA), Superfund Division (6SF-RA)
1201 Elm Street, Suite 500
Dallas, Texas 75270 2102

Southern Impoundment Supporting Deliverables
San Jacinto River Waste Pits Site
Harris County, Texas
EPA Region 6, CERCLA Docket No. 06-05-21 for Remedial Action

Dear Ms. Poulos:

GHD Services Inc. (GHD), on behalf of International Paper Company (Respondent), submits to the United States Environmental Protection Agency (EPA) this Quality Assurance Project Plan (QAPP). This QAPP is being submitted with the requirement that it be updated and resubmitted, following selection of the Remedial Contractor (RC) for the Southern Impoundment Remedial Action (RA), in order to incorporate the RC's input into the QAPP.

Should you have any questions or require additional information regarding this submittal, please contact GHD at (713) 734-3090.

Regards,

Charles Munce
MidCon Region Market Leader

+1 832 380-7655
charles.munce@ghd.com

CM/kdn/24

Encl: Attachment 1 - Quality Assurance Project Plan

Copy to: Robert Appelt, EPA
Katie Delbecq, Texas Commission on Environmental Quality (TCEQ)
Brent Sasser, IPC

100028297

Attachments

Attachment 1

Quality Assurance Project Plan

Quality Assurance Project Plan

Southern Impoundment

San Jacinto River Waste Pits Superfund Site
Harris County, Texas

International Paper Company

October 25, 2022

→ The Power of Commitment

Acronyms and Abbreviations

ANSI/ASQC	American National Standards Institute/American Society for Quality Control
AOC	Administrative Settlement Agreement and Order of Consent
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
DQOs	Data Quality Objectives
EDDs	Electronic Data Deliverables
EPA	United States Environmental Protection Agency
FSP	Field Sampling Plans
GC/MS	Gas Chromatography/Mass Spectrometry
GHD	GHD Services Inc.
HAZWOPER	Hazardous Waste Operations and Emergency Response
IPC	International Paper Company
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LIMS	Laboratory Information Management System
MAL	Minimum Analytical Limits
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NELAP	National Environmental Laboratory Accreditation Program
PARCCS	Precision, Accuracy, Representativeness, Comparability, Completeness, Sensitivity
PE	Performance Evaluation
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
RA	Remedial Action
RC	Remedial Contractor
RAWP	Remedial Action Work Plan
RPD	Relative Percent Difference
RL	Reporting Limit
SOP	Standard Operating Procedure
SOW	Statement of Work
SWMP	Site-Wide Monitoring Plan
TCEQ	Texas Commission on Environmental Quality
UAO	Unilateral Administrative Order

Quality Assurance Project Plan
Signature Page

Site Name:	San Jacinto River Waste Pits Superfund Site		
Location Address:	18003 Market Street, Channelview, Texas 77530 (29.791692, -95.066069)		
Anticipated Start Date:	November 2022	Anticipated Project Duration:	18 months
Updated By:	Wells Richard	Date:	October 25, 2022
Project Manager:	Wells Richard	Date:	October 25, 2022
Quality Assurance Officer:	Kathy Shaw	Date:	

This signature page must be completed prior to Southern Impoundment RA activities and be available on-site for review.

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1. Introduction

This Quality Assurance Project Plan (QAPP) was prepared by GHD Services Inc. (GHD), on behalf of International Paper Company (IPC) for the Southern Impoundment of the San Jacinto River Waste Pits Superfund Site in Harris County, Texas (Work Site). This QAPP is an updated version of the plan included as one of the supporting deliverables with respect to the Final 100% Remedial Design - Southern Impoundment (Amended April 2021) (Southern Impoundment 100% RD) (GHD, 2021a) and revised as one of the supporting deliverables with respect to the Southern Impoundment revised Remedial Action Work Plan (RAWP), submitted to the EPA on November 26, 2021 (GHD, 2021b) to meet requirements contained in the August 5, 2021, Unilateral Administrative Order (UAO; EPA, 2021).

The purpose of this QAPP is to describe quality assurance activities as part of the Southern Impoundment Remedial Action (RA). This updated version of the QAPP is being submitted to address the requirement that it be updated following selection of the Remedial Contractor (RC) for the Southern Impoundment RA, in order to incorporate the RC's input regarding the QAPP.

This QAPP was prepared in accordance with the EPA Requirements for Quality Assurance Project Plans, QA/R 5, EPA/240/B 01003 (March 2001, reissued May 2006); Guidance for Quality Assurance Project Plans, QA/G 5, EPA/240/R 02/009 (December 2002); and Uniform Federal Policy for Quality Assurance Project Plans, Parts 1 3, EPA/505/B 04/900A through 900C (March 2005). References in this QAPP to the "Work Site" are to the Southern Impoundment.

In accordance with the EPA guidance listed above, there are four main topics that must be included in a QAPP.

Those four topics are:

- ***Project Management*** - project management, project objectives, and project history.
- ***Data Generation and Acquisition*** - descriptions of the design and implementation of all measurement systems that will be used during the project.
- ***Assessment/Oversight*** - the procedures used to ensure proper implementation of the QAPP.
- ***Data Validation and Usability*** - the quality assurance (QA) activities that occur after the data collection phase of the project is completed.

Components of tasks associated with these four topics and suggested responsibilities for project management, data generation and acquisition, assessment/oversight, and data validation and usability are outlined in this QAPP.

This QAPP is a dynamic document, and it will be updated with specific addenda, if necessary, to reflect new scopes of work or changes in the current scope of required sampling. Any necessary modifications will be made by the Quality Assurance Officer (QA Officer) to be designated by IPC and will be reviewed by the Project Coordinator. This QAPP may be, depending on the length of the Southern Impoundment RA, reviewed on an annual basis by the QA Officer to determine if it should be modified to reflect any work being conducted at the Work Site.

2. Project Management

2.1 Project Organization

It is anticipated that, for purposes of the Southern Impoundment RA, project management and safety responsibilities will be assigned as described below. The role and if applicable, proposed responsibilities of the EPA, IPC, QA personnel, field personnel, and laboratory personnel are described in the following subsections. Additionally, any

recommended training/certification requirements related to implementation of the Southern Impoundment RA are identified.

2.1.1 Roles and Responsibilities

United States Environmental Protection Agency

The EPA is the lead agency with respect to the Southern Impoundment RA. The EPA has designated Lauren Poulos as the Remedial Project Manager (RPM) to oversee the Southern Impoundment RA.

Charles W. Munce - Project Coordinator - GHD

The Project Coordinator will work with the EPA and the Respondent to ensure the RA is conducted in accordance with the Field Sampling Plan (FSP).

Wells Richard - Project Manager - GHD

The Project Manager will have technical responsibility for data collection activities. The Project Manager's responsibilities will include reviewing QA reports, approving and authorizing actions necessary to accomplish QA objectives, and acting as liaison between agencies and field staff.

SGS Project Manager

SGS was selected as the analytical laboratory to support the RA. SGS is a full-service chemical analytical laboratory accredited under National Environmental Laboratory Accreditation Program (NELAP) and certified in Texas.

The SGS Project Manager will act as the primary point of contact between the SGS and the Project Manager and will have responsibility to address technical issues relating to generated analytical data.

The responsibilities of the SGS Project Manager will include the following:

– Ensure that resources of SGS are available on an as-required basis.
– Review of scope of work and planned analyses and methods.
– Review of final analytical reports.
– Approval of final reports prior to submission.

2.1.2 Quality Assurance Roles and/or Responsibilities

Project team members with QA responsibilities will include GHD's QA Officer and the person designated by SGS as its Quality Assurance Officer (SGS QA Officer). Responsibilities of these individuals will include the following:

Kathy Shaw - QA Officer - GHD

– Advise on appropriate sampling procedures and methods for field activities.
– Review of laboratory Quality Assurance/Quality Control (QA/QC).
– Coordination and review of data validation and assessment.
– Advise on laboratory corrective action procedures.
  Prepare and review QA reports.

Field QA Officer – Marc Kemper - GHD

– Manage field activities and field quality QA/QC.
– Conduct oversight and review of field QA/QC.
– Prepare Standard Operating Procedures (SOPs) for field activities.
– Implement and document field corrective actions, if required.

SGS QA Officer

– Coordinate and perform overview of laboratory systems audits.
– Perform overview of QA/QC documentation.
– Conduct detailed data review.
– Implement and document SGS's corrective actions, if required.
– Oversee compliance with SGS's quality assurance plans.
– Oversee preparation of SGS's SOPs.

2.1.3 Field Responsibilities

GHD will conduct all field sampling and obtain field measurements related to sampling during the RA, as described in the FSP. The specific procedures for field sample collection and field measurements will be developed in compliance with applicable SOPs for fieldwork, as determined by GHD. These procedures include requiring GHD's Site Supervisor to document any field-related non-conformances that are identified or reported by the leader or field team members and to implement and document any corrective actions.

2.1.4 SGS Responsibilities

Analyses for the RA will be performed by an SGS. The shipping address and contact information for SGS will be provided prior to samples being collected. The roles and specific responsibilities of SGS's personnel involved in the project will include the following:

SGS Contact

– Coordinate laboratory analyses.
– Supervise in-house chain-of-custody (COC).
– Subcontract sample analyses, as needed.
– Schedule sample analyses.
– Oversee data review.
– Oversee preparation of analytical reports.

Sample Custodian

– Receive and inspect incoming sample containers.
– Record the condition of incoming sample containers.
– Sign appropriate documents.
– Verify correctness of COC documentation.
– Notify SGS Contact of any non-conformances identified during sample receipt and inspection.
– Assign a unique identification number to each sample and enter the client identification number and sample identification numbers into the sample receiving log.
– Initiate transfer of the samples to appropriate laboratory sections.
– Control and monitor access/storage of samples and extracts.

2.2 Quality Objectives and Criteria

Data quality objectives (DQOs) are qualitative and quantitative statements derived from the outputs of each step of the DQOs process. The DQOs process is a series of planning steps based on the scientific method that is designed to ensure that the type, quantity, and quality of environmental data used in decision making are appropriate for the intended application. A systematic planning process will be used to develop DQOs for purposes of this QAPP. That

process, as described in *EPA's Guidance on Systematic Planning Using the DQOs Process* (EPA, 2006), is designed to ensure that environmental data are of the appropriate type and quality for the intended use, and lead to logical conclusions and defensible decisions or estimates. DQOs are developed through a seven-step process that is both sequential and iterative, depending upon the complexity of the problem. The steps involve both qualitative and quantitative criteria. The overarching outcomes of the DQO process are described below.

There are seven steps in the DQO process that include:

1. Stating the problem.
2. Identifying the goal of the study.
3. Identifying information inputs.
4. Defining the boundaries of the study.
5. Developing the analytical approach.
6. Specifying performance or acceptance criteria.
7. Developing the plan for obtaining data.

The resulting statements and DQOs are summarized as follows:

1	Problem	The Southern Impoundment 100% RD calls for RA that involves collecting water samples, imported backfill samples, and impacted material confirmation samples.
2	Goal	The goal is to collect the data necessary to analyze compliance samples following water treatment, analyze impacted material samples, and to analyze imported backfill samples.
3	Inputs	Analytical chemistry data will be collected to ensure effluent water treatment samples are below compliance criteria, to provide disposal facilities with impacted material analytical data to ensure waste is classified appropriately, and to ensure imported backfill samples meet applicable criteria.
4	Boundaries	Soil and water samples from the Work Site will be collected.
5	Analytical Approach	The analytical approach is to generate usable data in accordance with this QAPP.
6	Acceptance Criteria	Laboratory acceptance criteria are presented in this QAPP for the RA activities to generate validated data to address data needs.
7	Plan	The plan for sample collection activities is presented in the FSP.

2.2.1 Measurement Performance Criteria

The measurement performance criteria for precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) are provided in the following subsections.

2.2.1.1 Field Precision Criteria

Precision of the field sample collection procedures will be assessed by the analysis of field duplicate samples. Field duplicate samples will be collected at a frequency of 1 per 20 or fewer investigative samples or at a minimum frequency of 1 per sampling event. The samples will be labeled such that the field duplicate sample is "blind" to the laboratory. A relative percent difference (RPD) of 100 percent for soil/sediment and 50 percent for water samples will be used as the acceptance limit for analytes detected in both the investigative and field duplicate samples at concentrations greater than or equal to five times their quantitation limits. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criteria is one or two times the RL value for water and soil samples, respectively

Field precision for field measurements will be assessed through replicate measurement of the same sample, as applicable to the parameter being measured. The precision acceptance criteria for field measurements will be an RPD of 10 percent or less.

2.2.1.2 Laboratory Precision Criteria

Laboratory precision will be assessed through the calculation of RPDs for laboratory duplicate sample analyses. These will be matrix spike/matrix spike duplicate (MS/MSD) and/or laboratory control samples/laboratory control

sample duplicates (LCS/LCSD). The equation to be used to determine precision is presented in Section 5.3.1 of this QAPP. Laboratory precision acceptance criteria will be generated by SGS and included in the laboratory reports.

2.2.1.3 Field Accuracy Criteria

The criteria for accuracy of the field sample collection procedures will be to ensure that samples are not affected by sources external to the sample, such as inadequate equipment decontamination procedures or sample contamination by ambient conditions or sample cross-contamination. Field sampling accuracy will be assessed using the data from equipment blank samples.

Field equipment blank samples will be collected at a minimum frequency of 1 per 20 sampling equipment decontamination procedures with a minimum frequency of one per sampling event during which equipment decontamination occurs. Field equipment blank samples (hereafter referred to as equipment blank samples) will be collected by routing laboratory-provided deionized water through decontaminated sampling equipment for the same parameters being analyzed for the RA activities. The samples will be labeled such that the equipment blank sample is "blind" to the laboratory. Equipment blank samples will be analyzed to check for procedural contamination or ambient conditions that may cause sample contamination.

Equipment blank samples should not contain target analytes. The equipment blank sample data will be evaluated using the procedures specified in Section 5.3.2 of this QAPP. Accuracy also will be ensured by adhering to all sample handling procedures, sample preservation requirements, and holding time periods.

Accuracy of field measurements will be assessed by analyzing calibration check samples, as applicable to the parameter being measured.

2.2.1.4 Laboratory Accuracy Criteria

Laboratory accuracy will be assessed by determining percent recoveries from LCS analyses. An LCS will be analyzed at a frequency of 1 per laboratory batch of 20 or fewer samples of the same matrix. Accuracy relative to the sample matrix will be assessed by determining percent recoveries from the analysis of MS samples. The equation to be used to determine accuracy for this project is presented in Section 5.3.2 of this QAPP. Laboratory accuracy acceptance criteria will be generated by SGS and included in the laboratory reports.

The accuracy of all organic analyses also will be monitored through the analysis of surrogate compounds. Surrogate compounds are added to each sample, standard, blank, and QC sample prior to sample preparation and analysis. Surrogate compounds are not expected to be found occurring naturally in the samples but behave analytically similar to the compounds of interest. Consequently, surrogate compound percent recovery data will provide information on the effect that the sample matrix exhibits on the accuracy of the analyses. Surrogate compound percent recovery acceptance criteria will be generated by SGS and included in the laboratory reports.

2.2.1.5 Field Representativeness Criteria

Representativeness is dependent upon the proper design of the sampling program. The representativeness criteria for field sampling will be to ensure that the correct locations are sampled and that the proper sampling procedures are followed. The sampling program was designed to provide data representative of conditions at the Work Site. During development of the sampling program, consideration was given to existing analytical data and physical setting.

2.2.1.6 Laboratory Representativeness Criteria

The representativeness criteria for laboratory data will be to ensure that the proper analytical procedures are used for sample preparation, sample analysis, and that sample holding times are met. Additionally, the accuracy and precision of the laboratory data affect representativeness. The laboratory representativeness criteria will include achieving the accuracy and precision criteria for the sample analyses.

2.2.1.7 Field Comparability Criteria

The criteria for field comparability will be to ensure and document that the proper sampling procedures are followed.

2.2.1.8 Laboratory Comparability Criteria

The criteria for laboratory data comparability will be to ensure that the analytical methods used for the RA are comparable to the methods used for previous sampling events, as applicable.

2.2.1.9 Field Completeness Criteria

The criterion for field completeness will be 90 percent or more of the field-measured data to ensure that the data are usable. The procedure for determining field data usability is provided in Section 3.8.2 of this QAPP. The equation for calculating completeness is presented in Section 5.3.4 of this QAPP.

2.2.1.10 Laboratory Completeness Criteria

The criteria for laboratory completeness will be 90 percent or more of the laboratory data are determined to be usable for the intended purpose. The procedure for determining laboratory data usability is provided in Section 5.2 of this QAPP. The equation for calculating completeness is presented in Section 5.3.4 of this QAPP.

2.2.1.11 Field Sensitivity Criteria

Sensitivity is the measure of the concentration at which an analytical method can positively identify and report analytical results. The sensitivity of a given method is commonly referred to as the detection limit. The sensitivity criteria for field measurement will be in accordance with manufacturer specification.

2.2.1.12 Laboratory Sensitivity Criteria

Targeted quantitation limits have been set to meet the Texas Minimum Analytical Levels (MALs), when such limits have been established, for the specified analytes.

It should be noted that high concentration of target and non-target analytes and matrix interferences may prevent the targeted quantitation limits from being achieved for all samples. The methods selected for analyzing the samples are EPA methods routinely used to support environmental investigations and data gathering activities.

2.3 Special Training Requirements/Certifications

Field sampling team members will be required to have successfully completed relevant field training protocols and to follow the Health and Safety Plan for the Southern Impoundment RA. They will also, if appropriate, be required to have received the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) safety training and annual 8-hour refresher courses required by 29 Code of Federal Regulations (CFR) Parts 1910 and 1926. GHD will be required to maintain employee training documentation.

Laboratory personnel training records will be maintained by SGS. SGS is accredited through the NELAP and the Texas Commission on Environmental Quality (TCEQ) for the methods that that it will perform, as applicable to demonstrate compliance with EPA's requirement that SGS has a documented quality system that complies with American National Standards Institute/American Society for Quality Control (ANSI/ASQC) E4-94 ("Specifications and Guidelines for Quality System for Environmental Data Collection and Environmental Technology Programs", January 1995), and EPA QA/R-2 ("EPA Requirements for Quality Management Plans", March 2001).

2.4 Documentation and Records

The documents, records, and reports that will be generated during Southern Impoundment RA activities are identified in the following subsections. The Project Manager will ensure the most current version of the QAPP is available prior to each sampling event.

2.4.1 Field and Laboratory Records

Documents and records generated will include sample collection records, Quality Control (QC) sample records, laboratory records, and data handling records. A brief description of these documents and records are provided below.

Sample collection records to be used during RA sampling activities will include field logbooks and/or project standard field forms, stratigraphic logs, COC records, field narratives, and shipping papers.

QC sample records to be used to document the generation of QC samples will include field logbooks and/or project standard field forms recording field blank samples, and field duplicate samples. SGS will maintain quality records for all analytical blank samples (i.e., trip blank, equipment blank, and/or field blank samples).

Calibration data, where applicable, will be recorded in these logbooks and/or on project standard field forms.

Laboratory records to be maintained for the project will include sample receipt documentation, laboratory narratives, field, and laboratory COC documentation, sample container cleanliness certifications, reagent and standard reference material certifications, sample preparation records, sample analysis records (i.e., run logs), instrument/raw data, QC data, calibration data, corrective action reports, and final reports.

Data handling records to be maintained will include records verifying the accuracy of computer programs used to process or reduce raw data into final results for data validation reports.

GHD will maintain checklists, notes, and reports generated during the external data validation process.

2.4.2 Data Reporting Format

Field data will be recorded in field logbooks and/or on project standard field forms. Field data will be generated primarily from observations. This information will be included in project reports or submittals.

Laboratory reports for sampling and monitoring activities will include data deliverables, which will include some or all of the following:

1. Case narrative for each analyzed batch of samples.
2. Cross referencing of laboratory sample to project sample identification numbers.
3. Description of data qualifiers to be used.
4. Methods of sample preparation and analyses for samples.
5. Sample results.
6. Raw data for sample results and laboratory QC samples.
7. Results of (dated) initial and continuing instrument calibration records.
8. MS/MSD recoveries, LCS, method blank results, and surrogate recoveries (organics).
9. MS recoveries and matrix spike duplicate Relative Percent Difference (RPDs), LCS, serial dilutions, method blank results, and LCS reagent blank results (inorganics).
10. Labelled and dated chromatograms/spectra of sample results and laboratory QC checks.

Any data package prepared in connection with the Southern Impoundment RA will be an EPA "Contract Laboratory Program-like (CLP-like)" data package consisting of all the information presented in a CLP data package but not necessarily on CLP forms.

SGS will maintain validation and calibration data, which will include raw instrument data (including calibration data and instrument performance checks), method detection limit (MDL) studies, and method performance and validation studies. Summaries of the results of these studies will be included in the data packages.

2.4.3 Data Archiving and Retrieval

All records will be maintained consistent with SGS's and GHD's record retention policies and agency requirements.

3. Data Generation and Acquisition

The design and implementation of the measurement systems that will be used during RA activities, including sampling procedures, analytical procedures, and data handling and documentation, are detailed in the following subsections.

3.1 Sampling Program

The rationale for the sampling activities to be conducted during the RA is described in the FSP.

3.1.1 Sampling Methods

Sample collection methods and the following SOPs were included in the Final Second Phase Pre-Design Investigation Work Plan.

– SOP 4 Soil Sampling.
– SOP 5 Water Sampling.

3.1.2 Field Equipment and Sample Container Cleaning Procedures

Equipment cleaning/decontamination procedures are provided in the SOPs. Sample containers will be provided by SGS. All containers will be pre-cleaned in accordance with the EPA guidance document entitled "Specifications and Guidance for Contaminant-Free Sample Containers", EPA 540/R-93/051. Certificates of analysis for each lot of containers will be maintained by SGS or be available from the vendor upon request.

3.1.3 Field Equipment Maintenance, Testing, and Inspection Requirements

Field equipment will be inspected and tested prior to use in the field. Maintenance logs for all field equipment are recorded in the field logbooks or kept in field equipment files by GHD. Prior to use in the field, the equipment is checked again, and the performance information is recorded in the field logbook and/or on a standard field equipment form. All equipment returned from the field is inspected and tested. Any required maintenance is performed and documented prior to the equipment being returned to service.

Critical spare parts for field equipment and replacement field equipment are available and can be delivered to the field when the need is identified. Alternately, field equipment vendors can provide replacement equipment, if needed. The replacement equipment can be shipped for overnight delivery, as necessary.

3.1.4 Inspection and Acceptance Requirements for Supplies and Sample Containers

The field supplies will consist of detergent (Alconox) for equipment cleaning, distilled water for sample collection equipment rinsing, deionized water for final sample collection equipment rinsing and for collecting equipment rinsate blank samples, and sample containers to collect the samples.

Alconox, a standard laboratory-grade detergent, and distilled water will be purchased as needed from a variety of vendors.

Deionized water and sample containers will be provided by SGS. SGS will maintain documentation of the purity/cleanliness for these materials. The SGS QA Officer is ultimately responsible for ensuring these materials are acceptable for the project. The acceptability of these materials for use will be evaluated by reviewing lot analysis certificates (deionized water and containers). Water and containers that do not meet SGS's acceptability requirements will not be shipped to the field.

3.2 Sample Handling and Custody Requirements

The procedures for sample handling, labelling, shipping, and COC documentation that will be adopted in connection with RA activities are provided in the subsections that follow.

3.2.1 Sample Handling and Packaging

The procedures used to collect the samples are provided in the SOPs. The sample identification procedure is as follows:

Example: 11215131-112921-S-DJT-XXX

Where:

11215131	=	GHD project number (same project number as used in logbooks and on sample forms).
112921	=	Date of collection (mm,dd,yy).
S	=	Designates sample matrix (S - Soil, GW - Groundwater, SW - Surface Water, SE - Sediment, WC-Waste Confirmation).
DJT	=	Sampler initials.
XXX	=	Unique sample number.

Unique sequential sample numbers will be assigned to samples. Sample identifications, sample locations, and sample depths will be recorded in the field logbook or field forms.

Samples will be placed in shipping coolers containing ice immediately following collection. The samples will be placed in the shipping cooler, and then shipped to SGS via laboratory courier, hand delivery by GHD, or by an overnight courier service.

3.2.2 Chain-of-Custody

COC is the sequence of possession of an item. Field, laboratory, and final evidence files custody procedures that will be used during RA activities are described in the subsections that follow.

3.2.2.1 Field Custody Procedures

Log books and/or project standard field forms will be used to record field data collection activities. Field log books are bound field survey books or notebooks with consecutively numbered pages. Each log book will be identified by a project-specific document number.

Entries will be described in as much detail as possible to ensure that a particular situation could be reconstructed solely from these entries. Log books will be assigned to field personnel and will be stored at GHD's Houston office when not in use. Each log book will be identified by a project-specific document number.

The title page of each log book will contain the following information:

– Person to whom the log book is assigned.
– Log book number.
– Project name.
– Project start date.
– End date.

Entries into the logbook will contain a variety of information. At the beginning of each day's logbook entry, the date, start time, weather, names of all sampling team members present, and the signature of the person making the entry will be entered. The names of individuals visiting the Work Site or field sampling team and the purpose of their visit will also be recorded in the field logbook.

All field measurements and sample collection information will be recorded in a logbook and/or on a project standard field form. Project standard field forms will be specifically prepared for each project sampling location. These forms will be used to record all field measurements/information and samples collected for each location. All entries in such forms will be completed in ink, without any erasures. If an incorrect entry is made, the incorrect information will be crossed out with a single strike mark. The correct information will then be entered adjacent to the original entry. The forms are to be signed and dated.

Whenever a sample is collected, an identification and a detailed description, if necessary, of the location will be recorded in the logbook and/or on a project standard field form. Photographs taken at a location, if any, should be noted in the logbook. All equipment used to obtain field measurements will be recorded in the field logbook and/or on a project standard field form. In addition, the calibration data for all field measurement equipment will be recorded in the field logbook or on standard field forms.

Samples will be collected according to the applicable sampling procedures documented in the FSP or other project-appropriate planning document. The equipment used to collect samples, time of sample collection, sample description, volume and number of containers, and preservatives added, if applicable, will be recorded in the field logbook and/or on a project standard field form. A deviation from sampling procedures in the FSP, QAPP, or other project-appropriate planning document will be documented in the field logbook and/or on a project standard field form. Each sample will be uniquely identified by the procedure provided in Section 3.2.1.

The sample packaging and shipping procedures summarized below will ensure that the samples arrive at SGS with the chain-of-custody intact:

1. The field sampler is personally responsible for the care and custody of the samples until they are transferred to another person or SGS. As few people as possible will handle the samples.
2. All sample containers will be identified by using sample labels that include the sampler's initials, sample name, date and time of collection, and analyses to be performed. Sample labels will be completed for each sample using waterproof ink and will be placed on the sample container.
3. Samples will be accompanied by a properly completed COC form. The sample identification numbers and required analyses will be listed on the COC form. When transferring the possession of samples, the individuals relinquishing and receiving the samples will sign and record the date and time on the form. The COC form documents sample custody transfers from the sampler to another person, to SGS, or to/from a secure storage area.
4. Samples will be properly packaged for shipment and dispatched to SGS for analysis with a separate signed COC form enclosed in and secured to the inside top of each shipping cooler. Shipping coolers will be secured with custody seals for shipment to SGS. The custody seal is then covered with clear plastic tape to prevent accidental damage to the custody seal.

5. If samples are split with a government agency or other entity, it is the responsibility of that entity to prepare its own COC form for the samples. Information regarding the identity of the entity and the sample(s) that are being split will be recorded in the field logbook.
6. All sample shipments will be accompanied by the COC form identifying its contents. The COC form is a four-part carbonless-copy form. The form is completed by the sampling team which, after signing and relinquishing custody to the shipper, retains the bottom (goldenrod) copy. The shipper, if different than the sampling team members, retains the pink copy after relinquishing custody to SGS. The yellow copy is retained by SGS, and the fully executed white copy is returned as part of the data deliverables package.
7. If the samples are sent by common carrier, a bill of lading (i.e., FedEx air bill) will be used and copies will be retained as permanent documentation. Commercial carriers are not required to sign the COC form provided the form is sealed inside the sample cooler with the custody tape intact.

3.2.2.2 Laboratory Custody Procedures

SGS's sample custody begins when the samples are received at the laboratory. SGS's sample custodian will assign a unique laboratory sample identification number to each incoming sample. The field sample identification numbers, laboratory sample identification numbers, date, and time of sample collection, date, and time of sample receipt, and requested analyses will be entered into the sample receiving log. SGS's sample log-in, custody, and document control procedures will be consistent with its standard operating procedure for handling samples.

Following log-in, all samples should be stored within an access-controlled location and will be maintained properly preserved until completion of all laboratory analyses. Unused sample aliquots and sample extracts will be maintained properly preserved for a minimum of 30 days following receipt of the final report by GHD, or as agreed upon by GHD and SGS. SGS will be responsible for the disposal of unused sample aliquots, sample containers, and sample extracts in accordance with all applicable local, state, and federal regulations.

3.2.2.3 Final Evidence Files Custody Procedures

The final evidence file for the project will be maintained by GHD and will consist of the following:

1. Project plans.
2. Project logbooks.
3. Field data records.
4. Sample identification documents.
5. Chain-of-custody records.
6. Correspondence.
7. References, literature.
8. Final data packages.
9. Miscellaneous - photos, maps, drawings, etc.
10. Reports.

The final evidence file materials will be the responsibility of the evidentiary file custodian with respect to maintenance and document removal.

3.3 Analytical Method Requirements

The laboratory analytical methods that will be used are included in Table 1.

The turnaround time required for the analyses required for each batch of samples is to be noted on the COC documents submitted with the samples and will be communicated to SGS prior to the sampling event, as necessary.

3.4 Quality Control Requirements

The field and laboratory QC requirements that will be adopted for the Southern Impoundment RA are discussed in the following subsections. Specific QC checks and acceptance criteria are identified in the discussion of the referenced analytical methods.

3.4.1 Field Sampling Quality Control

Field QC requirements include analyzing reference standards for instrument calibration and for routine calibration checks. Field QC samples for this project include use of equipment blank samples to determine the existence and magnitude of sample contamination resulting from sample containers or sampling procedures and field duplicate samples to assess the overall precision of the sampling and analysis event.

3.4.2 Analytical Quality Control

The laboratory QC requirements for the analyses include analyzing method blanks, instrument performance checks, initial calibration standards, calibration verification standards, internal standards, surrogate compound spikes, and LCS. The acceptance criteria for LCS and surrogate compounds will be generated by the SGS and included in SGS's reports.

3.5 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Procedures to verify that instruments and equipment are functional and properly maintained are described in the following subsections.

3.5.1 Laboratory Instrument Maintenance

As part of its QA/QC program, SGS conducts routine preventive maintenance (including maintaining instruments based on the manufacturer's specifications) to minimize the occurrence of instrument failure and other system malfunctions and to document all maintenance that is performed will be documented in SGS's maintenance logbooks or other records.

3.6 Calibration Procedures and Frequency

Procedures for calibrating and maintaining the accuracy of all the instruments and measuring equipment that will be used for conducting field sampling and laboratory analyses are described in the following subsections.

3.6.1 Field Instruments/Equipment

Instruments and equipment used to gather, generate, or measure environmental data are to be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications.

Equipment to be used during field sampling will be examined to confirm that it is in operating condition.

3.6.2 Laboratory Instruments

Calibration of laboratory equipment will be based on approved written procedures. Records of calibration, repairs, or replacement will be filed and maintained by the designated SGS personnel performing these QC activities. These records generally will be filed at the location where the work is performed and will be subject to a QA audit. SGS will

have trained staff and in-house spare parts available for instrument repair or will maintain service contracts with vendors. Specific calibration procedures and frequencies are detailed in the referenced method.

3.7 Inspection/Acceptance Criteria for Supplies and Consumables

The procedures that will be used to ensure that supplies and consumables used in the field and laboratory will be available, as needed, and free of contaminants are detailed in the following subsections.

3.7.1 Field Supplies and Consumables

Supplies and consumables for field sampling will be obtained from various vendors and will include sample containers, detergent and water for equipment decontamination, and field blank water. Additional field supplies and consumables may include pump tubing and personal protective equipment. These materials will not introduce contaminants into the samples or interfere with the analyses. All field supplies will be consumed or replaced with sufficient frequency to prevent deterioration or degradation that may interfere with the analyses.

3.7.2 Laboratory Supplies and Consumables

SGS's vendors for general labware, reagents, chromatography supplies, and organic standards will be certified and meet the requirements of the analytical method or SGS's QAPP. The lot numbers of reagents and standards will be recorded and dates of receipt, first use, and expiration will be documented by SGS. Certificates of analysis will be maintained on file to document reagent/standard purity.

3.8 Data Management

Procedures for managing data from generation to final use and storage for the RA will include the procedures detailed in the subsections that follow.

3.8.1 Data Recording

Field information will be recorded in field logbooks, on project standard field forms or by other means, and will include measurements from direct reading instruments or direct measurements. Field staff will be responsible for recording field data and identifying and correcting recording errors.

Laboratory data are recorded in a variety of formats. Data from instruments will be recorded on magnetic media, strip charts, or bench sheets or by other means. The referenced methods provide the data recording requirement for each preparation and analysis method.

3.8.2 Data Validation

3.8.2.1 Field Data

Validation of field data for this project will primarily consist of checking for transcription errors and reviewing information recorded in field logbooks. Data transcribed from the field logbook into summary tables for reporting purposes will need to be verified for correctness by the Field QA Officer or designee, with any limitations on the use of field data identified.

3.8.2.2 Environmental Laboratory Generated Data

A full validation (or Stage 4 validation equivalent) will be performed on data collected during the RA. The full validation process will include a review of all technical holding times, instrument performance check sample results, initial and

continuing calibration results, and all batch and matrix QC (including equipment blanks, field duplicates, MS/MSD, laboratory duplicates, surrogate recoveries, method blanks, LCS results, continuing and initial calibration checks, and the identification and quantitation of specific analytes of interest), and review of raw and supporting documentation. Assessment of analytical data would include checks on data consistency by looking for comparability of duplicate analyses, adherence to accuracy and precision control criteria detailed in this QAPP and anomalously high or low parameter values. The results of any data validations will be reported to the SGS, with notations as to any discrepancies and their effect upon acceptability of the data. The procedure will include nonconformance reports that summarize the samples reviewed, parameters reviewed, any outliers with the established criteria, and potential validation actions (including data qualifiers).

3.8.3 Data Transformation/ Calculations

Field data calculation procedures may be different in scope compared to those implemented for laboratory data. Direct reading instrumentation may be employed in the field, if needed. The use of field instruments would generate data read directly from the meters following calibration, which would then be recorded into field logbooks, project standard field forms or other records immediately after the measurements are obtained. Laboratory data calculations would be made to produce final results from raw data.

3.8.4 Data Transmittal/Transfer

Field data will be entered into a field sample key (FSK) or standard spreadsheet format or documented by some other means. It will be the QA Officer's responsibility for verifying the correctness of the COC to the FSK after the data are transferred.

SGS will provide data in electronic format as electronic data deliverables (EDDs), which are generated directly from the laboratory information management system (LIMS). Laboratory EDDs can be imported into the database, and the data can be maintained in the database for manipulation and presentation.

It will be the responsibility of GHD's database analysts to verify the correctness of the analytical database after the laboratory data for each event have been imported, such as by comparing the data from the database to the hard copy analytical reports for a specified percentage (such as 10 percent) of the sample results and addressing any discrepancies between the database and analytical reports.

3.8.5 Data Assessment

Assessment of laboratory data will be performed using the procedures established for each analytical method. These assessments performed may vary by method, but will include determining the mean, standard deviation, relative standard deviation, percent difference, RPD, and percent recovery for certain QC elements.

3.8.6 Data Tracking

Data generated in the field, such as water level measurements, will be recorded in field logbooks, on project standard field forms or by other means, as there are no unique or special tracking requirements for these data. The data will be transcribed for analysis and reporting and included as part of a final evidence file.

Tracking of analytical data in the GHD database will include recording the laboratory generating the data, the due dates and receipt of when the data in the form of portable digital format (PDF) report and the EDD were received and imported, the dates when the data validation is due and completed, and when the final data validation report was completed.

3.8.7 Data Storage and Retrieval

Laboratory data and electronic instrument data will be stored in hard copy and/or electronic format for a minimum period of 10 years.

GHD's Project Manager is responsible for project data storage and retrieval. Final evidence files, which will include a copy of all laboratory data will be maintained by GHD in secure on-site or off-site storage.

3.8.8 Data Security

The laboratory data security will be the responsibility of the Laboratory Director. Data security measures implemented will include prohibitions on access to archived data without authorization.

4. Assessment and Oversight

The following subsections describe the procedures used to ensure proper implementation of this QAPP and the activities for assessing the effectiveness of the implementation of the project and associated QA/QC activities.

4.1 Assessments and Response Actions

Assessments consisting of internal and external audits will be performed during the project. Internal technical system audits of both field and laboratory procedures will be conducted to verify that sampling and analysis are being performed in accordance with the procedures established in the FSP and this QAPP.

An internal field technical system audit of field activities will be conducted by the Field QA Officer or designee at the beginning of the field sampling activities to identify deficiencies in the field sampling and documentation procedures. The field technical system audit will include examining field sampling records and COC documentation. In addition, sample collection, handling, and packaging in compliance with the established procedures will be reviewed during the field audit. Any deficiencies identified will be documented and corrective actions will then be taken and documented.

Follow-up audits will be performed, as necessary to verify that deficiencies have been corrected and that the QA/QC procedures described in this QAPP and the approved Southern Impoundment FSP have been followed.

An internal laboratory technical system audit will be conducted by the SGS's QA Officer or designee. The laboratory technical system audit typically is conducted on a biannual basis and includes examining laboratory documentation regarding sample receiving, sample log-in, storage and tracking, COC procedures, sample preparation and analysis, instrument operating records, data handling and management, data tracking and control, and data reduction. SGS's QA Officer will evaluate the results of the audit and provide a report to section managers and the Laboratory Director that includes any deficiencies and/or noteworthy observations.

Corrective action resulting from deficiencies identified during the internal laboratory technical system audit will be implemented immediately. The Laboratory Director will ensure implementation and documentation of the corrective action. All problems requiring corrective action and the corrective action taken will be reported to the Laboratory Project Manager. Follow-up audits will be performed as necessary to verify that deficiencies have been corrected.

External laboratory audits, if conducted, may include, but not be limited to, reviewing laboratory analytical procedures, laboratory on-site audits, and/or submitting performance evaluation samples to the laboratory for analysis.

4.2 Reports to Management

Quality assurance information will be summarized following completion of RA activities. This information will consist of the results of external performance evaluations, results of periodic data quality control and assessment, data use limitations, and any significant QA problems identified, and corrective actions taken.

5. Data Validation and Usability

The QA activities that will be performed to ensure that the data are scientifically defensible, properly documented, of known quality, and meet the project objectives are described in the following sections.

5.1 Data Review, Verification, and Validation

All field and laboratory data will be reviewed, verified, and validated. These terms are defined as follows:

– Data review is the in-house examination to ensure that the data have been recorded, transmitted, and processed correctly.
– Data verification is the process for evaluating the completeness, correctness, and conformance/compliance of a specific data set against the method, procedural, or contractual specifications.
– Data validation is an analyte and sample-specific process that extends the evaluation of data beyond method, procedure, or contractual compliance (i.e., data verification) to determine the quality of a specific data set relative to the end use.

The procedures and criteria that will be used to verify and validate field and laboratory data are presented in Section 5.2.

Laboratory data review will consist of raw data being reduced to results and checked by the responsible analyst. A second review of the data reduction procedure will be conducted by another analyst or senior chemist. After the data are verified, a draft report will be reviewed by the Laboratory Project Manager. Final reports are generated, signed, and transmitted after approval of the draft by the SGS Project Manager.

5.2 Validation and Verification Methods

Field data will be verified by reviewing field documentation and COC records. Data from direct reading field instruments will be verified by reviewing calibration and operating records and QC data.

Verification of sample collection procedures consists of reviewing sample collection documentation for compliance with the requirements of the work plan and QAPP. If alternate sampling procedures were used, the acceptability of the procedure would need to be evaluated to determine the effect on the usability of the data. Data usability will not be affected if the procedure that was used is determined to be an acceptable alternative that fulfills the measurement performance criteria.

SGS will internally verify its data by reviewing and documenting sample receipt, sample preparation, sample analysis (including internal QC checks), data reduction and reporting. Any deviations from the acceptance criteria, corrective actions taken, and data determined to be of limited usability (i.e., laboratory-qualified data) will be noted in the laboratory reports.

RA data validation will be conducted by GHD. The results of the data validation procedure will identify data that do not meet the measurement performance criteria. Data validation will determine whether the data are acceptable, of limited usability (qualified as estimated), or rejected. Data qualified as estimated will be reviewed and a discussion of the usability of estimated data will be included in the data validation report. The results of data verification/validation will be summarized in a data validation memorandum provided to the Project Coordinator and Project Manager for use in interpreting the results and for use in project reports.

Data determined to be unusable may require corrective action, such as resampling by the field team or reanalysis of samples by SGS.

5.3 Usability/Reconciliation with Data Quality Objectives

The overall usability of the data from the RA will be assessed by evaluating the PARCCS of the data set to the measurement performance criteria in Section 2.2.1 using basic statistical quantities, as applicable. The procedures and statistical formulas to be used for these evaluations are presented in the following subsections.

5.3.1 Precision

Precision of field sampling procedures will be evaluated by assessing the RPD data from field duplicate samples. Analytical precision will be evaluated by assessing the RPD data from either duplicate spiked sample analyses or duplicate LCS analyses. The RPD between two measurements is calculated using the following simplified formula:

$$RPD = \frac{|R_1 - R_2|}{R_1 + R_2} X\ 200$$

Where:

R_1 = Value of first result

R_2 = Value of second result

RPD data will provide the means to evaluate the overall variability attributable to the sampling procedure, sample matrix, and laboratory procedures. It should be noted that the RPD of two measurements can be very high when the concentrations approach the quantitation limit of an analysis.

5.3.2 Accuracy/Bias

The data from method blank samples, surrogate compound spikes, LCS, and MS will be used to determine accuracy and potential bias of the sample data.

Method blanks apply to all investigative samples belonging to the same sample preparation batch all investigative samples analyzed on the same instrument on the same day. No contaminants should be found in the method blank. If issues are identified with any blank, all associated data must be thoroughly scrutinized to determine if inherent variability is present or if the occurrence is isolated. Each area of analysis has its own particular suite of common laboratory contaminants. If target analytes are detected in the blanks, detection of these analytes in associated investigative samples may reflect contamination and must be qualified as non-detected.

The data from equipment and trip blank samples provide an indication of field conditions that may result in the qualification of sample data. Sample data associated with contaminated equipment blank samples will have been identified during the data verification/validation process. The evaluation procedure and qualification of sample data associated with equipment contamination are performed in a similar manner as the evaluation procedure for method blank sample contamination.

MS sample data provide information regarding the accuracy/bias of the analytical methods relative to the sample matrix. MS samples are field samples that have been fortified with target analytes prior to sample preparation and analysis. The percent recovery data provide an indication of the effect that the sample matrix may have on the preparation and analysis procedure. Sample data exhibiting matrix effects will have been identified during the data verification/validation process.

Surrogates are non-target compounds added to every sample at the beginning of the sample preparation to monitor the success of the sample preparation on an individual sample basis. The percent recovery data provide an indication of the effect that the sample preparation may have on the matrix and analysis procedure. Sample data exhibiting matrix effects will have been identified during the data validation process.

Analytical accuracy/bias will be determined by evaluating the percent recovery data of LCS. An LCS consists of a portion of analyte-free water or solid phase sample that is spiked with target analytes at a known concentration. The LCS is processed through the entire method procedure with each sample batch; the results are examined for target

analyte recovery. The percent recovery data from LCS analyses will provide an indication of the accuracy and bias of the analytical method for each analyte or analyte group.

Percent recovery (%R) is calculated using the following formula:

$$\%R = \frac{SSR - SR}{SA} X\ 100$$

Where:

SSR = Spiked Sample Result

SR = Sample Result or Background

SA = Spike Added

The percent recovery for surrogate compounds and LCS are determined by dividing the measured value by the true value and multiplying by 100.

Accuracy/bias will be determined by comparing the percent recovery data to the measurement performance criteria in Section 2.2.1 of this QAPP.

5.3.3 Sample Representativeness

Representativeness of the samples will be assessed by reviewing sample holding times, the results of field audits, if conducted, and the data from field duplicate samples. Sample representativeness will be considered acceptable if holding time periods are met, the results of field audits indicate that the approved sampling methods or alternate acceptable sampling methods were used to collect the samples, and the field duplicate RPD data are acceptable.

5.3.4 Completeness

Completeness will be assessed by comparing the number of valid (usable) sample results to the total possible number of results within a specific sample matrix and/or analysis. Percent completeness will be calculated using the following formula:

$$\%\ Completeness = \frac{Number\ of\ Valid\ (usable)\ measurements}{Number\ of\ Measurements\ Planned} X\ 100$$

Completeness will be considered acceptable if 90 percent of the data are determined to be valid. However, valid sample data will not be rendered unusable if this completeness goal is not met. Formal corrective actions and additional sampling/analysis may be required when data quality results in a percentage less than the completeness goal. This will be addressed on a per event basis, in conjunction with the client and GHD.

5.3.5 Comparability

The comparability of data sets will be evaluated by reviewing the sampling and analysis methods used to generate the data for each data set. Comparability will be determined to be acceptable if the sampling and analysis methods specified in this QAPP and any approved QAPP revisions or amendments are used for generating the data.

Comparability of data from split samples (samples that are collected at the same time from the same location and split equally between two parties using sample containers from the same source or vendor), if collected, will be evaluated by determining the RPD of detected analytes in both samples following data validation. Analytes that are detected in only one of the two samples will be assessed by reviewing the data validation reports for both data sets and determining the cause of the discrepancy, if possible. Comparability of split sample data will be considered acceptable if the RPD for detected analytes with concentrations greater than or equal to five times their respective quantitation limits does not exceed RPD acceptance criteria for field duplicate samples.

5.3.6 Sensitivity and Quantitation Limits

SGS reports will include method reporting limits. These limits will be reviewed for the samples to ensure that the sensitivity of the analyses was sufficient to achieve the program requirements. All relevant QC data will be reviewed to assess compliance with the measurement performance criteria specified in Section 2.2.1 of this QAPP.

It should be noted that quantitation limits may be elevated as a result of high concentrations of target compounds, non-target compounds, and matrix interferences (collectively known as sample matrix effects). In these cases, the sensitivity of the analyses will be evaluated on an individual sample basis relative to the applicable evaluation criteria.

5.3.7 Data Limitations and Actions

Data use limitations will be identified in data validation reports. Data that do not meet the measurement performance criteria specified in this QAPP will be identified and the impact on the project quality objectives will be assessed and discussed in these reports and project reports. Field information will be reviewed to ensure that all sampling procedures were conducted in accordance with the requirements of this QAPP. Data from samples collected using procedures inconsistent with the requirements of this QAPP will be evaluated using the procedures in Section 5.1 of this QAPP. Specific actions for laboratory data that do not meet the measurement performance criteria depend on the use of the data and may require that additional samples are collected, or the use of the data be restricted.

6. References

– GHD, 2021a. *Final 100% Remedial Design-Southern Impoundment (Amended April 2021)*, San Jacinto River Waste Pits Superfund Site. Prepared for International Paper Company and U.S. Environmental Protection Agency, Region 6. June 2, 2022.
– GHD, 2021b. *Remedial Action Work Plan - Southern Impoundment Revision 2*, San Jacinto River Waste Pits Superfund Site. Prepared for International Paper Company and U.S. Environmental Protection Agency, Region 6. November 26, 2021.
– EPA, 2021. Unilateral Administrative Order for Remedial Action. U.S. EPA Region 6, CERCLA Docket. No. 06-05-21. In the matter of: San Jacinto Waste Pits Superfund Site Southern Impoundment, Harris County, Texas. International Paper Company, Respondent. August 2021.
– EPA, 2006. EPA's Guidance on Systematic Planning Using the DQOs Process. United States Environmental Protection Agency. February 2006.

Table 1

Analyte List, Analytical Methods and Quantitation Limits
San Jancito River Waste Pits Superfund Site

Analyte List	Analytical Methods	Targeted Quantitation Limits
Imported Backfill		
TAL[1] Metals	SW-846[4] 6010/6020/7471A	Laboratory MDL
Hexavalent Chromium	SW-846 7196A	Laboratory MDL
Cyanide	SW-846 9010/9012	Laboratory MDL
TCL[2] Volatiles	SW-846 8260B	Laboratory MDL
TCL Semi-Volatiles	SW-846 8270D	Laboratory MDL
TCL Pesticides	SW-846 8081B	Laboratory MDL
Polychlorinated Biphenyls	SW-846 8082A	Laboratory MDL
Herbicides	SW-846 8151A	Laboratory MDL
Dioxins and Furans	SW-846 1613B	Laboratory MDL
Total Petroleum Hydrocarbons	TX 1005/1006[3]	Laboratory MDL
Waste Confirmation		
TCLP Dioxins and Furans		
2,3,7,8-TCDD	EPA-1613B	Laboratory MDL
1,2,3,7,8-PeCDD	EPA-1613B	Laboratory MDL
1,2,3,4,7,8-HxCDD	EPA-1613B	Laboratory MDL
1,2,3,6,7,8-HxCDD	EPA-1613B	Laboratory MDL
1,2,3,7,8,9-HxCDD	EPA-1613B	Laboratory MDL
2,3,7,8-TCDF	EPA-1613B	Laboratory MDL
1,2,3,7,8-PeCDF	EPA-1613B	Laboratory MDL
2,3,4,7,8-PeCDF	EPA-1613B	Laboratory MDL
1,2,3,4,7,8-HxCDF	EPA-1613B	Laboratory MDL
1,2,3,6,7,8-HxCDF	EPA-1613B	Laboratory MDL
1,2,3,7,8,9-HxCDF	EPA-1613B	Laboratory MDL
Metals		
Antimony	SW846 1311/6010	Laboratory MDL
Arsenic	SW846 1311/6010	Laboratory MDL
Barium	SW846 1311/6010	Laboratory MDL
Beryllium	SW846 1311/6010	Laboratory MDL
Cadmium	SW846 1311/6010	Laboratory MDL
Chromium	SW846 1311/6010	Laboratory MDL
Lead	SW846 1311/6010	Laboratory MDL
Mercury	SW846 1311/7470A	Laboratory MDL
Nickel	SW846 1311/6010	Laboratory MDL
Selenium	SW846 1311/6010	Laboratory MDL
Silver	SW846 1311/6010	Laboratory MDL

Analyte List, Analytical Methods and Quantitation Limits
San Jancito River Waste Pits Superfund Site

Analyte List	Analytical Methods	Targeted Quantitation Limits
Imported Backfill		
Total Petroleum Hydrocarbons		
TPH 1005/1006	TX 1005/1006	Laboratory MDL
Treated Effluent Samples		
Dioxins/Furans		
2,3,7,8-TCDD	EPA-1613B	Laboratory MDL
1,2,3,7,8-PeCDD	EPA-1613B	Laboratory MDL
1,2,3,4,7,8-HxCDD	EPA-1613B	Laboratory MDL
1,2,3,6,7,8-HxCDD	EPA-1613B	Laboratory MDL
1,2,3,7,8,9-HxCDD	EPA-1613B	Laboratory MDL
2,3,7,8-TCDF	EPA-1613B	Laboratory MDL
1,2,3,7,8-PeCDF	EPA-1613B	Laboratory MDL
2,3,4,7,8-PeCDF	EPA-1613B	Laboratory MDL
1,2,3,4,7,8-HxCDF	EPA-1613B	Laboratory MDL
1,2,3,6,7,8-HxCDF	EPA-1613B	Laboratory MDL
1,2,3,7,8,9-HxCDF	EPA-1613B	Laboratory MDL
General Chemistry		
pH	SW-846 9040C	Laboratory MDL
Total Suspended Solids (TSS)	SM 2540D	Laboratory MDL
Metals		
Arsenic	SW-846 6010	Laboratory MDL
Barium	SW-846 6010	Laboratory MDL
Boron	SW-846 6010	Laboratory MDL
Cadmium	SW-846 6010	Laboratory MDL
Chromium	SW-846 6010	Laboratory MDL
Copper	SW-846 6010	Laboratory MDL
Lead	SW-846 6010	Laboratory MDL
Manganese	SW-846 6010	Laboratory MDL
Mercury	SW-846 7470A	Laboratory MDL
Nickel	SW-846 6010	Laboratory MDL
Selenium	SW-846 6010	Laboratory MDL
Silver	SW-846 6010	Laboratory MDL
Zinc	SW-846 6010	Laboratory MDL

Notes:

(1) TCL: Target Compound List.

(2) TAL: Target Analyte List.

(3) TCEQ Methods 1005 and 1006.

(4) SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", EPA SW-846, 3rd Edition with Updates I through IVB.

GHD