Appendix D
Field Sampling and Analysis Plan for Site Unit 11

March 2023
Former Reynolds Metals Reduction Plant – Longview

Field Sampling and Analysis Plan for Site Unit 11

Prepared for
Northwest Alloys, Inc.
c/o Alcoa Corp.
201 Isabella Street
Pittsburgh, Pennsylvania 15212-5858

Prepared by
Anchor QEA, LLC
6720 South Macadam Avenue, Suite 125
Portland, Oregon 97219

Project Number: 220002-04.02
I:\Projects\Alcoa\NW Alloys\Longview\Remediation\6_Design\4_EDR\Deliverables\07 Final EDR_working\03 Appendices\D_SU11 FSAP\Appendix D_SU11 FSAP_2023-03-31.docx

TABLE OF CONTENTS

TABLE

FIGURES

ATTACHMENTS

ABBREVIATIONS

bgs	below ground surface
CAP	*Cleanup Action Plan*
CDID	Consolidated Diking Improvement District
cPAH	carcinogenic polycyclic aromatic hydrocarbon
COC	chain of custody
CVI	Chinook Ventures, Inc.
Ecology	Washington State Department of Ecology
FC	field coordinator
FSAP	*Field Sampling and Analysis Plan for Site Unit 11*
HASP	*Health and Safety Plan*
HDPE	high-density polyethylene
JSA	Job Safety Analysis
MBT-Longview	Millennium Bulk Terminals – Longview, LLC
MTCA	Model Toxics Control Act
mg/kg	milligrams per kilogram
PAH	polycyclic aromatic hydrocarbon
QAPP	*Quality Assurance Project Plan for Site Unit 11*
SU11	Site Unit 11
TEF	toxicity equivalency factor
WAC	Washington Administrative Code

1 Introduction

This *Field Sampling and Analysis Plan for Site Unit 11* (FSAP) describes the soil removal procedures, sampling and analysis protocols, sample locations and frequency, equipment, sample handling, and analytical procedures for conducting sampling activities at Site Unit 11 (SU11, also formerly called the flat storage area) at the former Reynolds Metals Reduction Plant in Longview, Washington (Figure D1). This FSAP is an appendix to the *Final Engineering Design Report, Version 2*, prepared in accordance with the cleanup action as specified in the *Cleanup Action Plan* (CAP; Ecology 2018a) pursuant to Consent Decree No. 18-2-01312-08 (Ecology 2018b).

Field work will consist of removing approximately 185 cubic yards of polycyclic aromatic hydrocarbon (PAH)-containing soil from the former flat storage area. Confirmation soil samples will be collected from the final excavated area. Collected samples will be sent to an analytical laboratory for analysis. This FSAP is supported by the *Quality Assurance Project Plan for Site Unit 11* (QAPP; Attachment D1) and the Job Safety Analysis (JSA) documents in Attachment D2. The site *Health and Safety Plan* (HASP) is the overarching plan for the cleanup and will also be used for SU11.

1.1 Site Description

The site is located at 4029 Industrial Way near Longview, Washington, in unincorporated Cowlitz County. The property includes about 460 acres and is currently operated as a multimodal bulk materials handling facility. The site is approximately 10 feet above mean sea level and bounded by the Columbia River to the south; Consolidated Diking Improvement District (CDID) drainage ditches to the north, west, and east; Industrial Way along the northern boundary; and private property to the east.

1.2 Background

The flat storage area was developed by former site operator Chinook Ventures, Inc. (CVI), in the western area of the property, between the north plant potline buildings and the Cable Plant (Figure D1). CVI constructed a pad structure from cement-amended soil for stockpiling bulk products, such as green petroleum coke and coal. More than 100,000 tons of green petroleum coke was left in the flat storage area when CVI vacated the property. The Washington State Department of Ecology (Ecology) approved an Millennium Bulk Terminals – Longview, LLC (MBT-Longview) plan to remove the remaining petroleum coke (Ecology 2012). During spring and summer of 2012, MBT-Longview coordinated with Conoco Phillips, the owner of the product, to remove all remaining petroleum coke off site by truck. Ecology also authorized removal of the pad structure. Final removal and decommissioning of the flat storage pad was completed by MBT-Longview in December 2012.

Soil sampling was conducted in 2011, 2012, and 2013 in the flat storage area to determine if PAHs associated with petroleum coke products may have migrated into underlying soils. Sampling in 2011

was conducted before removal of the pad structure. Supplemental sampling in 2012 and early 2013 was performed following petroleum coke and storage pad removal. In 2012, 12 test pits were excavated to a maximum depth of 3 to 4.5 feet below ground surface (bgs). Four test pits were excavated and sampled in January 2013 to provide improved delineation of an area of PAH contamination in the northeast corner of the former flat storage area. A single localized soil sample exceeded the Method C Industrial Soil Cleanup Level for carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and three samples within 50 feet of that location were below the soil cleanup level (Anchor QEA 2015). This localized area makes up SU11 and is to be removed per the CAP.

1.3 Document Organization

The remainder of this FSAP is organized into the following sections:

- Section 2: Project Objectives
- Section 3: Project Management and Responsibilities
- Section 4: Soil Removal Procedures
- Section 5: Sample Collection Procedures
- Section 6: Field Documentation, Sample Handling Procedures, and Decontamination Procedures
- Section 7: Health and Safety
- Section 8: Schedule and Reporting
- Section 9: References

Attachments to this document include the following:

- Attachment D1 – Quality Assurance Project Plan for Site Unit 11
- Attachment D2 – Job Safety Analysis Documents
- Attachment D3 – Field Forms and Logs

2 Project Objectives

As identified in the CAP, the project objective for the SU11 removal is to protect human health and the environment by limiting direct contact with the cPAH detections based on an industrial use scenario.

To meet the project objective, cPAH-impacted soils in SU11 will be excavated and managed by off-site disposal. Soil removed from this area will be disposed at an appropriately permitted facility. Confirmation soil sampling will be conducted to demonstrate compliance with the Method C Industrial Soil Cleanup Level for cPAH. Following confirmation soil sampling, the area will then be backfilled with gravel after contaminated materials have been removed.

3 Project Management and Responsibilities

This section describes the project management structure for implementing this FSAP. Additional information about staff responsible for project roles is identified in the QAPP (Attachment D1).

The project manager for Northwest Alloys, Inc., is Kristin Gaines. All site access and field work will be coordinated in advance with Ms. Gaines. Anchor QEA, LLC, field staff will notify Ms. Gaines or her designee before the beginning of work at the site. Upon arrival, each worker will sign the visitor's registration log at the guard's office and obtain a vehicle permit. All Anchor QEA staff must have Northwest Alloys safety training prior to working on the site.

The project manager for Anchor QEA is Nicole LaFranchise. Ms. LaFranchise will be responsible for overall project coordination, including production of all project deliverables and administrative coordination to ensure timely and successful completion of the project.

The field coordinator (FC) for Anchor QEA is Tim Stone. He will provide overall direction for the field sampling effort in terms of logistics and field operations, and he will supervise field collection of samples. Mr. Stone (or designee under his direction) will be responsible for positioning samples accurately; recording sample locations, depths, and identification; ensuring conformance to sampling and handling requirements, including field decontamination procedures; and completing chain-of-custody (COC) forms.

Sampling and analysis will be completed with equipment owned or contracted by Anchor QEA. Anchor QEA will be responsible for the submittal of environmental samples to the designated laboratory for chemical analyses. The laboratory project manager will provide analytical support and be responsible for providing certified, pre-cleaned sample containers and sample preservatives (as appropriate) and ensuring that all chemical analyses meet the project data quality objectives and other quality specifications of the QAPP.

4 Soil Removal Procedures

SU11 will be remediated using soil removal and off-site disposal. Soil removal and backfilling will be conducted by an excavation contractor. The soil removal procedures are discussed in Sections 4.1 through 4.4.

4.1 Site Preparation and Coordination

The excavation area will be delineated using coordinates from the remedial investigation sampling. Before field work begins at the site, public and private utility locating services and other information sources (such as property-specific plans) will be used to check for underground utilities within SU11. Anchor QEA will coordinate field work with on-site staff, both to define the locations of possible utilities and piping located on the site and to avoid interrupting business operations.

4.2 Excavation Procedures

Using a small excavator, soil will be removed in the 50-foot by 50-foot area, as shown in Figure D2, down to 2 feet bgs. It is estimated that approximately 185 cubic yards of soil will be removed. Removed soil will be placed directly into a roll-off box. Roll-off boxes will be provided with an appropriate liner and cover.

4.3 Confirmation Sampling and Backfill

Confirmation samples will be collected and compared to the cleanup levels defined in the CAP (Ecology 2018a) and as included in Section 5.3. If comparison of confirmation sample results with cleanup levels does not demonstrate compliance with cleanup levels, additional excavation will be performed, and confirmation samples will be collected until compliance is demonstrated. Following confirmation of compliance with cleanup levels, the excavation area will be backfilled with gravel.

4.4 Soil Disposal and Water Management

Excavated soil will be profiled for disposal and appropriately managed on site until transport to an approved landfill. Tools and construction equipment used for the soil removal will be decontaminated following soil removal. Following profiling, decontamination water will be appropriately managed for off-site disposal or on-site treatment through the wastewater treatment plant. Groundwater contact is not anticipated during this excavation, and the excavation area is not contained within the West or East Groundwater areas.

5 Sample Collection Procedures

This section presents the sample locations, sample identification, and sample collection methodology. The sample handling requirements are detailed in Section 6.

5.1 Sample Station Location and Identification

Soil samples will be collected from two locations approximately 25 feet apart within SU11. A location map and soil sampling locations are presented in Figures D1 and D2, respectively. Sidewall samples will not be collected due to the shallow excavation depth.

Each soil sample will be assigned a unique alphanumeric identifier according to the following method: Consultant (AQ)-Site Unit (SU11)-Sample Location No.-Date (month/day/year). An example of a soil sample based on this nomenclature is as follows:

- AQ-SU11-01-080121, indicating that a soil sample was collected from location number 01 within SU11 on August 1, 2021

5.2 Soil Collection

Discrete soil samples will be collected using a decontaminated stainless-steel hand trowel or amendable hand-sampling device (e.g., a shovel) from the top 6 inches of soil. The grab samples will be taken from two locations within the area of soil removal at the base of the excavation (Figure D2).

The FC will generate a field log (Attachment D3) that records each soil sample in accordance with the sampling scheme presented in this FSAP. Once collected, each soil sample will be placed into a decontaminated stainless-steel bowl, homogenized until a uniform color and texture is achieved, and spooned into laboratory-supplied jars for analysis. Containers will be placed in a cooler and shipped to Apex Laboratories LLC under COC. The COC form will be logged by the FC and relinquished to the courier and then to the laboratory staff. Samples will be analyzed for PAHs by U.S. Environmental Protection Agency Method 8270.

Field documentation and sample handling will be consistent with procedures described in Section 6. Analytical methods, practical quantitation limits, and target detection limits are defined in the QAPP (Attachment D1).

5.3 Soil Sample Confirmation

Confirmation samples will be compared to the cleanup levels defined in the CAP (Ecology 2018a) in accordance with data analysis procedures described in Washington Administrative Code (WAC) 173-340-740(7). The soil cleanup levels applicable to SU11 are summarized in Table D1

Table D1
Soil Cleanup Levels

Contaminant of Potential Concern	Soil Cleanup Level	Protection Basis
PAHs[1]	18 mg/kg	Method C

Note:

1. Cleanup level developed for potential cPAHs based on the approved MTCA TEF procedure.

These analysis procedures require that no single confirmation sample concentration will be greater than two times the cleanup level, less than 10% of the sample concentrations will exceed the cleanup level, and the 95% upper confidence limit will be less than the cleanup level. If comparison of confirmation sample results with cleanup levels does not demonstrate compliance with cleanup levels, additional excavation will be performed, and confirmation samples will be collected until compliance is demonstrated.

6 Field Documentation, Sample Handling Procedures, and Decontamination Procedures

This section addresses the sampling program requirements for field documentation, sample handling, and equipment decontamination.

6.1 Field Documentation

A record of soil sampling activities will be maintained on a soil field sample record form. All on-site activities (including health and safety entries) and field observations will be documented on a daily field form. Entries will be made in indelible ink. The daily field form is intended to provide sufficient data and observations to enable readers to reconstruct events that occurred during the sampling period. The field form will include clear information concerning any modifications to the details and procedures identified in this FSAP. Sample forms are presented in Attachment D3.

Sampling collection forms will be maintained as samples are collected and will be correlated to the sampling location map. The following information will be included on these forms:

- Sample location number
- Date and time of collection of each sample
- Names of FC and person(s) collecting and logging in the sample
- Observations made during sample collection, including weather conditions, complications, and other details associated with the sampling effort
- Any deviation from this FSAP

6.2 Sample Custody Procedures

Samples are considered to be in one's custody if they are the following: 1) in the custodian's possession or view; 2) in a secured location (under lock) with restricted access; or 3) in a container that is secured with an official seal such that the sample cannot be reached without breaking the seal.

COC procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the COC form. Each sample will be represented on a COC form the day it is collected. All data entries will be made using indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, then dating and initialing the change. Blank lines or spaces on the COC form will be lined out, dated, and initialed by the individual maintaining custody.

A COC form will accompany each cooler of samples to the analytical laboratories. Each person who has custody of the samples will sign the COC form and ensure that the samples are not left unattended unless properly secured. Copies of all COC forms will be retained in the project files.

6.3 Sample Shipping and Receipt Requirements

All sample containers will be hand-delivered to the analytical laboratory by the sampler or a courier on a daily basis. Sample containers will be shipped if neither of these options are available. Specific sample transportation procedures are as follows:

- Each cooler or container enclosing the samples for analysis will be transported via courier or hand-delivered by the sampler to the analytical laboratory. Following each delivery by courier, the FC will call the laboratory and verify that the samples were received and are in good condition.
- Coolant ice will be sealed in separate double plastic bags and placed in the sample coolers.
- Individual sample containers will be placed in a sealable plastic bag, packed to prevent breakage, and transported in a sealed ice chest or other suitable container.
- Glass jars will be separated in the sample coolers by shock absorbent material (i.e., bubble wrap) to prevent breakage.
- The sample coolers will be clearly labeled with sufficient information (name of project, time and date container was sealed, and person sealing the container with company name) to enable positive identification.
- The courier delivery will be documented on all COC forms accompanying the samples.
- A sealed envelope containing COC forms will be enclosed in a plastic bag and taped to the inside lid of each cooler.
- A minimum of two signed and dated COC seals will be placed on adjacent sides of each cooler prior to transporting.
- Each cooler will be wrapped securely with strapping tape, labeled "Glass – Fragile" and "This End Up." In addition, each cooler will be clearly labeled with the laboratory's address and Anchor QEA's return address.

Upon transfer of sample possession to the analytical laboratory, the persons transferring custody of the sample container will sign the COC form. Upon receipt of samples at the laboratory, the sample container seal will be broken, and the receiver will record the condition of the samples on a sample receipt form. COC forms will be used internally in the laboratory to track sampling handling and final disposition.

6.4 Field Equipment Decontamination

Sample containers, instruments, working surfaces, technician protective gear, and other items that may come into contact with sample material must meet high standards of cleanliness. Equipment and instruments used that are in direct contact with the soil for analysis must be made of glass,

stainless steel, or high-density polyethylene (HDPE). These items will be cleaned prior to each day's use and between sampling or compositing events. The decontamination procedure is as follows:

1. Perform a pre-wash rinse with tap water.
2. Wash with a solution of warm tap water and Alconox soap (using a brush).
3. Rinse with warm tap water.
4. Perform the first rinse with distilled water.
5. Rinse three additional times with distilled water.
6. Store in a clean, closed container for next use.

7 Health and Safety

The following section discusses the potential health and safety hazards associated with the field tasks described in this FSAP. Controls of these hazards are addressed through the mechanical and physical control measures, using personal protective equipment, monitoring, training, decontamination, emergency response, and safety procedures. These health and safety hazards are discussed in the project HASP.

Tasks conducted beyond those identified in the HASP are evaluated through JSAs (Attachment D2). As with the HASP, JSAs must be reviewed prior to conducting the work.

7.1 Job Safety Analysis

The contents of the JSA documents will be communicated to project staff during the site orientation meeting and during daily safety meetings when conducting work where the specific JSAs are applicable.

JSA documents applicable to this project are in Attachment D2 and include the following field tasks:

- Field Activities
- Soil and Groundwater Sampling
- Decontamination Activities
- Sample and Laboratory Glassware Handling

8 Schedule and Reporting

Consistent with the scope of work in Exhibit C to the Consent Decree (Ecology 2018b), the SU11 cleanup may be implemented following Ecology approval of the *Final Engineering Design Report, Version 2*. A summary of the SU11 removal activities will be included in a completion report upon completion of the full cleanup.

9 References

Anchor QEA, 2015. *Remedial Investigation and Feasibility Study*. Former Reynolds Metals Reduction Plant – Longview. Prepared for Northwest Alloys, Inc., and Millennium Bulk Terminals – Longview, LLC. January 2015.

Ecology (Washington State Department of Ecology), 2012. Agreed Order No. DE 8940. Issued to Northwest Alloys, Inc., and Millennium Bulk Terminals - Longview, LLC. February 2012.

Ecology, 2018a. *Cleanup Action Plan*. Final. Former Reynolds Metals Reduction Plant – Longview. October 2018.

Ecology, 2018b. Consent Decree No. 18-2-01312-08. Former Reynolds Metals Reduction Plant – Longview. December 14, 2018.

Figures

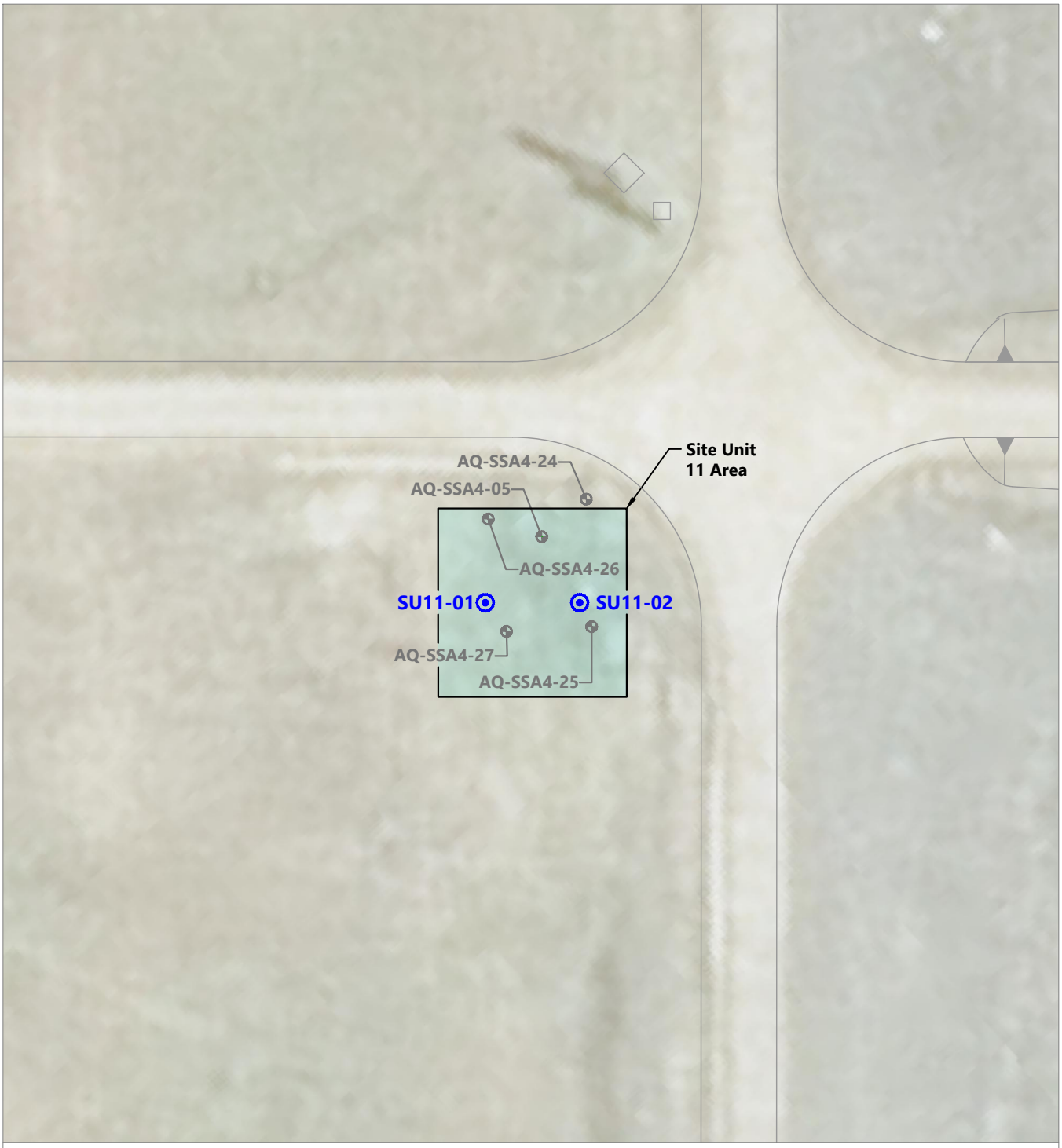
SOURCE: Bing Maps
HORIZONTAL DATUM: Washington State Plane South Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet

Publish Date: 2020/07/31 3:43 PM | User: chewett
Filepath: K:\Projects\0730-MBT-Longview\0730-RP-055 (Location Map-SU11).dwg Figure D1

ANCHOR QEA

Figure D1
Site Unit 11 Location

Field Sampling and Analysis Plan for Site Unit 11
Former Reynolds Metals Reduction Plant – Longview



SOURCE: Bing Maps
HORIZONTAL DATUM: Washington State Plane South Zone, North American Datum of 1983 (NAD83), U.S. Survey Feet

LEGEND:

- Historical Soil Sample Location
- Proposed Soil Sample Location

0 40
Feet

Publish Date: 2020/07/31 3:43 PM | User: chewett
Filepath: K:\Projects\0730-MBT-Longview\0730-RP-056 (Soil Samples-SU11).dwg Figure D2

ANCHOR QEA

Figure D2
Site Unit 11 Soil Sample Locations

Field Sampling and Analysis Plan for Site Unit 11
Former Reynolds Metals Reduction Plant – Longview

Attachment D1
Quality Assurance Project Plan for Site Unit 11

March 2023
Former Reynolds Metals Reduction Plant – Longview

Quality Assurance Project Plan for Site Unit 11

Prepared for
Northwest Alloys, Inc.
c/o Alcoa Corp.
201 Isabella Street
Pittsburgh, Pennsylvania 15212-5858

Prepared by
Anchor QEA, LLC
6720 South Macadam Avenue, Suite 125
Portland, Oregon 97219

Project Number: 210002-01.03
\\Fuji\Anchor\Projects\Alcoa\NW Alloys\Longview\Remediation\6_Design\4_EDR\Deliverables\07 Final EDR_working\03 Appendices\D_SU11 FSAP\03 Attachments\Att D1_QAPP\Longview SU11 QAPP_2023-03-31.docx

TABLE OF CONTENTS

TABLES

ABBREVIATIONS

µg/kg	micrograms per kilogram
Apex	Apex Laboratories LLC
ASTM	ASTM International
CCV	continuing calibration verification
COC	chain of custody
cPAH	carcinogenic polycyclic aromatic hydrocarbon
DQO	data quality objective
Ecology	Washington State Department of Ecology
FC	field coordinator
FSAP for SU11	*Field Sampling and Analysis Plan for Site Unit 11*
LCS	laboratory control sample
MD	matrix duplicate
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety and Health Act
oz	ounce
PAH	polycyclic aromatic hydrocarbon
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
R	recovery
RL	reporting limit
RPD	relative percent difference
SOP	standard operating procedure
SRM	standard reference material
SU11	Site Unit 11
USEPA	U.S. Environmental Protection Agency
WAC	Washington Administrative Code

1 Introduction

This Quality Assurance Project Plan (QAPP) establishes the quality assurance (QA) objectives for conducting sampling activities at Site Unit 11 (SU11, also called the flat storage area) at the former Reynolds Metals Reduction Plant in Longview, Washington. The analytical methods and QA procedures described herein will be followed by Anchor QEA, LLC, and its contractors during sample collection activities described in the *Field Sampling and Analysis Plan for Site Unit 11* (FSAP for SU11). This QAPP is Attachment D1 of the FSAP for SU11.

The goal of this QAPP is to ensure that data of sufficiently high quality are generated to support the project data quality objectives (DQOs). This QAPP will address project management responsibilities, sampling and analytical procedures, assessment and oversight, and data reduction, validation, and reporting.

1.1 Document Organization

This QAPP was prepared in accordance with the Washington State Department of Ecology (Ecology) *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (Ecology 2016) and the U.S. Environmental Protection Agency (USEPA) *Guidance for Quality Assurance Project Plans* (USEPA 2002). Additionally, the contract laboratory is an accredited laboratory under Ecology's Washington Administrative Code (WAC) 173-50, which requires laboratory QA manuals that contain laboratory standard operating procedures (SOPs) for analytical methods, data reduction, and equipment maintenance that are maintained and subject to approval through the laboratory accreditation program. Standard industry practices to establish laboratory measurements and assessment of data quality that meet project requirements have also been included to form a robust QAPP. These documents specify four groups of information that must be included in a QAPP: 1) Project Management; 2) Data Generation and Acquisition; 3) Assessment and Oversight; and 4) Data Validation and Usability. Each group is composed of several QAPP elements. Although the guidance documents provide a suggested outline for the QAPP elements, the guidance also indicates that certain elements may not be applicable to a given project and that the elements need not be presented in the order presented in the guidance.

The remainder of this QAPP is organized into the following sections:

- Section 2: Project Management
- Section 3: Data Quality Objectives and Criteria
- Section 4: Documentation and Records
- Section 5: Analytical Methods
- Section 6: Quality Assurance and Quality Control
- Section 7: Assessments and Response Actions

- Section 8: Data Validation, Usability, and Reporting
- Section 9: References

2 Project Management

This section describes the project management structure and key project personnel.

2.1 Project Organization

Responsibilities of the team members, as well as the laboratory project manager, are described in the following sections.

2.1.1 Project Managers

The project manager for Alcoa is Kristin Gaines. All site access and field work will be coordinated in advance with Ms. Gaines or her designee. Anchor QEA field personnel will notify Ms. Gaines or her designee before beginning work at the site. Upon arrival, each worker will sign the visitor's registration log at the guard's office and obtain a vehicle permit. All Anchor QEA staff must have Alcoa safety training prior to working on the site.

The project manager for Anchor QEA is Nicole LaFranchise. Ms. LaFranchise will be responsible for overall project coordination, including production of project deliverables. Ms. LaFranchise will be involved in all aspects of this project, including discussion, review, approval, and implementation of the FSAP for SU11 and interpretation of analytical results.

2.1.2 Field Coordinator

Tim Stone of Anchor QEA (or his designee) will serve as the field coordinator (FC) and provide direction to the field sampling team regarding logistics, personnel assignments, and field operations. Mr. Stone will supervise the field collection of samples and will be responsible for ensuring the following:

- Accurate positioning and recording of sample locations and identification
- Conformity to sampling and handling requirements, including field decontamination procedures
- Coordinate delivery of the samples to the laboratory

Mr. Stone will ensure that the samples are stored under proper conditions while in custody until delivery to the laboratory. He will be responsible for summarizing field sampling activities, including details of the sampling effort, sample preparation, sample storage and transport procedures, field QA, and documentation of deviations from this QAPP.

2.1.3 Quality Assurance/Quality Control Manager

Delaney Peterson will serve as the Anchor QEA QA/quality control (QC) manager. She will provide QA oversight for the laboratory program, coordinate with the analytical laboratory, verify data quality,

oversee data validation, and supervise project QA coordination. Ms. Peterson will also perform internal data review and validation. She will be responsible for reviewing the data in accordance with this QAPP along with *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (USEPA 1986) and *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2017) to ensure all data verification and data validation criteria are met.

2.1.4 Laboratory Project Manager

Darwin Thomas is the Apex Laboratories LLC (Apex) project manager. He will provide analytical support and will be responsible for ensuring that all laboratory analyses meet the project DQOs and other specifications required by the QAPP and Ecology guidelines. Apex is an accredited laboratory with Ecology in accordance with WAC 173-50. Contact information for Apex is as follows:

Apex Laboratories LLC
6700 SW Sandburg Street
Tigard, Oregon 97223
(503) 718-2323

2.2 Special Training Requirements/Certifications

For sample collection tasks, it is important that field crews are trained in standardized data collection requirements so that data are collected consistently among field crews. Field crews will comprise individuals who are fully trained in the collection and processing of soil samples, decontamination protocols, and chain-of-custody (COC) procedures.

In addition, the 29 Code of Federal Regulations Part 1910 Subpart 120 Occupational Safety and Health Act (OSHA) regulations require training to provide employees with the knowledge and skills enabling them to perform their jobs safely and with minimum risk to their personal health. All field personnel will have completed the 40-hour HAZWOPER training course and 8-hour refresher courses as necessary to meet OSHA regulations.

3 Data Quality Objectives and Criteria

The DQOs for this project will ensure that data collected are of known and acceptable quality so that the project objectives described in this QAPP are achieved. The quality of laboratory data is assessed by precision, accuracy, representativeness, comparability, completeness, and sensitivity (the "PARCCS" parameters). Definitions of these parameters and the applicable QC procedures are described in the following subsections. Applicable objectives for these data quality parameters are listed or referenced in Table D1-1.

Table D1-1
Data Quality Objectives for Analytical Data

Parameter	Replicate and MS/MSD Precision	LCS and MS/MSD Accuracy	Completeness
PAHs	± 35% RPD	50-150% R	95%

3.1 Precision

Precision is the ability of an analytical method or instrument to reproduce its own measurement. It is a measure of the variability, or random error, in sampling, sample handling, and laboratory analyses. ASTM International (ASTM) recognizes the following two levels of precision (ASTM 2002):

1. **Repeatability:** The random error associated with measurements made by a single test operator on identical aliquots of test material in a given laboratory with the same apparatus under constant operating conditions
2. **Reproducibility:** The random error associated with measurements made by different test operators in different laboratories using the same method but different equipment to analyze identical samples of test material

In the laboratory, "within-batch" precision is measured using duplicate samples or QC analyses and is expressed as the relative percent difference (RPD) between the measurements. The "batch-to-batch" precision is determined from the variance observed in the analyses of standard solutions or laboratory control samples (LCSs) from multiple analytical batches.

Laboratory precision control limits are listed in Table D1-1 for each analysis. The RPD equation used to express precision is shown in Equation D1-1.

Equation D1-1

$$RPD = \frac{(C_1 - C_2)x\ 100\%}{(C_1 + C_2)/2}$$

where:

RPD	=	relative percent difference
C_1	=	larger of the two observed values
C_2	=	smaller of the two observed values

Precision measurements can be affected by the nearness of a chemical concentration to the reporting limit (RL), where the percent error (expressed as RPD) increases. Parent and/or duplicate results that are less than five times the RL will be evaluated by using the difference between the results using a control limit of plus or minus two times the RL.

3.2 Accuracy

Accuracy is a measure of the closeness of an individual measurement (or an average of multiple measurements) to the true or expected value. Accuracy is determined by calculating the value of results from analyses of LCSs, standard reference materials (SRMs), and standard solutions. In addition, matrix spike (MS) samples are also measured, which indicate the accuracy or bias in the actual sample matrix. Accuracy is expressed as percent recovery of the measured value, relative to the true or expected value. If a measurement process produces results that are not the true or expected values, the process is said to be biased. Bias is the systematic error either inherent in a method of analysis (e.g., extraction efficiencies) or caused by an artifact of the measurement system (e.g., contamination). Analytical laboratories use several QC measures to eliminate analytical bias, including systematic analysis of method blanks, LCSs, and independent calibration verification standards. Because bias can be positive or negative, and because several types of bias can occur simultaneously, only the net, or total, bias can be evaluated in a measurement.

Laboratory accuracy will be evaluated using quantitative LCSs, MS, and SRM recoveries compared with method-specified performance criteria or criteria listed in Table D1-1. Accuracy can be expressed as a concentration compared to the true or reference value or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. The equation used to express accuracy is shown in Equation D1-2.

Equation D1-2

$\%R = 100\%\ x\ (S - U)/Csa$

where:

$\%R$	=	percent recovery
S	=	measured concentration in the spiked aliquot
U	=	measured concentration in the unspiked aliquot
Csa	=	actual concentration of spike added

Field accuracy will be controlled by adhering to sample collection procedures outlined in the FSAP for SU11.

3.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition. Sample collection and handling procedures described in the FSAP for SU11 will be followed to ensure samples represent field conditions.

3.4 Comparability

Comparability expresses the confidence with which one dataset can be evaluated in relation to another dataset. For this program, comparability of data will be established by using standard analytical methodologies and reporting formats and through common traceable calibration standards and reference materials.

3.5 Completeness

Completeness is a measure of the amount of data determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

$$C = \frac{(Number\ of\ acceptable\ data\ points)x\ 100}{Total\ number\ of\ data\ points}$$

The DQO for completeness for all components of this project is 95%. Data qualified as estimated because QC criteria are not met will be considered valid for the purposes of assessing completeness. Data that are rejected will not be considered valid for the purposes of assessing completeness.

3.6 Sensitivity

Sensitivity is a measure of analytical detection and RLs. In general, the lowest method detection limits (MDLs) and RLs achievable by the specified method will be targeted for this project.

The MDL is defined as the minimum concentration at which a given target analyte can be measured and reported with 99% confidence that the analyte concentration is greater than zero. Laboratory RLs are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Laboratory MDLs and RLs will be used to evaluate the method sensitivity and applicability prior to the acceptance of a method for this program. Method blanks will be analyzed to ensure target analytes are not introduced during sample preparation or analysis that would affect the analytical sensitivities.

The sample-specific MDLs and RLs will be reported by the laboratory and will account for any factors relating to the sample analysis that might decrease or increase these limits (e.g., dilution factor, percent moisture, or analytical mass/volume). If MDLs and RLs are elevated due to matrix interferences and subsequent dilutions or reductions in sample aliquots, then data will be evaluated by Anchor QEA and the laboratory to determine if an alternative course of action is required or possible. The sample-specific MDLs and RLs will be the values provided in the data transmittal from the laboratory.

4 Documentation and Records

This project will require central project files to be maintained at Anchor QEA. Project records will be stored and maintained in a secure manner. Each project team member is responsible for filing all necessary project information or providing it to the person responsible for the filing system. Individual team members may maintain files for individual tasks but must provide such files to the central project files upon completion of each task. Hard copy documents will be kept on file at Anchor QEA or at a document storage facility throughout the duration of the project, and all electronic data will be maintained in a database or in a designated directory at Anchor QEA. Field documentation procedures are described in the FSAP for SU11.

4.1 Analytical Records

The laboratory will retain analytical data records. Additionally, Anchor QEA will retain a copy of analytical data in the central project files. Data reporting requirements will include those items necessary to complete data validation. Elements to be reported in the laboratory data packages are listed in Section 6.3.6.

All instrument data will be fully restorable at the laboratory from electronic backup. The laboratory will be required to maintain records relevant to project sample analyses for a minimum of 5 years. Data validation reports will be maintained in the central project files with the analytical data reports.

4.2 Data Reduction

Data reduction is the process by which original data (analytical measurements) are converted or reduced to a specified format or unit to facilitate analysis of data. Data reduction requires that all aspects of sample preparation that could affect the test result (such as sample mass or volume analyzed, sample moisture content, and dilutions required) be considered in the final result. It is the laboratory analyst's responsibility to reduce data, which are subject to further review by the laboratory project manager, Anchor QEA project manager, QA/QC manager, and independent reviewers. Data reduction may be performed manually or electronically.

5 Analytical Methods

This section summarizes the target chemical methods that will be used for the samples collected. Sample analyses will be conducted in accordance with USEPA-approved methods, other commonly acceptable methods, or as described in the approved laboratory SOPs and this QAPP. Prior to analyses, all samples will be maintained according to the appropriate holding times and temperatures for each analysis as listed in Table D1-2. Analytes, analytical methods, and target detection limits for chemical testing are presented in Table D1-3. The laboratory will prepare reports in accordance with this QAPP.

Table D1-2
Guidelines for Sample Handling and Storage

Parameter	Sample Size	Container Size and Type[1]	Holding Time	Preservative
cPAHs	150 grams	16-oz glass	14 days until extraction	Cool/4°C
			1 year until extraction	Freeze -18°C
			40 days after extraction	Cool/4°C

Note:

1. Container size may vary based on laboratory preference and supply.

Table D1-3
Parameters for Analysis, Methods, and Target Quantitation Limits

Parameter	Analytical Method	Laboratory RL[1,2]
PAHs (µg/kg dry weight)		
Benz(a)anthracene	8270	4.00
Benzo(a)pyrene	8270	6.00
Benzo(b)fluoranthene	8270	6.00
Benzo(k)fluoranthene	8270	6.00
Chrysene	8270	4.00
Dibenzo(a,h)anthracene	8270	4.00
Indeno(1,2,3-cd)pyrene	8270	4.00
Total cPAHs	Calculated	--

Notes:

1. Actual laboratory RLs may vary based on sample aliquot size, moisture content, and required dilution factor. All detected results will be reported between the MDL and the RL as estimated.
2. Total PAH is a calculated value; therefore, there is no RL.

Prior to the analyses of the samples, the laboratory will calculate MDLs and establish RLs for each analyte of interest, where applicable. RLs will be at or below the values specified in Table D1-3, if technically feasible.

Total cPAH will be calculated by summing the results of the individual PAH compounds listed in Table D1-3. For results reported by the laboratory as below the RL (i.e., "U" qualified), zero will be used as the result value for that sample result in the calculation of totals.

Chemical preparation and testing will be conducted at Apex. All chemical testing will adhere to the most recent USEPA QA/QC procedures outlined in the approved analytical methods, the laboratory SOPs, and this QAPP. If more current analytical methods are available, the laboratory may use them.

In completing chemical analyses for this project, the laboratory subcontractors are expected to meet the following minimum requirements:

- Adhere to the methods outlined in this QAPP, including methods referenced for each analytical procedure (Table D1-3).
- Deliver electronic data as specified.
- Meet reporting requirements for deliverables.
- Meet turnaround times for deliverables.
- Implement QA/QC procedures discussed in this QAPP, including following DQOs, laboratory QC requirements, and performance evaluation testing requirements.
- Notify the project QA/QC manager of any QAPP QA/QC problems when they are identified to allow for quick resolution.
- Allow laboratory and data audits to be performed, if deemed necessary.

6 Quality Assurance and Quality Control

Field and laboratory activities will be conducted in such a manner that the results meet specified quality objectives and are fully defensible. Guidance for QA/QC is derived from the protocols developed for *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods* (USEPA 1986), *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2017), the laboratory SOPs, and the cited analytical methods.

6.1 Field Quality Control

Field team staff will identify and label samples in a consistent manner to ensure that field samples are traceable. Labels should be used in conjunction with the COC form, the FSAP for SU11, and this QAPP to provide all information necessary for the laboratory to conduct required analyses properly. QC samples will be collected in the field to ensure project DQOs are met. Samples will be placed in appropriate containers and preserved for shipment to the laboratory in accordance with the requirements presented in Table D1-2.

6.2 Field Quality Assurance Sampling

Field QA procedures will consist of the following procedures for acceptable practices for sample collection and handling, as well as periodic and routine equipment inspection:

- Field QC samples will include the collection of additional sample mass or volume as required to ensure that the laboratory has sufficient sample mass or volume to run the matrix-specified analytical QA/QC (matrix duplicate [MD]/MS) samples for analyses, as specified in Table D1-4. Additional samples to meet this requirement will be collected at a frequency of one per matrix per sampling event or one per matrix per 20 samples collected, whichever is more frequent. The samples designated for MD/MS analyses should be clearly marked on the COC form.
- All field QC samples will be documented on the field forms and verified by the QA/QC manager.

Table D1-4
Laboratory Quality Assurance/Quality Control Criteria

Analysis Type	Laboratory Quality Control Elements							
	Initial Calibration	**Ongoing Calibration**	**Replicates**	**MSs**	**LCS or SRM[2]**	**MSDs[3]**	**Method Blanks**	**Surrogate Spikes**
cPAHs	As needed[1]	Every 12 hours	NA	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	Every sample

Notes:

1. Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.
2. When SRM is available, it may be used in lieu of an LCS.
3. An MS/MSD may be analyzed in lieu of a sample replicate.

6.2.1 Sample Containers

Sample containers and preservatives will be provided by the laboratory. The laboratory will maintain documentation certifying the cleanliness of bottles and the purity of preservatives provided. Container requirements are listed in Table D1-2.

6.2.2 Sample Identification and Labels

Each sample will have an adhesive plastic or waterproof paper label affixed to the container and will be labeled at the time of collection. The following information will be recorded on the container label at the time of collection:

- Project name
- Sample identification
- Date and time of sample collection
- Preservative type (if applicable)
- Analysis to be performed

6.3 Laboratory Quality Control

Laboratory QC procedures, where applicable, include initial and continuing instrument calibrations, SRMs, LCSs, matrix replicates, MS samples, and method blanks. A summary of the DQOs is provided in Table D1-1. QA/QC sample analytical frequencies are provided in Table D1-4.

The analyst will review the results of the QC samples from each sample group immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine if control limits have been exceeded. If control limits are exceeded in the sample group, the QA/QC manager will be contacted immediately, and corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

6.3.1 Laboratory Instrument Calibration and Frequency

An initial calibration will be performed on each laboratory instrument to be used prior to the start of the project, after each major interruption to the analytical instrument, and when any ongoing calibration does not meet method control criteria. An initial calibration verification will be analyzed following each initial calibration and will meet method criteria prior to analyses of samples. Continuing calibration verifications (CCVs) will be analyzed at method-required frequencies to track instrument performance. CCVs will be analyzed at a frequency of once for every 10 field samples analyzed and at the end of each run. If the continuing calibration is out of control, the analysis will be terminated until the source of the control failure is eliminated or reduced to meet control

specifications, which may include analyzing a new initial calibration. Any project samples analyzed while the instrument calibration was out of control will be reanalyzed.

Instrument blanks or continuing calibration blanks provide information on the stability of the baseline established. Continuing calibration blanks will be analyzed immediately prior to or immediately following CCV at the instrument for each type of applicable analysis.

6.3.2 Laboratory Duplicates/Replicates

Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates and replicates are subsamples of the original sample that are prepared and analyzed as separate samples.

6.3.3 Matrix Spikes

Analyses of MS samples provide information on the extraction efficiency of the method on the sample matrix, as well as any interferences introduced by the sample matrix.

6.3.4 Method Blanks

Method blanks are prepared and analyzed in the same manner as project samples to assess possible laboratory contamination at all stages of sample preparation and analysis. The method blank for all analyses must be less than the method RL of any single target analyte. If a laboratory method blank exceeds this criterion for any analyte and the concentration of the analyte in any of the samples is less than five times the concentration found in the blank, analyses must stop, and the source of contamination must be eliminated or reduced. Affected samples should be prepared and analyzed again, if possible.

6.3.5 Laboratory Control Samples

LCSs are analyzed to assess possible laboratory bias at all stages of sample preparation and analysis. The LCS is a matrix-dependent spiked sample prepared at the time of sample extraction, along with the preparation of the sample, MD, MS, and method blank. The LCS will provide information on the accuracy of the analytical process and, when analyzed in duplicate, will provide precision information as well.

6.3.6 Laboratory Deliverables

Data packages will be checked for completeness immediately upon receipt from the laboratory to ensure that data and QA/QC information requested are present. The analytical laboratory will be required, where applicable, to report the following:

- **Project Narrative.** This summary, in the form of a cover letter, will include a discussion of any problems encountered during analyses. This summary should include (but not be limited to)

QA/QC, sample receipt, sample storage, and analytical difficulties. Any problems encountered and their resolutions will be documented in as much detail as appropriate.

- **COC Forms.** Legible copies of the COC forms will be provided as part of the data package. This documentation will include the time of receipt and condition of the samples received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented on a sample receipt form. The form must include sample shipping container temperatures measured at the time of sample receipt.
- **Sample Results.** The data package will summarize the results for each sample analyzed. The summary will include the following information when applicable:
  - Field sample identification code and the corresponding laboratory identification code
  - Sample matrix
  - Date of sample preparation/extraction
  - Date and time of analysis
  - Mass or volume used for preparation and analysis
  - Final dilution or concentration factors for the sample
  - Identification of the instrument used for analysis
  - MDLs and method RLs accounting for sample-specific factors (e.g., dilution and total solids)
  - Analytical results with reporting units identified
  - Data qualifiers and their definitions
- **QA/QC Summaries.** This section will contain the results of the laboratory QA/QC procedures. Each QA/QC sample analysis will be documented with the same information required for the sample results. No recovery or blank corrections will be made by the laboratory. The required summaries are as follows (additional information may be requested):
  - **Method Blank Analysis.** The method blank analysis associated with each sample and the concentration of all target analytes identified in these blanks will be reported.
  - **MS Recovery.** MS recovery data for all applicable analyses will be reported. The names and concentrations of analytes added, percent recoveries, and range of acceptable recoveries will be listed. The percent recoveries and RPD values for MS duplicate (MSD) analyses will be reported.
  - **Matrix Duplicates.** The RPD values for MD analyses will be reported.
  - **Laboratory Control Sample.** LCS recovery data will be reported. The names and concentrations of analytes added, percent recoveries, and range of acceptable recoveries will be included. The percent recoveries and RPD values for LCS duplicate analyses will be included.
- **Electronic Data Deliverable.** An electronic data deliverable in the Anchor QEA custom EQuIS format specified in advance will be prepared and submitted.

6.4 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

This section describes procedures for testing, inspection, and maintenance of field and laboratory equipment.

6.4.1 Field Instruments/Equipment

In accordance with the QA program, Anchor QEA will maintain an inventory of field instruments and equipment. The frequency and types of maintenance will be based on the manufacturer's recommendations and previous experience with the equipment.

The FC will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. The equipment maintenance information will be documented in the instrument's calibration log. The frequency of maintenance is dependent on the type and stability of the equipment, the methods used, the intended use of the equipment, and the recommendations of the manufacturer. Detailed information regarding the calibration and frequency of equipment calibration is provided in each specific manufacturer's instruction manual.

All maintenance records will be verified prior to each sampling event. The FC will be responsible for verifying that required maintenance has been performed prior to using the equipment in the field. Any problems will be noted in the field log book and corrected prior to continuing sampling operations.

6.4.2 Laboratory Instruments/Equipment

In accordance with the QA program, the laboratory will maintain an inventory of instruments and equipment, and the frequency of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment.

The laboratory preventative maintenance program, as detailed in the laboratory's QA plan, is organized to maintain proper instrument and equipment performance and to prevent instrument and equipment failure during use. The program considers instrumentation, equipment, and parts that are subject to wear, deterioration, or other changes in operational characteristics; the availability of spare parts; and the frequency at which maintenance is required. Any equipment that has given suspect results or been overloaded, mishandled, or determined to be defective will be taken out of service, tagged with the discrepancy noted, and stored in a designated area until the equipment has been repaired. After repair, the equipment will be tested to ensure that it is in proper operational condition. The client will be promptly notified in writing if defective equipment casts doubt on the validity of analytical data. The client will also be notified immediately regarding any delays due to instrument malfunctions that could impact holding or turnaround times.

The laboratory will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. Maintenance records will be checked according to the schedule on an annual basis and recorded by laboratory personnel. The laboratory project manager or designees will be responsible for verifying compliance.

6.4.2.1 Laboratory Instrument/Equipment Calibration

As part of their QC programs, laboratories perform two types of calibrations. A periodic calibration is performed at prescribed intervals (e.g., balances, drying ovens, refrigerators, and thermometers), and operational calibrations are performed daily at a specified frequency or prior to analysis (i.e., initial calibrations) according to method requirements. Calibration procedures and frequency are discussed in the laboratory's QA plan. Calibrations are discussed in the laboratory SOPs for analyses.

The laboratory QA/QC manager will be responsible for ensuring that the laboratory instrumentation is calibrated in accordance with applicable specifications. Implementation of the calibration program will be the responsibility of the respective laboratory group supervisors. Recognized procedures (USEPA, ASTM, or manufacturer's instructions) will be used when available.

Physical standards (i.e., weights or certified thermometers) will be traceable to nationally recognized standards, such as those of the National Institute of Standards and Technology (NIST). Chemical reference standards will be NIST SRMs or vendor-certified materials traceable to these standards.

The calibration requirements for each method and respective corrective actions will be accessible, either in the laboratory SOPs or in the laboratory's QA plan for each instrument or analytical method in use. All calibrations will be preserved on electronic media.

6.5 Inspection/Acceptance of Supplies and Consumables

Inspection and acceptance of field supplies, including laboratory-prepared sampling bottles, will be performed by the FC. All primary chemical standards and standard solutions used for this project, either in the field or laboratory, will be traceable to documented, reliable commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in the standard will be documented.

6.6 Data Management

Field data sheets will be checked for completeness and accuracy by the FC prior to delivery to the QA/QC manager. Data generated in the field will be documented in electronic or hard copy. Manually entered data will be verified by a second party. Field documentation will be filed in the main project folder after data entry and verification are complete.

Laboratory data will be provided to the QA/QC manager in the EQuIS electronic format. Laboratory data that are electronically provided and loaded into a database will undergo a check against the

laboratory hard copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified. Data tables and reports will be exported from EQuIS to Microsoft Excel tables.

7 Assessments and Response Actions

Once data are received from the laboratory, several QC procedures will be followed to provide an accurate evaluation of the data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness.

7.1 Compliance Assessments

Laboratory and field performance audits consist of on-site reviews of QA systems and equipment for sampling, calibration, and measurement. Laboratory audits will not be conducted as part of this study. However, all laboratory audit reports will be made available to the project QA/QC manager upon request. The laboratory is required to have written procedures addressing internal QA/QC, and these procedures will be made available upon request. The laboratory must ensure that personnel engaged in analytical tasks have appropriate training. The laboratory will provide written details for all method modifications planned prior to project commencement.

7.2 Response and Corrective Actions

Sections 7.2.1 and 7.2.2 identify the responsibilities of key project team members and actions to be taken in the event of an error, problem, or non-conformance of protocols identified in this document.

7.2.1 Field Activities

The FC will be responsible for correcting equipment malfunctions during the field sampling effort. The project QA/QC manager will be responsible for resolving situations identified by the FC that may result in non-compliance with this QAPP. All corrective measures will be immediately documented in the field log book.

7.2.2 Laboratory

The laboratory is required to comply with their SOPs. The laboratory project manager will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

The laboratory project manager will be notified if any QC sample exceeds control limits and corrective action does not improve results. The analyst will identify and correct the anomaly before continuing with the sample analysis. If the laboratory internal corrective action does not resolve the non-conformance, the laboratory project manager will notify the QA/QC manager. A narrative describing the anomaly, the steps taken to identify and correct the anomaly, and the treatment of

the relevant sample batch (i.e., recalculation, reanalysis, and re-extraction) will be submitted with the data package in the form of a cover letter.

7.3 Reports to Management

QA reports to management include verbal status reports and data validation reports. These reports will be the responsibility of the QA/QC manager.

8 Data Validation, Usability, and Reporting

This section describes the processes that will be used to review project data quality.

8.1 Data Review, Validation, and Verification

During the validation process, analytical data will be evaluated for project, method, and laboratory QC compliance, and their validity and applicability for program purposes will be determined. Based on the findings of the validation process, data validation qualifiers may be assigned.

8.2 Validation and Verification Methods

Data validation includes signed entries by the field and laboratory technicians on field data sheets and laboratory data sheets, respectively; review for completeness and accuracy by the FC and laboratory project manager; review by the QA/QC manager for outliers and omissions; and the use of QC criteria to accept or reject specific data. If errors are found, further verification will be performed to ensure that all data are accurate. Any errors found will be corrected, and the laboratory will be notified of the errors.

All laboratory data will be reviewed and verified to determine whether DQOs have been met and that appropriate corrective actions have been taken, when necessary. The QA/QC manager will be responsible for the final review of data generated from analyses of samples.

The first level of review will take place in the laboratory as the data are generated. The laboratory department manager or designee will be responsible for ensuring that the data generated meet minimum QA/QC requirements and that the instruments were operating under acceptable conditions during data generation. DQOs will also be assessed at this point by comparing the results of QC measurements with pre-established criteria as a measure of data acceptability.

The analysts or laboratory department manager will prepare a preliminary QC checklist for each parameter and for each sample delivery group as soon as analysis of a sample delivery group has been completed. Any deviations from the DQOs listed on the checklist will be brought to the attention of the laboratory project manager to determine whether corrective action is needed and to determine the impact on the reporting schedule.

Data packages will be checked for completeness immediately upon receipt from the laboratory to ensure that data and QA/QC information requested are present. Stage 2A validations (USEPA 2009) will be conducted on all data packages. Data validation will be conducted by a reviewer using current National Functional Guidelines (USEPA 2017), the analytical methods, and this QAPP by considering the following information, as applicable:

- COC documentation and sample receipt condition
- Holding times

- Method blanks
- MDLs
- RLs
- LCSs
- MS samples
- Laboratory duplicates
- SRM results

The data will be validated in accordance with the project-specific DQOs described previously, analytical method criteria, and the laboratory's internal performance standards based on their SOPs.

8.3 Reconciliation with User Requirements

The QA/QC manager will review data after each survey to determine if DQOs have been met. If data do not meet the project's specifications, the QA/QC manager will review the errors and determine if the problem is due to calibration, maintenance, sampling techniques, or other factors and will suggest corrective action. Retraining, revision of techniques, or replacement of supplies/equipment should correct the problem; if not, the DQOs will be reviewed for feasibility. If specific DQOs are not achievable, the QA/QC manager will recommend appropriate modifications.

8.4 Data Reporting

Data will be reported in a completion report as discussed in Section 7 of the FSAP for SU11.

9 References

ASTM (ASTM International), 2002. *Standard Practices for Use of the Terms Precision and Bias in ASTM Test Methods*. E177-90a. 2002.

Ecology (Washington State Department of Ecology), 2016. *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies*. Environmental Assessment Program. Publication No. 04-03-030. December 2016.

USEPA (U.S. Environmental Protection Agency), 1986. *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*. Office of Solid Waste and Emergency Response. EPA 530/SW-846. November 1986.

USEPA, 2002. *Guidance for Quality Assurance Project Plans*. EPA QA/G-5. Office of Environmental Information. EPA/240/R-02/009. December 2002.

USEPA, 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. Office of Solid Waste and Emergency Response. EPA 540-R-08-005. January 2009.

USEPA, 2017. *National Functional Guidelines for Inorganic Superfund Methods Data Review*. Office of Superfund Remediation and Technology Innovation (OSRTI). EPA-540-R-2017-001. January 2017.

Attachment D2
Job Safety Analysis Documents

Job Safety Analysis

Field Activities

Project Name: Former Reynolds Metals Reduction Plant – Longview	**Project Number:** 210002-01.03	**JSA Number:** 001	**Issue Date:** August 11, 2020
Location: Northwest Alloys, Inc., Longview, Washington	**Contractor:** Anchor QEA, LLC	**Analysis by:** Kendra Skellenger	**Analysis Date:** April 17, 2020
Work Operation: Field activities	**Superintendent/Competent Person:** Field team	**Revised by:** N/A	**Revised Date:** N/A
Required Personal Protective Equipment (PPE): • Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 • Safety glasses/splash goggles and hard hat • Depending on activity, the following PPE may also be required: nitrile outer gloves and latex inner gloves.		**Reviewed by:** Tim Stone	**Reviewed Date:** May 15, 2020
		Approved by: Tim Stone	**Approved Date:** May 15, 2020

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor physical activity	Slips, trips, and falls	• Avoid walking while writing or texting—maintain a heads-up posture. • Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. • Maintain good housekeeping practices. Clean up all spills immediately. • Be aware of weather effects on the work area, including wet or frozen ground. • Jumping, running, and horseplay are prohibited. • Keep all areas clean and free of debris to prevent any trips and falls. • Be aware of and limit loose clothing or untied shoelaces that may contribute to slips, trips, and falls. • Notify the field team members of any unsafe conditions.	• Routinely inspect work area for unsafe conditions.

Job Safety Analysis

Field Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor physical activity (continued)	Heat stress	• Adjust work schedules, as necessary, to avoid the hottest part of the day. • Take rest breaks as warranted. • Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. • Maintain body fluids at normal levels. • Train workers to recognize the symptoms of heat-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions. • Monitor outside temperature versus worker activity.
	Cold stress	• Provide shelter (enclosed, heated environment) to protect personnel during rest periods. • Educate workers to recognize the symptoms of frostbite and hypothermia. • Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. • Have a dry change of clothing available. • Train workers to recognize the symptoms of cold-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions and PPE. • Monitor outside temperature versus worker activity and PPE.
	Rain or snow	• Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity.	• Review weather forecast prior to field work. • Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
	Sunshine	• Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.	• Ensure that sunscreen and water are available.
	Lightning	• Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment. • Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch major electronic equipment, including the radio, throughout the duration of the storm.	• Obtain weather forecast and updates as needed.

Job Safety Analysis

Field Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor physical activity (continued)	High winds	• Wear goggles or safety glasses if dust or debris are visible.	• Review weather forecast prior to field work. • Ensure that goggles or safety glasses are available.
	Biological hazards (flora [e.g., poison ivy or poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, or snakes])	• Be aware of likely biological hazards in the work area. • Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent. • Wear hand and arm protection when clearing plants or debris from the work area. • Be aware of potential wildlife and defensive behavior (e.g., nesting birds, or animals with young).	• Ensure that insect repellent is available. • Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.
	Noise exposure	• Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).	• Ensure that hearing protection is available.
Working near rail	Personal injury	• Be aware of work area. • Keep a careful lookout in both directions when working near rail. • Stand clear of tracks when trains are approaching and move away from tracks to avoid being struck by doors or protruding items.	• Look both directions before crossing or working near tracks.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis

Soil and Groundwater Sampling

Project Name: Former Reynolds Metals Reduction Plant – Longview	**Project Number:** 210002-01.03	**JSA Number:** 002	**Issue Date:** August 11, 2020
Location: Northwest Alloys, Inc., Longview, Washington	**Contractor:** Anchor QEA, LLC	**Analysis by:** Kendra Skellenger	**Analysis Date:** April 17, 2020
Work Operation: Soil and Groundwater Sampling	**Superintendent/Competent Person:** Field team	**Revised by:** N/A	**Revised Date:** N/A
Required Personal Protective Equipment (PPE): • Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 • Safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves.		**Reviewed by:** Tim Stone	**Reviewed Date:** May 15, 2020
		Approved by: Tim Stone	**Approved Date:** May 15, 2020

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If using glassware		• Follow the JSA for handling glassware.	
Soil and groundwater sampling	Injury from hand- and power-tool operation (e.g., spatula or drill)	• Be aware of sharp edges on hand tools (e.g., spatulas, knives, drill bits, and saw blades). • Be aware of electrical connections and water hazards when working with electric or battery-operated tools. • Ensure that all tools are working properly; repair or replace defective tools. Repair when unplugged and off. • Keep guards on power tools when not in use.	• Inspect tools to ensure that they are in good working order. • Inspect electrical connections (if applicable). • Inspect tools periodically to ensure dry and clean operation.
	Noise exposure	• Wear hearing protection in high-noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).	• Ensure that hearing protection is available.

Job Safety Analysis

Soil and Groundwater Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Soil and groundwater sampling (continued)	Slips, trips, and falls	• Avoid walking while writing or texting—maintain a heads-up posture. • Be aware of potentially slippery surfaces, including boat decks, riprap, muddy or algae-covered rocks, shoreline plants/seaweed, thick mud, and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. • Maintain good housekeeping practices. Clean up all spills immediately. • Be aware of weather effects on the work area, including wet or frozen ground. • Jumping, running, and horseplay are prohibited. • Be cautious when entering or exiting the vessel, and load/unload items onto or off of the pier or shore once boarded. • Keep all areas clean and free of debris to prevent any trips and falls. • Notify the field team members of any unsafe conditions.	• Routinely inspect work area for unsafe conditions.
	Ingestion of contaminants, or skin or eye contact with contaminants	• Wear appropriate PPE to prevent or reduce exposure. • Contact 911, as necessary; perform CPR if breathing stops. • Move exposed person away from source of contamination, and rinse mouth. If exposure to skin occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. • Follow decontamination procedures as outlined in the Health and Safety Plan (HASP).	• Ensure that decontamination procedures are on hand and are reviewed. • Ensure that PPE and rinsing water are available.
	Muscle strain or injuries from improper lifting	• Use proper lifting techniques or ask for assistance with heavy objects. • If boating, avoid carrying objects directly onto or off the boat; rather, load/unload objects while on the boat to or from the pier or shore.	• Evaluate weight and center of gravity of heavier items prior to lifting or moving.
	Pinch points	• If boating, secure any unsecured objects on deck; they may shift on deck quickly in wave, current, or engine acceleration conditions. • Maintain a safe distance from closing mechanisms and moving parts on sampling gear. • Avoid placing hands or self between boat and dock or piles.	
Working outdoors	Heat stress	• Adjust work schedules, as necessary, to avoid the hottest part of the day. • Take rest breaks as warranted. • Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. • Maintain body fluids at normal levels. • Train workers to recognize the symptoms of heat-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions. • Monitor outside temperature versus worker activity.

Job Safety Analysis

Soil and Groundwater Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	Cold stress	• Provide shelter (enclosed, heated environment) to protect personnel during rest periods. • Educate workers to recognize the symptoms of frostbite and hypothermia. • Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. • Have a dry change of clothing available. • Train workers to recognize the symptoms of cold-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions and PPE. • Monitor outside temperature versus worker activity and PPE.
	Rain or snow	• Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity.	• Review weather forecast prior to field work. • Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
	Sunshine	• Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.	• Ensure that sunscreen and water are available.
	Lightning	• Do not begin or continue work until lightning subsides for 30 minutes. Disconnect and do not use or touch electronic equipment. • Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch major electronic equipment, including the radio, throughout the duration of the storm.	• Obtain weather forecast and updates as needed.
	High winds	• Wear goggles or safety glasses if dust or debris are visible.	• Review weather forecast prior to field work. • Ensure that goggles or safety glasses are available.
	Biological hazards (flora [e.g., poison ivy or poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, or snakes])	• Be aware of likely biological hazards in the work area. • Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent. • Wear hand and arm protection when clearing plants or debris from the work area.	• Ensure that insect repellent is available. • Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.

Job Safety Analysis

Soil and Groundwater Sampling

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis

Decontamination Activities

Project Name: Former Reynolds Metals Reduction Plant – Longview	**Project Number:** 210002-01.03	**JSA Number:** 004	**Issue Date:** August 11, 2020
Location: Northwest Alloys, Inc., Longview, Washington	**Contractor:** Anchor QEA, LLC	**Analysis by:** Kendra Skellenger	**Analysis Date:** April 17, 2020
Work Operation: Decontamination activities	**Superintendent/Competent Person:** Field team	**Revised by:** N/A	**Revised Date:** N/A
Required Personal Protective Equipment (PPE): • High-visibility safety vest • Hard hat where overhead hazards and/or heavy equipment are present • U.S. Coast Guard-approved personal flotation device (PFD), if boating (see cold stress section for cold-weather PFD information)		**Reviewed by:** Tim Stone	**Reviewed Date:** May 15, 2020
		Approved by: Tim Stone	**Approved Date:** May 15, 2020

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontamination area set up	Vehicle, heavy equipment traffic, or boat traffic in work area	• Wear high-visibility safety vest and hard hat PPE. • Be alert when working around heavy equipment and/or other boats, especially if wearing hearing protection.	• Ensure that safety vests are available for staff and visitors.
	Muscle strain or injuries from improper lifting	• Use proper lifting techniques or ask for assistance with heavy objects. • If boating, avoid carrying objects directly onto or off of the boat; rather, load/unload objects while on the boat to or from the pier or shore.	• Evaluate weight and center of gravity of heavier items prior to lifting or moving.
	Biological hazards (flora [e.g., poison ivy or poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, or snakes])	• Be aware of likely biological hazards in the work area. • Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent. • Wear hand and arm protection when clearing plants or debris from the work area.	• Ensure that insect repellent is available. • Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.

Job Safety Analysis

Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontamination activities	Injury from hand- and power-tool operation (e.g., spatula or drill)	• Be aware of sharp edges on hand tools (e.g., spatulas, knives, drill bits, and saw blades). • Be aware of electrical connections and water hazards when working with electric or battery-operated tools. • Ensure that all tools are working properly; repair or replace defective tools. Repair when unplugged and off. • Keep guards on power tools when not in use.	• Inspect tools to ensure that they are in good working order. • Inspect electrical connections (if applicable). • Inspect tools periodically to ensure dry and clean operation.
	Noise exposure	• Wear hearing protection in high-noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).	• Ensure that hearing protection is available.
	Slips, trips, and falls	• Avoid walking while writing or texting—maintain a heads-up posture. • Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. • Maintain good housekeeping practices. Clean up all spills immediately. • Be aware of weather effects on the work area, including wet or frozen ground. • Jumping, running, and horseplay are prohibited. • Keep all areas clean and free of debris to prevent any trips and falls. • Notify the field team members of any unsafe conditions.	• Routinely inspect work area for unsafe conditions.
	Ingestion of contaminants or decontamination fluids, or skin or eye contact with contaminants or decontamination fluids	• Wear appropriate PPE to prevent or reduce exposure. • Contact 911, as necessary; perform CPR if breathing stops. • Move exposed person away from source of contamination, and rinse mouth. If exposure to skin occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. • Follow decontamination procedures as outlined in the Health and Safety Plan (HASP).	• Ensure that decontamination procedures are on hand and are reviewed. • Ensure that PPE and rinsing water are available.
Working outdoors	Heat stress	• Adjust work schedules, as necessary, to avoid the hottest part of the day. • Take rest breaks as warranted. • Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. • Maintain body fluids at normal levels. • Train workers to recognize the symptoms of heat-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions. • Monitor outside temperature versus worker activity.

Job Safety Analysis

Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	Cold stress	• Provide shelter (enclosed, heated environment) to protect personnel during rest periods. • Educate workers to recognize the symptoms of frostbite and hypothermia. • Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. • Consider additional precautions if working near water in cold weather. • Have a dry change of clothing available. • Train workers to recognize the symptoms of cold-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions and PPE. • Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	• Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity.	• Review weather forecast prior to field work. • Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
	Sunshine	• Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.	• Ensure that sunscreen and water are available.
	Lightning	• Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment.	• Obtain weather forecast and updates as needed.
	High winds	• Wear goggles or safety glasses if dust or debris are visible.	• Review weather forecast prior to field work. • Ensure that goggles or safety glasses are available.

Job Safety Analysis

Decontamination Activities

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis

Sample and Laboratory Glassware Handling

Project Name: Former Reynolds Metals Reduction Plant – Longview	**Project Number:** 210002-01.03	**JSA Number:** 009	**Issue Date:** August 11, 2020
Location: Northwest Alloys, Inc., Longview, Washington	**Contractor:** Anchor QEA, LLC	**Analysis by:** Kendra Skellenger	**Analysis Date:** April 17, 2020
Work Operation: Sample and laboratory glassware handling	**Superintendent/Competent Person:** Field team	**Revised by:** N/A	**Revised Date:** N/A
Required Personal Protective Equipment (PPE): • Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 • Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device		**Reviewed by:** Tim Stone	**Reviewed Date:** May 15, 2020
		Approved by: Tim Stone	**Approved Date:** May 15, 2020

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Transporting and using glassware	Breakage of containers during field activities	• Use appropriately sized tubs or bottle carriers with dividers to prevent bottle-to-bottle contact during transport. • Consider using coated glassware, if practicable. • Carry oversize bottles in tubs or bottle carriers using both hands during transfer to the sampling vessel and whenever the vessel is underway.	• Ensure dividers are sufficient and will remain in place during transport.
	Faulty glassware	• Replace any glassware that is chipped, nicked, or cracked.	• Inspect glassware before use.
	Impact with equipment and other objects	• Use care when loading and unloading sampling equipment. • Minimize the handling of individual containers to the extent possible.	

Job Safety Analysis

Sample and Laboratory Glassware Handling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Filling sample containers	Overtightening of bottle lids causing breakage	• Avoid use of excessive force to tighten bottle caps (i.e., finger tight). • Secure lids with clear tape to prevent opening during transport.	
	Breakage during sample collection	• Place containers in plastic tubs between aliquots to limit contact with hard surfaces. • Place containers on a stable and non-slip surface during collection. • Use the buddy system as needed to hold bottles during filling.	
	Contact with sample preservatives (generally hydrochloric acid or sulfuric acid to lower pH to less than 2)	• Wear nitrile gloves and protective eyewear to prevent skin and eye contact if a container is damaged. • Do not open preserved bottles until necessary.	
Packing samples for shipment	Breakage during packing and shipment	• Use bottle wraps, foam sleeves, or bubble wrap to prevent bottle contact in the cooler. • Pack coolers snugly, but do not overpack.	• Ensure glass bottles do not touch to minimize potential breakage during transport.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including, but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Attachment D3
Field Forms and Logs

APEX LABS

6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # _____ COC ___of___

Company:	Project Mgr:	Project Name:	Project #:
Address:	Phone:	Email:	PO #
Sampled by:			

ANALYSIS REQUEST

Site Location: OR WA CA AK ID ____ SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)								Archive

Normal Turn Around Time (TAT) = 10 Business Days

SPECIAL INSTRUCTIONS:

TAT Requested (circle)

1 Day 2 Day 3 Day

4 DAY 5 DAY Other: _____

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Date:	Signature: Date:	Signature: Date:	Signature: Date:
Printed Name: Time:	Printed Name: Time:	Printed Name: Time:	Printed Name: Time:
Company:	Company:	Company:	Company:

Daily Log

Anchor QEA, LLC
6720 S Macadam Ave., Suite 125
Portland, OR 97219
Phone 503.670.1108

PROJECT NAME: Former Reynolds Metals Reduction Plant - Longview **DATE:**

PROJECT NUMBER: 210002-01.03 **WORK:** SU11 Cleanup

SITE ADDRESS: 4029 Industrial Way, Longview, WA **PERSONNEL:**

WEATHER: **WIND FROM:**

N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
SUNNY		CLOUDY		RAIN		?				

TEMPERATURE: ° F . ° C
[Circle appropriate units]

TIME	COMMENTS

Signature: _____

ANCHOR QEA

Surface Soil Field Sample Record

Project Name: **Project No:**

Sampling Crew: _____

Sample Date: _____ Sampling Method: _____

Station Coordinates: N / Lat. _____ Weather: _____

E / Long. _____

Datum: NAD 83 / WGS 84

Sample Number: _____

Analysis: Metals / TBTs / SVOCs / VOCs / PCBs / Pest Other: _____

TS / TVS / Grain Size / TOC / Ammonia / Sulfides Other: _____

(Circle Appropriate Analyses)

Sample Depth: _____ Time:_____

Soil Type:	Soil Color:	Density:	Soil Odor:	
cobble	D.O.	Very soft/Loose	none	H2S
gravel	gray	soft/loose	slight	Petroleum
sand C M F	black	mod dense/stiff	moderate	other:
silt clay	brown	dense/stiff	strong	
organic matter	brown surface	very dense/stiff	overwhelming	

Comments:

Sample Location Sketch:

Sample Location Description:

Recorded by:_____