

**REMEDY SELECTION REPORT**  
**AEP MOUNTAINEER PLANT**  
**BOTTOM ASH PONDS**  
*New Haven, West Virginia*

*Prepared for American Electric Power*



An **AEP** Company

**BOUNDLESS ENERGY™**

*Prepared by Sanborn, Head & Associates, Inc.*  
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# TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	I
1.0 INTRODUCTION.....	1
2.0 REMEDY SELECTION PROCESS.....	2
3.0 SELECTION OF REMEDY.....	6
4.0 EVALUATION OF SELECTED REMEDY.....	7
5.0 SCHEDULE OF REMEDIAL ACTIVITIES.....	15
6.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION .....	16

## APPENDICES

Appendix A	Bottom Ash Ponds Geochemical Assessment Summary Report
Appendix B	Documentation of Supporting Hydraulic Testing and Numerical Groundwater Model
Appendix C	Groundwater Reactive Media Treatability Study

## LIST OF ACRONYMS AND ABBREVIATIONS

<b>Acronym</b>	<b>Definition</b>
µg/L	Micrograms per Liter
ACM	Assessment of Corrective Measures
AEP	American Electric Power
BAPs	Bottom Ash Ponds
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
COCs	Constituents of Concern
EPRI	Electric Power Research Institute
gpm	Gallons per Minute
GWPS	Groundwater Protection Standards
HCS	Hydraulic Control System
ICP-MS	Inductively Coupled Plasma-Mass Spectroscopy
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NPDES	National Pollutant Discharge Elimination System
PRB	Permeable Reactive Barrier
RCRA	Resource Conservation and Recovery Act
SAP	Statistical Analysis Plan
SSL	Statistically Significant Levels
UCL	Upper Confidence Limit
USEPA	United States Environmental Protection Agency
WVDEP	West Virginia Department of Environmental Protection
WWTP	Wastewater Treatment Plant
XRD	X-ray Diffraction
XRF	X-ray Fluorescence

## EXECUTIVE SUMMARY

This document is the Selection of Remedy Report for groundwater impacts associated with the Bottom Ash Ponds, a coal combustion residuals unit at the American Electric Power Mountaineer Power Plant in Letart, West Virginia (Site) near the Town of New Haven. The document was prepared to meet the requirements of the U.S. Environmental Protection Agency of the Coal Combustion Residual Rule (40 Code of Federal Regulations (CFR) §257 Subpart D).

Groundwater concentrations of lithium (a listed constituent in Appendix IV of the Coal Combustion Residual Rule) at the Site were detected at statistically significant levels exceeding the groundwater protection standard, as discussed in the January 2019 report, *Statistical Analysis Summary, Bottom Ash Pond* report, which is published as an appendix in the 2019 Annual Groundwater Monitoring and Corrective Action Report (January 2020).

In accordance with the Coal Combustion Residual Rule, in June 2019, an Assessment of Corrective Measures Report (revised in November 2020) was prepared for the Site to address these statistically significant levels of lithium. Following publication of the Assessment of Corrective Measures Report, a public meeting was held on August 22, 2019, to present the findings of the report to the public.

Based on the conclusions of the Assessment of Corrective Measures and additional evaluations conducted since the Assessment of Corrective Measures Report was published, Source Removal and Hydraulic Containment (Alternative 2) was selected as the remedial approach for the Site. In accordance with 40 CFR §257.97, this remedy was evaluated in the context of, and subsequently meets, the criteria of the Coal Combustion Residual (CCR) Rules. This remedy protects human health and the environment. The selected remedy will include the following:

- The existing Bottom Ash Ponds will be decommissioned and repurposed as geomembrane-lined wastewater treatment ponds. The Bottom Ash Ponds will be drained, and the CCR material currently present in the Bottom Ash Ponds will be removed, and transported to the Site's Landfill for disposal. Removal of the CCR materials will remove a source of lithium to the subsurface.
- The Site currently has five groundwater extraction wells that provide water for Site operations, fire suppression, maintenance operations, and additional process water for the facility. The hydraulic control system for the site will use a combination of pumping from these five available extraction wells and will be designed to maintain hydraulic capture of contaminated groundwater at the Site. Like current site operations, the extracted water would be used for Site operations and then delivered to the Site's wastewater treatment plant prior to discharge at the Ohio River outfall in accordance with the Site's National Pollutant Discharge Elimination System permit.

Compliance with the groundwater protection standard for lithium is anticipated to be achieved approximately 2 to 7 years following closure of the Bottom Ash Ponds. Future groundwater monitoring will be used to assess when full protection is achieved, and the



Corrective Action Monitoring section of the Statistical Analysis Plan, required by 40 CFR §257.93(f) and (g), will be followed when evaluating compliance with the groundwater protection standard. The corrective measures will be considered complete upon achieving compliance with the groundwater protection standard established in 40 CFR §257.95(h) at all points within the plume for three consecutive years utilizing the statistical analysis program set forth in accordance with 40 CFR §257.93(f) and (g), which can be found at American Electric Power's publicly accessible Coal Combustion Residual Internet site for Mountaineer Bottom Ash Pond.

## 1.0 INTRODUCTION

This document is the Selection of Remedy Report for groundwater impacts associated with the Bottom Ash Ponds (BAPs), a coal combustion residuals (CCR)<sup>1</sup> unit at the American Electric Power (AEP) Mountaineer Power Plant in Letart, West Virginia (Site) near the Town of New Haven. On behalf of AEP, Sanborn, Head & Associates, Inc. (Sanborn Head) prepared this report according to the requirements set forth by the U.S. Environmental Protection Agency (USEPA) in the Coal Combustion Residual Rule (40 Code of Federal Regulations (CFR) §257 Subpart D).

Groundwater concentrations of lithium (a listed constituent in Appendix IV of the CCR Rule) at the Site were detected at statistically significant levels (SSLs) exceeding the groundwater protection standard (GWPS), as discussed in the January 2019 report, *Statistical Analysis Summary, Bottom Ash Pond*<sup>2</sup> report, which is an appendix to the 2019 Annual Groundwater Monitoring and Corrective Action Report (January 2020). In accordance with the CCR Rule, in June 2019, an Assessment of Corrective Measures (ACM) Report (revised in November 2020) was prepared for the Site to address these SSLs of lithium. Following publication of the ACM, a public meeting was held on August 22, 2019 to present the ACM to the public.

### 1.1 Document Purpose

This Selection of Remedy Report was prepared as required by, and in accordance with, 40 CFR §257.97 and was developed to select remedial measures for addressing elevated lithium concentrations in site groundwater. The target cleanup levels are the GWPS defined under 40 CFR §257.95(h). The current site-specific GWPS for lithium is 40 micrograms per liter (µg/L).

To focus the selection of remedial technologies intended to reduce the concentration of lithium to below the GWPS, this Selection of Remedy Report was prepared using information available in the following documents:

- Assessment of Corrective Measures prepared by Sanborn Head (June 2019, Revised November 2020);
- 2019 Annual Groundwater Monitoring Report prepared by AEP (January 2020);
- 2020 Annual Groundwater Monitoring Report prepared by AEP (January 2021);
- Bottom Ash Complex Closure Plan prepared by AEP (October 2016, Revised November 2020);

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<sup>1</sup> The EPA CCR Rule defines coal combustion residuals as material that is generated from the combustion of coal, including solid fuels classified as anthracite, bituminous, subbituminous, and lignite, for the purpose of generating steam for the purpose of powering a generator to produce electricity or electricity and other thermal energy by electric utilities and independent power producers. CCR includes fly ash, bottom ash, boiler slag, and flue gas desulfurization materials.

<sup>2</sup> *Statistical Analysis Summary, Bottom Ash Pond, Mountaineer Plant, New Haven, West Virginia* prepared by Geosyntec, dated January 8, 2019.

- Mountaineer Plant Bottom Ash Pond Geochemical Assessment Summary Report prepared by Sanborn Head (January 2019) – included as Appendix A;
- Documentation of Supporting Hydraulic Testing and Numerical Groundwater Model prepared by Sanborn Head (November 2021) – included as Appendix B; and
- Groundwater Reactive Media Treatability Study, prepared by Anchor QEA on behalf of AEP (November 2021) – included as Appendix C.

Information from the above listed documents that is pertinent to the selection of remedy is summarized in Section 2 of this report.

## 1.2 Description of Site CCR Units

Two regulated CCR units are associated with the Site and include the BAPs, which are south of the Site power plant on the same contiguous property, and the nearby Little Broad Run Landfill.

The BAPs consist of two ponds of approximately equal size that are named east BAP and west BAP. Several non-CCR regulated ponds are located immediately to the south of the BAPs, and together with the BAPs form the Site Pond Complex.

CCR materials from the Site are sent to AEP's Little Broad Run Landfill (Site's Landfill), which is located approximately 2 miles southwest of the BAPs. The Site's Landfill is a lined landfill that is regulated by the West Virginia Department of Natural Resources and is currently permitted for disposal of CCR materials and operated under Permit Number WV 0077038.

## 2.0 REMEDY SELECTION PROCESS

After the development of the ACM Report, the remedy selection process was continued by holding a public meeting to discuss the proposed alternatives for corrective measures. Pursuant to 40 CFR §257.96(e), the owner or operator must discuss the results of the corrective measures assessment at least 30 days prior to the selection of remedy in a public meeting with interested and affected parties. A public meeting was held in New Haven, West Virginia on August 22, 2019. Three alternatives were presented at the public meeting in which the public was invited to comment. No comments were received following the meeting, which was interpreted as acceptance of all three approaches by the public and the alternatives were incorporated into the remedy selection process.

During the interim period between the issuance of the ACM and the preparation of this report, four semi-annual progress reports were prepared by AEP describing the progress in selecting and designing the remedy. These reports are posted on AEP's publicly accessible CCR Rule Compliance Data and Information website for the Site.

### BAP Closure Plan

The BAP closure plan was prepared by AEP (*Bottom Ash Complex Closure Plan*, October 2016, Revised November 2020). AEP is continuing to work with an engineering firm on the design and planning for closure by removal as the means of source control for each alternative

presented in the ACM. Engineering design started in December 2019. The design was sent out to bid in October 2021, and bids were received in November 2021. AEP is currently reviewing contractor bids and intends to select a contractor for source removal as part of the initiation of selected remedy within 90 days of the remedy selection.

### **Summary of Assessment of Corrective Measures**

The ACM report was originally submitted in June 2019 and included three remedial alternatives. The original ACM report was revised in November 2020 to address comments received from the USEPA. The primary corrective measure for each alternative was removal of the existing CCR material through closure of the BAPs at the Site. In addition to implementation of the source removal, each alternative included a different groundwater remediation approach to meet the corrective action objectives of preventing potential human exposure to groundwater impacted by lithium and restoring groundwater quality within the aquifer consistent with maximum contaminant level (MCL)s/GWPS. The three remedial alternatives developed for detailed evaluation in the ACM included:

- Alternative 1: Source Removal and Monitored Natural Attenuation
- Alternative 2: Source Removal and Hydraulic Containment
- Alternative 3: Source Removal and In-Situ Groundwater Treatment

Each alternative included institutional controls to restrict use of the groundwater as drinking water until the corrective action objectives are met. Each alternative is discussed below.

#### **Alternative 1 – Source Removal and Monitored Natural Attenuation (MNA)**

This alternative includes monitored natural attenuation (MNA) of the dissolved phase plume following removal and disposal of CCR material from the BAPs. MNA would be facilitated by the removal of CCR material that would reduce or eliminate the contaminant mass flux into the groundwater from the BAPs. This alternative includes routine periodic monitoring of the existing groundwater monitoring network for a list of analytes similar to the current CCR monitoring program. MNA would rely on naturally occurring subsurface processes that act to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in groundwater.

To evaluate the potential for MNA at the Site, Sanborn Head performed a subsurface geochemical assessment of the BAPs at the Site on behalf of AEP to assist with remediation design for the BAPs. The assessment included a review of the Site environmental system to allow an understanding of the fate and transport of lithium in groundwater; and geochemical analysis of Site samples to assess fate and mobility of lithium. Soil samples were collected and submitted for geochemical analyses relevant to the occurrence, fate, and transport of constituents of concern (COCs). Testing included: bulk analysis of CCR Rule Appendix III/IV parameters; sequential extraction procedure (SEP) analysis; partition coefficient analysis; pH dependent batch leaching tests; column leaching test of CCR material; clay mineral

analysis; and Heavy Mineral Separation and Mineralogic and Chemical Analysis using a combination of x-ray diffraction (XRD), x-ray fluorescence (XRF), and Inductively Coupled Plasma Mass Spectroscopy (ICP-MS) techniques to provide a qualitative and quantitative assessment of mineralogy and major and trace elements. Results of geochemical analysis related to the fate and mobility of COCs in groundwater were used to form a conceptual understanding of the soil geochemistry and hydrogeology and integrated to inform the assessment of remedial alternatives. A copy of the summary report documenting this assessment is included as Appendix A.

Based on the results of the assessment, lithium is generally weakly or not taken up by soil (low  $K_d$ ), and its leaching is expected to decrease as pH increases. These relatively low  $K_d$  values are consistent with the generally relatively weak cation exchange strength of lithium relative to the other monovalent cations (e.g.,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Rb}^+$ ) and divalent cations (e.g.,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Co}^{2+}$ )<sup>3</sup> (Rose et al, 1979). Lithium is thought to substitute for major elements such as sodium or potassium in silicate minerals such as clays and feldspars. Lithium may therefore be weakly attenuated in the shallow silty clay soil beneath the BAPs but would be expected to be relatively mobile in the groundwater present in the deeper sand and gravel under existing Site conditions. This information, along with the observation of generally elevated lithium concentrations (relative to the GWPS of 40  $\mu\text{g}/\text{l}$ ) in groundwater in the downgradient wells, suggest that lithium is relatively mobile under Site conditions.

Since publication of the ACM Report, AEP has continued to perform semi-annual groundwater sampling and analysis, and the results are summarized in the 2019 and 2020 Annual Groundwater Monitoring and Corrective Action Reports. MNA utilizes groundwater data to develop contaminant trends and to evaluate reductions in contaminant concentrations brought about by naturally occurring mechanisms. The groundwater data collected during semi-annual groundwater monitoring is being analyzed to assess existing spatial and temporal trends in lithium concentrations. MNA is a viable remedy at a site when the site data demonstrate that there is a stable to decreasing concentration trend observed at the plume boundaries (i.e., spatial extent of the plume is stable or shrinking). The existing site data indicates that the lithium plume is relatively stable. Following source removal, groundwater data will continue to be collected with the expectation that the spatial extent of the lithium plume will shrink in response to removal of the source.

In the ACM, it was noted that complete characterization of the nature and extent of lithium coming from the BAPs is currently complicated by other potential contributors of lithium in groundwater. Therefore, in addition to the on-going semi-annual groundwater monitoring, since the last semi-annual progress report, AEP has performed additional assessment to inform the nature and extent study, with sampling and analysis of water from site production wells, the BAPs, and other non-CCR regulated ponds adjacent to the BAPs. These additional data will be used to inform the evaluation of groundwater data following implementation of the groundwater remedy.

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<sup>3</sup> Rose, A.W., Hawkes, H.E., and Webb, J.S. (1979) *Geochemistry in Mineral Exploration*. 2nd Edition, Academic Press, London, 658 pp.

## **Alternative 2 – Source Removal and Hydraulic Containment**

This alternative proposes operating up to five of the groundwater pumping wells that are currently active at the Site to provide hydraulic control of the groundwater plume following removal and disposal of CCR material from the BAPs. As groundwater is pumped from the extraction well network, a hydraulic gradient is created that draws the contaminated groundwater towards the extraction wells and limits or prevents the contaminated water from migrating off site. The extracted water would continue to be used for Site operations and then delivered to the Site's wastewater treatment plant (WWTP) prior to discharge at the Ohio River outfall in accordance with the Site's National Pollutant Discharge Elimination System (NPDES) permit. Natural attenuation processes also would act to gradually reduce the residual contaminant mass until compliance with GWPSs was achieved.

Pursuant to the criteria set forth in 40 CFR §257.97 regarding selection and design of a remedy, AEP worked with Sanborn Head to further evaluate the technology identified in the ACM as Alternative 2 (Source Removal with Hydraulic Containment).

The Site supply wells are generally operated continuously. As previously summarized in the ACM Report, an opportunity to observe groundwater flow under non-pumping conditions occurred in March 2019 when pumps at the Site were shut down for maintenance. Two sets of groundwater elevation measurements were collected during this time to assess groundwater flow conditions. Beginning in March 2021, Sanborn Head further assessed the onsite groundwater flow including flow direction under variable pumping conditions. Prior evaluation of groundwater flow under pumping conditions did not include operation of Production Well 5. Additional groundwater monitoring wells were installed following the March 2019 assessment, which allowed for further understanding of groundwater response to pumping in the vicinity of the BAPs. In May 2021, Well 5 was pumped for a period of three days while pumping from the Site's supply wells (i.e., East 1 and West 1) was reduced. Manual measurements of groundwater levels were performed periodically in the site CCR groundwater monitoring wells, while continuous measurements were made in a sub-set of ten monitoring wells using pressure transducer data loggers.

Following collection of the data from the May 2021 pumping event, Sanborn Head developed a numerical groundwater flow model using detailed geologic data presented in the Conceptual Site Model and the groundwater level measurements described above. This was incorporated into the existing groundwater model to help refine the viability and approach for remedial alternative 2. The results of the modeling show that hydraulic containment of the lithium groundwater plume using existing site production wells and associated infrastructure is a viable alternative. A memorandum summarizing the May 2021 pumping test and the development of the numerical groundwater flow model is included as Appendix B.

## **Alternative 3 – Source Removal and In-Situ Treatment**

This alternative would include installation of an on-site permeable reactive barrier (PRB) located hydrogeologically downgradient from the BAPs along the northwestern and



northeastern edges following removal and disposal of CCR material from the BAPs. The PRB would include an engineered reactive amendment/media that is intended to remove lithium from groundwater by precipitation and/or sorption to the media to reduce the concentration of lithium in groundwater downgradient of the PRB. The PRB would transect the aquifer and be keyed into the underlying low-permeability layer (sandstone bedrock) to provide contact with the plume across the vertical extent of the permeable saturated zone. This alternative would decrease concentrations downgradient from the PRB as contaminant mass would be removed from the groundwater as it passes through the media.

AEP performed laboratory testing to assess the effectiveness of various media at the removal of constituents of concern (including lithium) from groundwater. This work was conducted under a contract with the Electric Power Research Institute (EPRI). The initial approach involved bench scale treatability testing by mixing potential media with quartz sand as a base soil matrix. Site-specific groundwater was added to the base soil matrix. The test solutions were analyzed to evaluate metals removal rates and efficiency. The bench scale test results were then used to design a series of laboratory column tests. The column tests were performed with mixed media and site-specific aquifer soils to create the soil matrix. Additional volumes of site-specific groundwater were pumped through the soil column to infiltrate the soil matrix. Similar to the initial bench scale testing, data from the column tests were analyzed to evaluate metals removal rates and efficiency. Results from the tests demonstrated that at a laboratory scale the tested media have the potential to remove the COCs, including lithium. We note that the media was not tested in an in-situ application, and a pilot-scale in-situ test would need to be completed before use as a full-scale remedy. In addition, although the tested media were successful in removing lithium, the longevity of the media for removing lithium was relatively limited and therefore not favorable for application in a deep permeable reactive barrier. A copy of the memorandum summarizing the groundwater reactive media treatability study is included as Appendix C.

### **3.0 SELECTION OF REMEDY**

Following the ACM, selection of the remedy for the site is the next step in the Corrective Action process.

#### **3.1 Selected Remedy**

Based on the conclusions of the ACM and additional evaluations conducted since the ACM was published (See Section 2), Alternative 2 – Source Removal and Hydraulic Containment was selected as the remedial approach for the Site. In accordance with 40 CFR §257.97, this alternative was evaluated in the context of, and subsequently meets, the criteria of the CCR Rules. This remedy protects human health and the environment. The selected remedy will include the following.

##### **3.1.1 Source Removal and Disposal**

The existing BAPs will be decommissioned (closure by removal) and the area repurposed with geomembrane-lined wastewater treatment ponds (non-CCR). The BAPs will be drained, and the CCR materials present in the BAPs will be removed and transported to the Site's Landfill for disposal. A soil sampling and analysis plan (SSAP) will be prepared and following

removal of the CCR material from the BAPs, the underlying soil will be sampled and tested, and compared to background soil concentrations to confirm contaminated media was removed. Soil affected by a release from the BAPs will be removed to the extent feasible to reduce or eliminate further releases to the environment. The removal of the CCR material and the affected soil underlying the BAPs, will eliminate the introduction of additional lithium to the subsurface from the footprint of the BAPs.

### **3.1.2. Hydraulic Containment System**

The Site currently has five groundwater extraction wells. The two primary wells are West 1 and East 1, which provide process water for the Site. West 1 and East 1 have pumping capacities of approximately 930-950 gallons per minute (gpm) and 550-575 gpm, respectively. Wells 4, 5, and 6 are pumped at lower flow rates (generally less than 500 gpm each) than West 1 and East 1, and currently provide groundwater for fire suppression, maintenance operations, and additional process water for the Site. The hydraulic control system (HCS) for the Site will be designed to maintain hydraulic capture of contaminated groundwater using a combination of pumping from these five extraction wells. The HCS would include automated groundwater elevation measurement to track hydraulic control and to guide adjustment of relative pumping rates of the five groundwater extraction wells. The extracted water would be used for Site operations and then delivered to the Site's WWTP prior to discharge at the Ohio River outfall in accordance with the Site's NPDES permit.

### **3.1.3 Long-Term Monitoring**

Within 90 days of implementation of the corrective action program, a corrective action monitoring program will be developed to document the effectiveness of the corrective action remedy and demonstrate progress towards compliance with the GWPS. The corrective measures will be considered complete upon achieving compliance with the GWPS established in 40 CFR §257.95(h) at all points within the plume for three consecutive years utilizing the statistical analysis program set forth in accordance with 40 CFR §257.93(f) and (g). That statistical method selection program can be found at AEP's publicly accessible CCR internet site for Mountaineer Bottom Ash Pond.

## **4.0 EVALUATION OF SELECTED REMEDY**

As discussed in Section 3.0, the selected remedy proposes operating existing groundwater pumping wells that are currently active at the Site to provide hydraulic control of the groundwater plume along with removing the CCR material from the BAPs and disposing the CCR material in the Site's Landfill. As groundwater is pumped from the extraction well network, a hydraulic gradient is created that draws the contaminated groundwater towards the extraction wells and limits or prevents the contaminated water from migrating off site.

Based on 40 CFR §257.97, the selected remedy must:

- Be protective of human health and the environment;
- Attain the groundwater protection standard as specified pursuant to 40 CFR §257.95(h);



- Control the source(s) of releases to reduce or eliminate, to the maximum extent feasible, further releases of constituents in appendix IV to 40 CFR §257 into the environment;
- Remove from the environment as much of the contaminated material that was released from the BAPs as is feasible, considering factors such as avoiding inappropriate disturbance of sensitive ecosystems; and
- Comply with standards for management of wastes as specified in 40 CFR §257.98(d).

Additionally, this section of the report addresses the consideration of the evaluation factors listed in 40 CFR §257.97(c):

- Long-term and short-term effectiveness and protectiveness of the remedy;
- Effectiveness of remedy to control the source;
- Ease of implementation; and
- Community acceptance.

The following subsections include an evaluation of the above criteria for the selected remedy.

#### **4.1 Overall Protection of Human Health and the Environment**

CCR material removal (including the underlying potentially contaminated soil) will remove contaminant mass from the BAPs. Hydraulic containment will reduce lithium concentrations, control the migration of contaminated groundwater, and reduce the potential for lithium exposure to receptors from groundwater.

#### **4.2 Ability to Attain Groundwater Protection Standard**

The remedy provides the ability to comply with the GWPS through: (i) source removal; and (ii) containment, extraction, and natural attenuation of contaminated groundwater. Under 40 CFR 257.97(b)(2), the remedy must be able to attain the GWPS pursuant to 40 CFR 257.95(h). The GWPS must be the greater of the background concentration and the MCL established by the USEPA for the constituent, or when an MCL is not set, the USEPA adopted health-based levels as the GWPSs for Appendix IV constituents without a designated MCL (i.e., the CCR rule specified screening levels for cobalt, lead, lithium, and molybdenum). The remedy will achieve the GWPS for lithium by reducing the concentration of lithium that is present in groundwater in the vicinity of the BAPs. Evaluation of whether the remedy has achieved the GWPSs will follow the statistical approach outlined below.

Following implementation of remedial activities, a corrective action monitoring program will be established in accordance with 40 CFR 257.98(a)(1), and the requirements of the site assessment monitoring program [40 CFR 257.98(a)(1)(i)]. The effectiveness of the corrective action will be evaluated by comparing groundwater monitoring results to the GWPS. A Statistical Analysis Plan (SAP) was previously prepared (Revision 1, dated January 2021, prepared by Geosyntec on behalf of AEP) for the Site in accordance with the CCR Rule

and the USEPA's Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities, Unified Guidance (USEPA, 2009). The site SAP includes statistical procedures for corrective action monitoring. A remedy will be considered complete when concentrations are less than the GWPS. Success is defined when the average concentrations of monitoring well-constituent pairs, where an SSL was previously identified, is less than the GWPS (i.e., when the upper confidence limit [UCL] is less than the GWPS). The SAP includes a detailed path for calculating the UCL for the monitoring well-constituent pairs based on the nature of the data (i.e., seasonality, distribution of data, significant non-detects, etc.). Further, a remedy is considered complete when confidence intervals constructed for Appendix IV constituents for monitoring wells identified with SSLs do not exceed the GWPS for three consecutive years [40 CFR 257.98(c)(2)]. These, or similar, procedures will be implemented once the corrective action groundwater monitoring program is established.

#### **4.3 Source Control and Reduction of Contaminated Material**

Closure of the BAPs, including excavation and removal of potentially contaminated soil within the current footprint of the BAPs, would effectively eliminate the source of lithium contamination to site groundwater. Lithium present in groundwater downgradient of the BAPs at the time of closure would be hydraulically captured and removed from the subsurface over time by the hydraulic containment system.

#### **4.4 Removal of Released Material**

Under 40 CFR §257.97(b)(4), the selected remedy must remove as much of the released contaminated material (CCR material, potentially contaminated soil, and contaminated groundwater) as is technically feasible. Potentially contaminated soil in the footprint of the BAPs will be assessed by comparing lithium concentrations to background. In groundwater, released material is identified as concentrations of lithium at the Site detected at statistically significant levels exceeding the GWPS.

Removal of the CCR material from the BAPs and removing soil in the footprint of the BAPs that has lithium concentrations above the background soil concentrations will reduce or eliminate contaminated media from the Site. These materials will be disposed of in the Site's Landfill. The HCS will remove lithium from the subsurface with the extracted groundwater, and will operate until lithium concentrations at the Site are no longer detected at statistically significant levels exceeding the GWPS. These actions will remove as much of the release contaminated material as is technically feasible.

#### **4.5 Compliance with Standards for Management of Wastes**

CCR material removed from the BAPs during closure will be hauled and disposed of in the Site's Landfill, in compliance with applicable RCRA requirements as required under 40 CFR §257.98(d).

#### **4.6 Evaluation Factors**

In selecting the remedy, the evaluation factors listed in 40 CFR §257.97(c) were considered. A summary of each evaluation factor is provided in the following subsections.

#### **4.6.1 Long-Term and Short-Term Effectiveness and Protectiveness**

Long-term and short-term effectiveness and protectiveness of the potential remedy, along with the degree of certainty that the remedy will prove successful are evaluated under 40 CFR §257.97(c)(1) through the following eight criteria.

##### **4.6.1.1 Magnitude of Reduction of Existing Risks**

The risk from the existing release of lithium from the BAPs will be reduced following excavation of CCR material from the BAPs and disposal of these materials in the Site's Landfill. Removing and disposing of the CCR material from the BAPs will have a positive effect in the short term by significantly decreasing mass flux of lithium entering groundwater from the BAPs. Future leaching of lithium from soil beneath the existing BAPs will be reduced by: (i) removing soil with lithium concentrations above the background soil concentrations per the SSAP; and (ii) reducing rainwater infiltration with the geomembrane-lined wastewater treatment ponds.

Further risk will be mitigated by hydraulic control of contaminated groundwater within the vicinity of the BAPs, which will limit risk to humans and environmental receptors by reducing exposure via groundwater. Operating the HCS will have an immediate positive effect by decreasing lithium concentrations and controlling migration of lithium in the groundwater.

Groundwater monitoring will be used to verify the effectiveness of reducing existing and future risk. Following removal of the CCR material and the underlying contaminated soil from the BAPs, groundwater monitoring is expected to indicate decreasing concentrations of lithium in groundwater within the plume within an estimated timeframe of 2 to 7 years based on the groundwater modeling summarized in Appendix B. Containment of contaminated groundwater during corrective action will be achieved by operating the HCS.

When source removal, operation of the HCS, and available MNA processes reduce the residual concentration of lithium in the groundwater to below the GWPS, the identified risk associated with the former BAPs will be reduced to an acceptable level. The site SAP will be followed to assess compliance with the GWPS.

##### **4.6.1.2 Magnitude of Residual Risks of Further Releases due to CCR**

Following closure of the BAPs, CCR material will be managed through proper operation and maintenance of the Site's Landfill. Residual risk associated with the former BAPs will be limited to residual lithium in the subsurface pore water below the former ponds, which will be contained by the HCS.

##### **4.6.1.3 Type and Degree of Long-Term Management Required**

Long-term management requirements for the remedy include operation and maintenance of the HCS and the Site's wastewater treatment system. The Site maintains resources and personnel to manage the system and can continue to operate these in support of the remedy. Monitoring of groundwater elevation and flow direction, as well as groundwater quality is

required to evaluate the effectiveness of the HCS, and statistical procedures will be used to assess if the GWPS is met as described in the corrective action monitoring section of the SAP.

#### **4.6.1.4 Short-Term Risks to the Community or Environment**

Excavation and removal of the CCR material could create the potential for worker exposure to contaminated material and for potential off-site fugitive dust emissions. In addition, there are safety hazards common to earthmoving and construction activities. The potential impact of these activities will be managed with engineering controls, which are described in the current revision of Mountaineer Plant Coal Combustion Residual Fugitive Dust Control Plan. The BAP and Landfill are inspected weekly, and the dust control plan is periodically assessed and, if necessary, amended to verify its effectiveness.

During the operation of the HCS, institutional controls already in place at the Site (including the Site's NPDES Best Management Practices Plan, Stormwater Pollution Prevention Plan, and Groundwater Protection Plan) would protect local residents and other potentially affected people by limiting exposure to impacted groundwater both in-situ and following extraction by the hydraulic containment system. In addition, based on the groundwater modeling simulations summarized in Appendix B, the remedy is protective of the New Haven public water supply wells, which are located along the northwest property boundary. The groundwater modeling simulations show that CCR contaminants will not migrate to New Haven public water supply wells under current or future conditions.

#### **4.6.1.5 Time Until Full Protection is Achieved**

By removing the CCR materials and the underlying potentially impacted soil as part of the BAP closure, compliance with the GWPS for lithium is anticipated to be achieved approximately 2 to 7 years (see Appendix B). The anticipated timeframe of approximately 2 to 7 years derived from the simulations described in Appendix B is an estimate based on our current understanding of conditions and the assumptions stated in developing the numerical groundwater flow and transport model. The BAP was the only CCR-regulated source considered in developing the estimate timeframe, and the actual time to achieve compliance with the GWPS may be affected by other non-CCR regulated sources of lithium. The anticipated timeframe of approximately 2 to 7 years is also a generalization of when the model simulated concentrations fall below the GWPS across the horizontal and vertical extent of the simulated lithium plume and does not include statistical analysis of the model simulated data. Future groundwater monitoring, and the Corrective Action Monitoring section of the SAP, required by 40 CFR §257.93(f) and (g), will be used when assessing compliance with the GWPS.

#### **4.6.1.6 Potential for Exposure to Remaining Wastes**

Exposure to the CCR material transferred to the Site's Landfill is negligible once the CCR material is placed and covered as part of normal operations.

The utilization of extracted water for Site operations could create the potential for worker exposure, although the likelihood of contact is negligible due to the essentially non-volatile nature of lithium and the use of enclosed process equipment. Acute aquatic toxicity is

monitored in the Site's discharge to the Ohio River per the Site's NPDES discharge permit. Final discharge to the Ohio River is therefore not expected to present a concern to the environment.

#### **4.6.1.7 Long-Term Reliability of the Engineering and Institutional Controls**

Institutional and engineering controls associated with the remedy will generally include operation and maintenance of the HCS extraction well network. Operation and maintenance of the HCS relative to performance of the remedy will be incorporated into the Site's operating plans.

#### **4.6.1.8 Potential Need for Replacement of Remedy**

The source removal portion of the project does not require additional resources once complete.

The HCS is an active component of the remedy and will require operation and maintenance associated with the facility's groundwater extraction equipment as well as the facility's WWTP. While the Site is active, these systems will be operated and maintained to keep the Site in operation. In the case that the Site ceases operations before the corrective action objectives are met, a groundwater containment and/or treatment system may need to be implemented to replace the function of the existing extraction system and WWTP.

### **4.6.2 Effectiveness of Remedy to Control the Source**

Effectiveness of the remedy to control the source to reduce further releases is evaluated under 40 CFR §257.97(c)(2) through the following two criteria.

#### **4.6.2.1 Extent of Containment to Reduce Further Releases**

The effectiveness of the remedy relies on two integrated measures. First, removing the CCR material and the underlying potentially impacted soil from the BAPs will effectively eliminate future mass flux of lithium to groundwater. Second, the containment and extraction of contaminated groundwater will reduce and eliminate potential off-site migration of lithium and remove contaminant mass from groundwater. While mass removal rates of groundwater extraction are typically low, the reliability and permanence of this approach are well demonstrated. Based on groundwater monitoring results obtained to date, and based on the model simulated extent of lithium in groundwater emanating from the BAP, the existing extraction of groundwater for Site operations is likely already preventing off-site migration of lithium.

The remedy relies on a strong understanding and characterization of subsurface conditions. With the removal and disposal of the CCR material, the mass of lithium available for leaching will be limited, and hence lithium leaching is expected to decrease with time assuming current groundwater pH and redox conditions are maintained. Our review of historical data sources, and additional site characterization and data analysis conducted, including qualitative plume stability analysis and groundwater modeling, confirm our understanding that the subsurface conditions at the Site are sufficiently stable to employ this approach.

#### **4.6.2.2 Extent of Treatment Technologies**

The remedy relies on the existing extraction of groundwater used for Site process water and the discharge of treated process water to the Ohio River in accordance with the Site's existing NPDES permit.

#### **4.6.3 Ease of Implementation**

The ease of implementing the remedy is evaluated under 40 CFR 257.97(c)(3) through the following five criteria.

##### **4.6.3.1 Degree of Difficulty to Construct the Remedy**

The remedy entails well-understood and reliable technologies that are not difficult to construct. Although the conversion of the Site to a dry bottom ash handling system (allowing closure and repurposing of the BAP area for geomembrane-lined wastewater treatment ponds) will be difficult, the removal of the CCR material and the underlying potentially impacted soil and operation of the HCS to maintain hydraulic control is less difficult. The source removal component of the remedy is generally similar to operations currently implemented at the site to transfer CCR material from the BAPs to the Site's Landfill with the addition of complete removal (using traditional heavy civil construction equipment) and soil testing. Most elements of the HCS are in place already. Changes to the existing Site process water and WWTP systems necessary for the remedy are primarily limited to additional instrumentation and control logic programming.

##### **4.6.3.2 Expected Operational Reliability of the Remedy**

The HCS proposes to use the existing groundwater pumping system used to provide process water for Site operations. AEP has been operating and maintaining the Site's process water, WWTP, and the Landfill for years, and these systems have been reliable over time. No concerns are anticipated to maintain these operations under the remedy.

##### **4.6.3.3 Need to Obtain Necessary Approvals and Permits**

No concerns relating to local permitting or approval processes were identified.

State acceptance of the remedy requires a Solid Waste Landfill Permit and a Construction Stormwater General Permit. Because the area to be disturbed during source removal would exceed three acres, and as part of the construction stormwater general permitting process, a Construction Site Registration Application must be submitted at least forty-five days prior to site disturbance. Also, the proximity of Little Broad Run Stream necessitates establishing a fifty-foot natural vegetative buffer in addition to other erosion control best management practices. AEP already possesses Solid Waste Landfill Permit (WV077038).

The remedy additionally requires an Individual Industrial Facilities NPDES Permit to discharge extracted water to the Ohio River. AEP already possesses Individual Industrial Facilities NPDES Permit (WV0048500) for discharge of treated wastewater to the Ohio River. The current NPDES permit expired in 2013 and was administratively continued pending permit renewal as a result of AEP's timely submittal of a permit renewal application. AEP



provided supplemental information in 2018 and 2021; however, a renewed permit has yet to be issued to AEP. Under current conditions, the Site's WWTP complies with discharge permit limits, and although the relative groundwater pumping rates of the five existing groundwater extraction wells may shift over time to better maintain the effectiveness of the HCS, an adjustment of relative pumping rates is not expected to significantly affect the WWTP operation nor prevent the Site from achieving discharge limits or West Virginia Water Quality Standards.

In the case that a new or modified groundwater extraction and treatment system needs to be implemented (e.g., if the Site ceases operations before the corrective action objectives are met), the NDPEs permit may need to be modified. In addition, if the existing facility treatment processes do not meet the contaminant removal requirements and additional ex-situ treatment is required, then a modification to the NDPEs permit may be required.

#### **4.6.3.4 Availability of Necessary Equipment and Specialists**

Removal of CCR material from the BAPs will be performed using standard earthwork construction equipment with disposal of the excavated material in the Site's Landfill. Prior to implementation of the excavation and removal phase, an engineered design plan will be developed that considers the geotechnical requirements for the BAPs stability, dewatering requirements, wastewater management/treatment processes, and construction sequencing. Equipment and personnel to implement this removal are readily available.

The necessary equipment and personnel for the HCS are readily available using existing Site groundwater extraction wells, treatment processes, and personnel.

#### **4.6.3.5 Availability of Capacity and Location of Treatment, Storage, and Disposal Services**

The Site's Landfill has sufficient capacity to accept the quantity of CCR material currently present in the BAPs without compromising its operations, and most of the CCR material to be generated during the closure of the BAPs were planned to be transferred to the Site's Landfill.

The groundwater extraction rate required from the HCS to capture the lithium contaminant plume from the BAPs is well within the capacity of the Site's current groundwater extraction rate to satisfy process water requirements. No capacity concerns for the HCS are anticipated.

#### **4.6.4 Community Acceptance**

Following initial publishing of the ACM report in June 2019, AEP held a public meeting in accordance with 40 CFR §257.96(e). The public meeting was well attended and received by members of the local community. No questions or concerns were submitted by attendees nor other community members, and community acceptance of the selected remedy is expected to be high.

## 5.0 SCHEDULE OF REMEDIAL ACTIVITIES

Closure of the BAPs is currently anticipated to begin in Spring of 2022 and to be completed by Fall 2023. AEP received bid documents for the closure project in November 2021 and intends to select a contractor for the source removal component of the project within 90 days of the remedy selection.

Operating the HCS will have an immediate positive effect by decreasing lithium concentrations and controlling migration of lithium in the groundwater. Reduction of lithium concentrations in groundwater also will be realized over time through natural attenuation processes. Based on modeling of predicted conditions at the Site following source removal and operation of the HCS, the time to reach GWPSs for lithium is estimated to be approximately 2 to 7 years. The actual timeframe to reach GWPSs may be influenced by contaminant contribution to groundwater from other potential sources near the former BAPs (e.g., the Sporn Plant former ash ponds, non-CCR regulated ponds at the Site, and underground mines and associated discharge via bedrock groundwater). The site-specific SAP section related to corrective action monitoring statistics will be followed when determining compliance with the GWPS.



## 6.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

By means of this certification, I certify that I am a qualified professional engineer as defined in 40 CFR §257.53, that I have reviewed this Remedy Selection Report, dated December 22, 2021 (the "Report"), and the selected remedy described in this Report meets the requirements of 40 CFR §257.97. The Report was prepared by Sanborn, Head & Associates, Inc. for the Mountaineer Power Plant in Letart, West Virginia near the Town of New Haven.

ERIC S. STEINHAUSER

Printed Name of Licensed Professional Engineer

Eric S. Steinhauser

Signature



11932

License Number

West Virginia

Licensing State

December 22, 2021

Date

## APPENDIX A

**BOTTOM ASH POND GEOCHEMICAL  
ASSESSMENT SUMMARY REPORT  
AEP MOUNTAINEER PLANT**  
*New Haven, West Virginia*

*Prepared for American Electric Power  
File No. 4345.00  
January 10, 2019*

# TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
1.1	Objectives.....	1
1.2	Scope and Organization of Report.....	1
2.0	BACKGROUND .....	2
2.1	Review of Site Hydrogeology and Groundwater Chemistry Data .....	3
2.1.1	Hydrogeology .....	3
2.1.2	Groundwater Chemistry .....	4
2.2	Published Literature Review.....	6
2.2.1	Published Geologic Information on Ohio River Alluvium Composition .....	6
2.2.2	Published Partition Coefficients for Site COCs .....	6
3.0	SOIL AND ASH SAMPLING AND ANALYSIS .....	7
4.0	SUMMARY OF RESULTS.....	11
4.1	CCR Appendix III/IV Parameters.....	11
4.2	Mineralogical Results .....	13
4.3	Leaching and Extraction Methods Results.....	16
4.3.1	Sequential Extraction Procedure .....	16
4.3.2	Partition Coefficient Analysis.....	20
4.3.3	pH Dependent Batch Leaching Test.....	21
4.3.4	Bottom Ash Percolation Column Leaching Test .....	22
5.0	GEOCHEMICAL SUMMARY .....	23
5.1	Distribution of COCs in Soil.....	24
5.2	Summary of Site Geochemical Assessment – Cobalt, Lithium and Molybdenum .....	24
5.2.1	Cobalt.....	25
5.2.2	Lithium.....	25
5.2.3	Molybdenum.....	26
6.0	ASSESSMENT OF REMEDIAL ALTERNATIVES .....	27
6.1	Monitored Natural Attenuation.....	27
6.2	Injected Media.....	28
6.3	Pond Closure.....	30

## **TABLES**

Table 1	Summary of Analytical Results – Groundwater
Table 2	Summary of Analytical Results – Soil Appendix III/IV
Table 3	Summary of Analytical Results – Sequential Extraction Procedure
Table 4	Summary of Analytical Results – Partition Coefficients
Table 5	Summary of Analytical Results – pH Dependent Batch Leaching Test
Table 6	Summary of Analytical Results – Percolation Column Leaching Test
Table 7	Review of Analytical Results

## **FIGURES**

Figure 1	Locus Plan
Figure 2	Exploration Location Plan
Figure 3	Summary of Bulk Soil Appendix III/IV Concentrations

## **APPENDICES**

Appendix A	Limitations
Appendix B	Field Documentation
B.1	Sampling and Analysis Plan
B.2	Boring Logs
Appendix C	Average Groundwater Concentration Plans
Appendix D	Sequential Extraction Procedure Charts
D.1	SEP Line Charts by Analyte
D.2	SEP Bar Charts by Location (Concentrations)
D.3	SEP Bar Charts by Location (Percentages)
Appendix E	Partition Coefficient Charts
Appendix F	pH Leaching Charts
Appendix G	BA-01 Ash Leaching Charts
Appendix H	Analytical Laboratory Reports
H.1	Bulk Soil Reports
H.2	Sequential Extraction Procedure Report
H.3	Partition Coefficient Reports
H.4	pH Leaching Test Report
H.5	Percolation Column Leaching Test Report
H.6	Mineralogy Reports

## 1.0 INTRODUCTION

This report presents the findings of a subsurface geochemical assessment of the Bottom Ash Pond (BAP) complex at American Electric Power Service Corporation's (AEP's) Mountaineer Plant in New Haven, West Virginia (the Site). The work and the preparation of this report were performed by Sanborn, Head & Associates, Inc. (Sanborn Head) on behalf of AEP under a contract for services which was authorized by AEP in Professional Services Agreement No. 02972716x215, dated February 14, 2018. The scope of work (SOW) was outlined in Sanborn Head's proposal dated February 2, 2018. Sanborn Head's work and this report are subject to the limitations as outlined in Appendix A.

### 1.1 Objectives

The purpose of the geochemical assessment is to assist AEP with remediation design for the BAP Coal Combustion Residual (CCR) Unit associated with compliance requirements under the United States Environmental Protection Agency (USEPA) CCR Rule 40 CFR 257<sup>1</sup>. To meet this project objective, we have performed the following scope of services. The objectives of this work are the following:

1. Perform a review of the site environmental system to allow an understanding of the fate and transport in groundwater associated with potential contaminants of concern (COCs), including cobalt, lithium, and molybdenum.
2. Perform geochemical analysis of site samples to assess fate and mobility of potential COCs.
3. Review of the geochemical data to help inform the viability of remediation design including three specific remedial options selected in discussion with Mr. John Massey-Norton of AEP.

### 1.2 Scope and Organization of Report

This report presents a conceptual understanding of the soil geochemistry and hydrogeology, and results of geochemical analysis related to the fate and mobility of COCs in groundwater.

- Review of on-Site groundwater quality, specifically Appendix IV analytes cobalt, lithium and molybdenum, and boring logs, with the purpose of understanding geology, hydrogeology and groundwater chemistry at the Site. Refer to Section 2.1 for a summary of the on-Site groundwater quality review.
- Perform a brief literature review of geologic publications to inform understanding of aspects of the Site environment that may influence fate and transport of the COCs in groundwater. Refer to Section 2.2 for further discussion of the literature review.

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<sup>1</sup> 40 CFR 257 Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities, effective October 14, 2015.



- Collect soil samples and submit samples for geochemical analyses relevant to the occurrence, fate and transport of COCs. Refer to Sections 3.0 and 4.0 for additional description of the scope of work completed, and discussion of the results, respectively.
- Section 5.0 provides an integrated summary of results presented in Section 4.0 that informs the assessment of remedial alternatives in the subsequent section.
- Section 6.0 provides recommendations relevant to potential remedial alternatives, including monitored natural attenuation, in-situ injected media, and pond closure, informed by the results discussed in Section 5.0

## 2.0 BACKGROUND

The BAP CCR unit subject of this report, regulated under USEPA CCR Rule 40 CFR 257, is located in the southern portion of the AEP Mountaineer Plant, approximately 0.5 miles southwest of the Ohio River. The retired AEP Phillip Sporn Plant separates the BAP CCR unit from the Ohio River. The BAPs are bordered by West Virginia Route 62 (Graham Station Road) to the northeast, a fly ash conveyor to the northwest and western sides of the BAP, Little Broad Run to the southwest, and wastewater ponds to the southeast. Refer to Figure 1 for a locus plan.

The East and West BAPs, with a combined normal pool surface area of 28 acres, are constructed of earthen embankments approximately 35 ft tall, and lined with 3 feet of clay derived from offsite borrow areas<sup>2</sup>. The BAPs receive influent through above- and below-ground piping from coal pile run-off, fly ash silo and turbine room sumps, pyrite and bottom ash transport, stormwater, and the bioreactor, as well as direct precipitation<sup>3</sup>. Reportedly, the West BAP receives more influent than the East BAP. Surface water generally flows from northwest to southeast through the BAPs from the BAP (West/East) to Wastewater Ponds (West/East) to either the Reclaim Pond or Clearwater Pond, and eventually to the Ohio River<sup>4</sup>. In addition to BAP effluent, the Wastewater Ponds receive influent from the water treatment sump and cooling tower blowdown. Other features in the BAP complex include a leachate collection surge pond, a flue-gas desulfurization (FGD) waste containment pond, and a metal cleaning waste tank secondary containment basin<sup>5</sup>. Of the BAP complex features mentioned herein, only the West and East BAPs are a regulated CCR impoundment<sup>6</sup>.

As described in the Groundwater Monitoring Well Network Evaluation (GMWNE)<sup>7</sup>, the BAP groundwater monitoring network consists of four upgradient (MW-1601A, MW-1602, MW-

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<sup>2</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016.

<sup>3</sup> History of Construction CFR 257.73(c)(1) Bottom Ash Complex Mountaineer Plant, prepared by American Electric Power Service Corporation on behalf of Appalachian Power Company, dated October 2016.

<sup>4</sup> Ibid.

<sup>5</sup> 2017 Dam & Dike Inspection Report Mountaineer Bottom Ash Complex (Facility ID #05307) GERS-17-046-Revision 0, prepared by AEP Service Corporation, dated November 2017.

<sup>6</sup> Ibid.

<sup>7</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016.

1603, and MW-1608) and eight downgradient (MW-1604S/D, MW-1605S/D, MW-1606S/D, and MW-1607S/D) monitoring wells sampled for water quality. An additional eleven monitoring wells/wells/piezometers are used for hydraulic monitoring only. Refer to Figure 2 for monitoring well locations.

As part of the background information review, including the review of site hydrogeology and groundwater chemistry data (Section 2.1), the following documents provided by AEP were reviewed:

- Annual Post-Injection Monitoring Report Mountaineer Power Plant, prepared by Battelle Memorial Institute on behalf of Appalachian Power Company dba AEP, dated August 2016;
- History of Construction CFR 257.73(c)(1) Bottom Ash Complex Mountaineer Plant, prepared by American Electric Power Service Corporation on behalf of Appalachian Power Company, dated October 2016;
- Little Broad Run Landfill – CCR Groundwater Monitoring Well Network Evaluation, prepared by Arcadis U.S. Inc., on behalf of AEP, dated October 18, 2016;
- Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016;
- 2017 Dam & Dike Inspection Report Mountaineer Bottom Ash Complex (Facility ID #05307) GERS-17-046-Revision 0, prepared by AEP Service Corporation, dated November 2017;
- Statistical Analysis Summary Bottom Ash Pond, Mountaineer Plant, prepared by Geosyntec Consultants on behalf of AEP, dated January 15, 2018; and
- Annual Groundwater Monitoring Report, Appalachian Power Company Mountaineer Plant Bottom Ash Pond CCR Management Unit, prepared by American Electric Power Service Corporation on behalf of AEP, dated January 2018.

## **2.1 Review of Site Hydrogeology and Groundwater Chemistry Data**

This section summarizes a review and assessment of site hydrogeologic and groundwater data used to support selection of samples for laboratory testing and inform the interpretation of remedial alternatives. Refer to Section 2.0 for a summary of documents reviewed as part of this section. Where applicable, this section incorporates observations based on borings completed as part of this work scope (see logs in Appendix B.2).

### **2.1.1 Hydrogeology**

As summarized in the GMWNE, the BAP complex is underlain by 80 to 90 feet of Quaternary alluvium that thins towards valley walls. Based on work completed by previous workers at the Site and summarized in the GMWNE report, observations based on borings indicate that the alluvium generally coarsens downward, consisting of silt and clay with interlayered sands and gravel to depths of approximately 10 to 20 feet below ground surface (bgs), and



sand and gravel interlayered with silt and clay at greater depths. Logs by others included in the GWMNE (e.g. MW-1608 log) indicate that alluvium includes clasts of sedimentary, igneous and metamorphic rocks. Soil borings installed in June 2018 as part of this work (i.e. SB-1802, SB-1805, SB-1806, SB-1808) are generally consistent with previous observations by others. The alluvium generally appears typical of glacial outwash.

Bedrock beneath the site includes Pennsylvanian-age sandstone and shale of the Monongahela Group. The Permian Dunkard Group, consisting of similar lithologies as the Monongahela Group, overlies the Monongahela Group at higher elevations near the site<sup>8</sup>. Consistent with previously collected information, SB-1805 encountered a 5-foot-thick seam of coal underlying approximately 41 feet of gray fine-to-medium-grained sandstone and a silty clay shale interbed near the coal seam.

The groundwater table beneath the site is encountered in unconsolidated alluvium at elevations of approximately 539 to 546 feet above mean sea level (amsl) (approximately 40 to 60 ft bgs), based on Table 1 of the GWMNE. Based on interpretations by others, overburden groundwater elevations are controlled by the Ohio River stage: during normal stage conditions (river elevation at 539 to 540 ft amsl), groundwater contours indicate flow towards the river trending in a downriver direction (i.e., groundwater flow generally to the north-northeast); however, during high flow conditions (stage around 545 ft amsl), contours suggest temporary reversal of groundwater flow<sup>9</sup>. Groundwater pumping locally influences groundwater levels near supply wells (e.g. East 1, West 1, Well 5, Well 6)<sup>10</sup>. Little Broad Creek, southwest of the BAPs, is reportedly perched compared to site groundwater<sup>11</sup>. The BAPs have a normal pool elevation of 612 ft<sup>12</sup>, which is approximately 70 feet above water table elevations.

### **2.1.2 Groundwater Chemistry**

A summary of groundwater chemistry compiled from the GWMNE report and related statistical analysis is included in Table 1. Calculated average concentrations of select analytes based on results reported in the GWMNE are shown on figures included in Appendix C.

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<sup>8</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016.

<sup>9</sup> Annual Post-Injection Monitoring Report Mountaineer Power Plant, prepared by Battelle Memorial Institute on behalf of Appalachian Power Company dba AEP, dated August 2016.

<sup>10</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016.

<sup>11</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016.

<sup>12</sup> 2017 Dam & Dike Inspection Report Mountaineer Bottom Ash Complex (Facility ID #05307) GERS-17-046-Revision 0, prepared by AEP Service Corporation, dated November 2017.

Groundwater concentrations are compared to: site background (described in Site GWMNE<sup>13</sup> and Statistical Analysis Reports<sup>14</sup>); USEPA Maximum Contaminant Levels (MCLs)<sup>15</sup>; and USEPA Groundwater Protection Standards (GWPS) for cobalt, lithium, molybdenum and lead effective August 29, 2018<sup>16</sup>. Our comparison of the nine rounds of groundwater data collected by others from September 2016 to October 2017 included in the GWMNE report to current standards indicate the following exceedances of MCLs and/or GWPS:

- Arsenic at a concentration of 11.2 µg/L in one sample from MW-1607S (above the respective MCL of 10 µg/L);
- Radium 226+228 at a concentration of 8.46 pCi/L in one sample from MW-1606D (above the respective MCL of 5 pCi/L);
- Cobalt at a concentration of 20.1 µg/L in one sample from MW-1607S (above the respective GWPS of 6 µg/L);
- Lithium at concentrations ranging from 45 to 132 µg/L in all samples from downgradient locations MW-1605S/D, MW-1606S/D, MW-1607S/D and at concentrations of 41 to 42 µg/L in two samples collected from downgradient location MW-1604S (above the respective GWPS of 40 µg/L); and
- Molybdenum at concentrations of 101 to 112 in three samples from MW-1606S in 2016 (above the respective GWPS of 100 µg/L).

Information summarized in Table 1 and Appendix C were used to support selection of soil samples for laboratory analyses, such that samples were collected at locations nearby existing monitoring wells at similar depths as the screened intervals of: MW-1605S/D and MW-1606S/D based on apparent elevated groundwater concentrations of cobalt, lithium and molybdenum compared to background; MW-1602 based on sampling “background” concentrations as described in the GWMNE; and MW-1608 based on sampling “background” concentrations in a location more peripheral/cross-gradient to the BAPs.

In addition to reviewing reports related to BAP compliance with CCR Rules, Sanborn Head reviewed an annual post-injection carbon dioxide (CO<sub>2</sub>) monitoring report at the Site (Battelle 2016 Report)<sup>17</sup>. This report included a summary of shallow groundwater monitoring at the Site for water levels, chemical parameters (wet chemistry, major ions, metals), isotopes of water ( $\delta^{18}\text{O}$ ,  $\delta\text{D}$ ), carbon ( $\delta^{13}\text{C}$ ), and strontium ( $^{87}\text{Sr}/^{86}\text{Sr}$ ). The Battelle

<sup>13</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016.

<sup>14</sup> Statistical Analysis Summary Bottom Ash Pond, Mountaineer Plant, prepared by Geosyntec Consultants on behalf of AEP, dated January 15, 2018.

<sup>15</sup> <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>

<sup>16</sup> 40 CFR 257 Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One), effective August 29, 2018.

<sup>17</sup> Annual Post-Injection Monitoring Report Mountaineer Power Plant, prepared by Battelle Memorial Institute on behalf of Appalachian Power Company dba AEP, dated August 2016

2016 Report summarized an investigation into lithium increases at shallow monitoring wells in 2014 (we note that cobalt and molybdenum do not appear to have been analyzed as part of the monitoring conducted by Battelle as documented in the Battelle 2016 Report). At three locations (MW-16, JTMN-2, and MW-4) lithium concentrations increased in December 2014 and returned to pre-December 2014 values in June 2015 (MW-16: post-injection [before December 2014] and June 2015 = <80 µg/L, December 2014 = 154 µg/L; JTMN-2 and MW-4: post-injection [before December 2014] and June 2015 = <20 µg/L, December 2014 = 69 and 34 µg/L, respectively).

## **2.2 Published Literature Review**

This section summarizes a preliminary review of published geologic information compiled by Sanborn Head used to inform the understanding the Site geologic environment that may influence fate and transport of the contaminants of concern (COCs) in groundwater. The review focused on information available online about: Ohio River alluvium composition (Section 2.2.1), and soil/sediment partition coefficients for cobalt, lithium and molybdenum (Section 2.2.2).

### **2.2.1 Published Geologic Information on Ohio River Alluvium Composition**

Quaternary alluvium in the Ohio River Valley generally consists of glacial outwash deposited via melting of the Laurentide Ice Sheet and locally-derived deposits from the erosion and weathering of nearby sedimentary bedrock<sup>18</sup>. As part of a study investigating differences between alluvial deposits in the Monongahela, Allegheny, and Ohio Rivers, King (1932)<sup>19</sup> performed mineralogy analysis on light and heavy fractions (density less than and greater than 2.83) of sands (< ½ millimeter) from alluvial deposits, including an Ohio River sand sample from New Martinsville, West Virginia, approximately 100 miles up-river from the Site. The light portion of the sample included primarily quartz, with common micro-perthite and rare orthoclase. The heavy portion of the sample included abundant garnet, common ilmenite, zircon, sillimanite, muscovite, tourmaline, hypersthene, hornblende, and scarce leucoxene, cyanite, augite, epidote, rutile, and titanite. King (1932) indicated the sand composition reflects deposition of mixed sedimentary, igneous and metamorphic deposits of glacial outwash origin.

### **2.2.2 Published Partition Coefficients for Site COCs**

A review was performed to collect published soil/water partition coefficient ( $K_d$ ) values for cobalt, lithium and molybdenum.  $K_d$  values vary based on factors such as: method of analysis; soil composition (e.g. grain size, mineralogy, organic matter content, initial COC concentration); water composition (e.g. initial COC concentration, pH); and solid/liquid ratio. Therefore, the literature search was limited to references that provide overview of multiple studies to gain an understanding of the degree of variability, as well as studies based on conditions generally similar to those encountered at the site (e.g. granular soils and near neutral groundwater pH). A summary of the literature review is provided in Exhibit 1.

<sup>18</sup> Wayne, W.J., 1952, Pleistocene Evolution of the Ohio and Wabash Valleys, The Journal of Geology, Vol. 60, No. 6, p. 575-585.

<sup>19</sup> King, B. F., 1932, Mineral composition of sands from Monongahela, Allegheny, and Ohio Rivers, American Mineralogist, Vol. 17, No. 10. P. 485-490.

**Exhibit 1 – Summary of Literature Review - Partition Coefficient Values**

Analyte	Soil/Water Partition Coefficient (mL/g)	Reference	Notes
Cobalt	1.94	(a) USDOE 1989	pH 5 to 9, sandy soils
	8.81		pH 5 to 9, loamy soils
	200		pH 5 to 9, clayey soils
	130 (median) 0.1 to 13,000 (range)	(b) USEPA 2005	From a literature search (n = 41)
Molybdenum	40.0	(a) USDOE 1989	pH 5 to 9, sandy soils
	120.0		pH 5 to 9, loamy soils
	280.0		pH 5 to 9, clayey soils
	13 (median) 0.6 to 500 (range)	(b) USEPA 2005	From a literature search (n = 8)
Lithium	0.0	(a) USDOE 1989	pH 5 to 9, sandy soils
	0.2		pH 5 to 9, loamy soils
	0.8		pH 5 to 9, clayey soils

Notes:

1. References:

(a) Chemical Data Bases for the Multimedia Environmental Pollutant Assessment System (MEPAS): Version 1, prepared by Streng, D.L. and Peterson, S.R. (Pacific Northwest National Laboratory operated by Battelle) on behalf of the U.S. Department of Energy, dated December 1989.

(b) Partition Coefficients for Metals in Surface Water, Soil and Waste (EPA/600/R-05/074), prepared by Allison, J.D. (HydroGeoLogic, Inc.) and Allison, T. L. (Allison Geoscience Consultants, Inc.) on behalf of U.S. Environmental Protection Agency Office of Research and Development, dated July 2005.

2. Soil/water partition coefficients ( $K_d$ ) are presented in units of milliliters per gram (mL/g).

As indicated in Exhibit 1, published partition coefficients vary by orders of magnitude for each analyte, confirming uncertainty and heterogeneity of  $K_d$  values in natural systems. Despite this variability, in general, reported  $K_d$  values for cobalt are higher than those for molybdenum, which are higher than those for lithium. Site specific values calculated as part of this work scope are compared to published values in Section 4.2.2.

### 3.0 SOIL AND ASH SAMPLING AND ANALYSIS

The sampling and analysis plan is included in Appendix B.1, and soil boring logs are included in Appendix B.2. A summary of soil and ash sampling activities, and laboratory analyses performed, including a description of differences between the planned and implemented activities, is provided below.

Four soil borings (SB-1802, SB-1805, SB-1806, and SB-1808) were advanced between June 18 and 26, 2018 with hollow stem augers (HSA) and sampled using split-spoon samplers by Terracon Consultants, Inc. of Charleston, West Virginia. The borings were advanced at locations nearby to the existing monitoring wells MW-1602, MW-1605S/D, MW-1606S/D, and MW-1608, respectively. At the request of AEP, and for purposes not related to this scope of work, boring SB-1805 was also advanced with casing advancer in overburden, and subsequently advanced in bedrock with wireline coring and completed as a bedrock

monitoring well<sup>20</sup>. Down-hole equipment was decontaminated between sample intervals using analconox and potable water wash. Borings were backfilled with bentonite following sampling, except for SB-1805, which was completed as a bedrock monitoring well (MW-1805).

Sanborn Head observed and logged drilling activities, including visually classifying soil types and bedrock cores. Textural descriptions and boring logs are provided in Appendix B.2. Soil samples were temporarily stored in clean soil bags and jars. Soil sample depth intervals submitted for laboratory analysis are summarized in Exhibits 2 and 3 below. Soil samples were composited using stainless-steel mixing bowls and scoops, which were decontaminated between samples using analconox and potable water wash followed by a distilled water rinse.

A sample of bottom ash was collected on June 20, 2018, by compositing ash collected from 12 locations in the northwestern area of Bottom Ash Pond West. Ash was collected with a stainless-steel scoop from approximately 0 to 6 inches below the ash surface, and composited in a stainless-steel mixing bowl. Site water was collected from the outlet of Bottom Ash Pond (West) by using a bucket to transfer water into laboratory provided containers.

Samples were submitted for laboratory analyses as indicated below following standard chain-of-custody procedures:

- Test America in Pittsburgh, Pennsylvania for analysis of:
  - Chemical analysis for CCR Appendix III/IV parameters in soil by USEPA Methods 2540G, 6020A, 7471B, 9056A, 9045D, 9315, and 9320;
  - Partition coefficient (Kd) analysis for cobalt, lithium and molybdenum by modified ASTM 4646-16 using the pHs, initial solution concentrations, and liquid to solid (L/S) ratios described in Table 4;
  - pH dependent leaching test by USEPA Method 1313 modified to 6 pH points (approximately 5, 6, 7, 8, and 10, and the natural pH of the material [approximately 9]); and
  - Percolation column leaching test (bottom ash sample only) by USEPA Method 1314 using site water;
- Test America in Knoxville, Tennessee for analysis of ICP-Metals and mercury using the sequential extraction procedure (SEP) by USEPA Method 6010B (ICP-MS metals) and 7470A SEP (mercury); and

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<sup>20</sup> Sanborn Head observed and logged drilling/sampling in overburden and bedrock coring, but did not observe monitoring well installation. Monitoring well installation was performed and recorded by Terracon.

- SGS in Lakefield Ontario, Canada for analysis of:
  - On three shallow silt/clay samples:
    - qualitative mineral identification by x-ray diffraction (XRD); major element oxides<sup>21</sup> and loss on ignition (LOI) analysis by x-ray fluorescence (XRF); trace-element analysis by a combination of inductively coupled plasma-optical emission spectroscopy (ICP-OES)<sup>22</sup>; ion selective electrode for fluoride; combustion and infrared detection for sulfur; and cold vapor atomic absorption analyzer for mercury. In addition, semi-quantitative analysis of mineral abundances was generated from the XRD results by software and the data reconciled with XRF chemical analysis data; and
    - subsequent separation from the bulk sample of the clay fraction by centrifuge with subsequent clay mineral speciation by XRD;
  - On one composite sand and gravel sample:
    - Analysis of the bulk sample for qualitative mineral identification by XRD, major element oxides/LOI analysis by XRF, and trace-element analysis;
    - subsequent separation from the bulk sample of heavy [i.e., sink fraction – density > 3.3 grams per cubic centimeter (g/cc<sup>3</sup>) and light (i.e., float fraction - density < 2.0 g/cc<sup>3</sup>) fractions by heavy-liquid separation;
    - analysis of the heavy and light fractions for qualitative mineral identification by XRD, major element oxides/LOI analysis by XRF, and trace-element analysis; and
    - for each fraction (bulk, heavy and light), semi-quantitative analysis of mineral abundances.

Differences between the sampling and analysis plan (included in Appendix B.1) and the implemented procedures are summarized as follows:

- Borings were not pre-drilled for utility clearance based on a decision by AEP and Terracon;
- A combination of 3-inch and 2-inch diameter split-spoons and a 2-inch diameter Shelby tube were used for sample collection. The 2-inch diameter split spoon was observed to recover more sample than the other sampling devices, so most sampling was performed with the 2-inch split spoon. As indicated on the boring logs, up to three split spoon samples were attempted at each 2-ft-long sample interval in order to recover more

<sup>21</sup> Silicon Dioxide (SiO<sub>2</sub>), Aluminum Oxide (Al<sub>2</sub>O<sub>3</sub>), Iron(III) Oxide (Fe<sub>2</sub>O<sub>3</sub>), Magnesium Oxide (MgO), Calcium Oxide (CaO), Sodium Oxide (Na<sub>2</sub>O), Potassium Oxide (K<sub>2</sub>O), Titanium Dioxide (TiO<sub>2</sub>), Phosphorus Pentoxide (P<sub>2</sub>O<sub>5</sub>), Manganese Oxide (MnO), Chromium (III) Oxide (Cr<sub>2</sub>O<sub>3</sub>), Vanadium Oxide (V<sub>2</sub>O<sub>5</sub>).

<sup>22</sup> Silver (Ag), Arsenic (As), Barium (Ba), Beryllium (Be), Bismuth (Bi), Cadmium (Cd), Cobalt (Co), Copper (Cu), Lithium (Li), Molybdenum (Mo), Nickel (Ni), Lead (Pb), Antimony (Sb), Selenium (Se), Tin (Sn), Strontium (Sr), Thallium (Tl), Uranium (U), Yttrium (Y), Zinc (Zn).



sample volume. In these instances, textural classification and blow counts were based on the first recovered spoon from each depth interval.

- Because of heaving sands below the water table, bentonite was added to the drilling fluids below the water table. Care was taken to remove the upper portion of samples if drilling fluid was observed to be in contact with the sample.
- Borings were backfilled with bentonite mixed with water only; cement was not used to backfill borings due to concerns of impact to nearby monitoring well(s).
- Boring SB-1805 was advanced into bedrock as indicated in the drilling log. Bedrock samples were stored on site in core boxes and were not submitted for laboratory analysis.
- Sample intervals varied from proposed intervals because of sample recovery. Exhibits 2 and 3 summarizes actual samples submitted for laboratory analyses.

**Exhibit 2 - Summary of Samples and Laboratory Analyses of Appendix III/IV  
Parameters in Soil and Leaching Tests**

Sample Location/Depth Interval/ID	Sample Description (major component)	Bulk App III/IV	Kd Analysis	pH Leaching Test	Perc. Column Leaching Test	SEP	Mineralogy (see Exhibit 3 for details)
SB-1802 (10-12')	SILT	X					X
SB-1802 (60-66')	f-c SAND	X					
SB-1802 (66-72')	f-c SAND	X					
SB-1805 (10-11')	SILT	X					X
SB-1805 (50-60')	f-c SAND	X				X	
SB-1805 (60-66')	f-c SAND	X					
SB-1805 (66-78')	f-c SAND	X		X		X	
SB-1806 (10-13')	SILT, f SAND						X
SB-1806 (46-60')	f-c SAND	X	X			X	
SB-1806 (64-70')	f-c SAND	X		X			
SB-1806 (70-76')	f-c SAND	X	X			X	
SB-1808 (45-57')	f-c SAND	X	X	X		X	
SGS-1 (Composite of: SB-1802 [50-66'], SB-1806 [60-62'], SB-1806 [76-78'], SB-1808 [45-59'])	f-c SAND						X
BA-01	Bottom Ash				X		
<b>Total</b>		<b>11</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>5</b>	<b>4</b>

Notes:

1. X = sample analyzed
2. f = fine; f-c = fine to coarse

### Exhibit 3 – Summary of Samples and Laboratory Mineralogical Analysis by SGS

Sample Location/ Depth Interval/ ID	Sample Description	Sample Fraction	Major Element Oxides/LOI Analysis by XRF	Qualitative Mineral Identification by XRD	Clay Mineralogy by XRD	Semi-Quantitative Mineral Abundance Analysis	Trace Element Analysis
SB-1802 (10-12')	SILT	Bulk	X	X		X	
		Clay			X		
SB-1805 (10-11')	SILT	Bulk	X	X		X	
		Clay			X		
SB-1806 (10-13')	SILT, fine SAND	Bulk	X	X		X	
		Clay			X		
SGS-1 (Composite of: SB-1802 [50-66'], SB-1806 [60-62'], SB-1806 [76-78'], SB-1808 [45-59'])	Fine to coarse SAND	Bulk	X	X		X	X
		Light/float density <2.0 g/cc <sup>3</sup>	X	X		X	X
		Heavy/sink density > 3.3 g/cc <sup>3</sup>	X	X		X	X

Notes:

1. X = sample analyzed

## 4.0 SUMMARY OF RESULTS

This section describes results of soil analytical testing used to help develop the geochemical assessment summarized in Section 5.0, and the assessment of remedial alternatives summarized in Section 6.0. Table 7 provides a summary overview of key findings from the analytical tests, focusing on results relevant to gaining an understanding of the potential effectiveness of remedial alternative options for cobalt, lithium and molybdenum.

### 4.1 CCR Appendix III/IV Parameters

Concentrations of CCR Appendix III and IV parameters in soil samples are summarized in Table 2 and on Figure 3. Analytical laboratory reports are included in Appendix H.1. Each Appendix III/IV parameter was detected or estimated at J-flag concentrations (i.e., below the reporting limit [RL] but greater than or equal to the method detection limit [MDL]) in one or more soil samples. The concentrations of most parameters in most samples are relatively similar, especially amongst the sand and gravel samples below the water table (SB-1802 [60-66'], SB-1802 [66-72'], SB-1805 [50-60'], SB-1805 [60-66'], SB-1805 [66-78'], SB-1806 [46-60'], SB-1806 [64-70'], SB-1806 [70-76'], and SB-1808 [45-57']), with a few exceptions (noted instances are typically where downgradient sand and gravel sample concentrations are more than twice the highest upgradient sand and gravel concentrations):

- boron was detected in downgradient samples (2.2 to 3.1 mg/kg) at consistently higher concentrations than upgradient samples (0.95 to 1.6 mg/kg);



- calcium was detected at substantially higher concentrations in downgradient samples (5,500 to 24,000 mg/kg) than upgradient samples (380 to 1,900 mg/kg);
- chloride was detected in downgradient samples only (6.9 to 16 mg/kg);
- molybdenum concentrations are relatively low and generally similar between samples, ranging from 0.45 J to 2.1 mg/kg. For sand and gravel samples, shallow downgradient sample SB-1806 (46 - 60') is higher (2.1 mg/kg) than the other sand and gravel samples (0.45 J to 1.0 mg/kg);
- selenium was detected at a somewhat higher concentration in one downgradient sand and gravel sample (SB-1805 [60-66'] at 1.6 mg/kg), compared to the other sand and gravel samples (0.15 J to 0.53 J mg/kg); and
- sulfate was detected at generally higher concentrations in downgradient sand and gravel samples (56 to 130 mg/kg) as compared to upgradient sand and gravel samples (20 to 38 mg/kg).

With the exception of the noted instance for molybdenum, unlike groundwater, cobalt, lithium, and molybdenum concentrations in downgradient soil samples are not substantially higher compared to upgradient/peripheral samples.

Trace element analysis was also performed on the composite sand and gravel sample (SGS-1) as part of the mineralogical assessment that is discussed in the proceeding Section 4.2. Refer to Section 3 for information on the laboratory analysis performed and Appendix H.6 for the laboratory reports. The results of the trace element analysis are summarized in Exhibit 4 and indicate that:

- Cobalt was detected at 19 and 83 mg/kg<sup>23</sup> in the light and heavy fraction samples, respectively, and not detected (< 9 mg/kg) in the bulk sample;
- Lithium was detected at 11 mg/kg in the bulk sample, and was not detected (<20 mg/kg) in the light and heavy fraction samples; and
- Molybdenum was not detected (< 5 mg/kg) in the three samples.

As further described in Section 5.1, the results from the analysis of discrete interval sand and gravel samples are generally consistent with results from the trace element analysis of the composite sand and gravel sample (SGS-1).

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<sup>23</sup> Results are reported by the laboratory in grams per ton (g/ton), which is equivalent to milligrams per kilogram (mg/kg).

### Exhibit 4 – Summary of Trace Element Results

Analyte	Units <sup>1</sup>	Sand and Gravel Composite Sample		
		SGS-1 (Bulk Sample)	SGS-1 (Light Fraction)	SGS-1 (Heavy Fraction)
Ag	mg/kg	< 2	< 3	< 3
As		< 70	< 100	< 100
Ba		216	240	85.5
Be		< 0.7	2.41	1.28
Bi		< 20	< 20	< 20
Cd		< 5	< 2	< 2
Co		< 9	19	83
Cu		11.8	83.6	64.3
Hg		< 0.3	< 0.3	< 0.3
Li		11	< 20	< 20
Mo		< 5	< 5	< 5
Ni		< 20	72	57
Pb		< 30	< 40	< 40
Sb		< 20	< 40	< 40
Se		< 40	< 30	< 30
Sn		< 50	< 30	< 30
Sr		87.2	85.2	52.7
Tl		< 30	< 30	< 30
U		< 20	< 40	< 40
Y		9.6	45.5	175
Zn	< 30	-	-	
S	%	0.02	0.53	0.13
F	%	0.015	0.038	0.051

Notes:

1. Results are reported by the laboratory in grams per ton (g/ton), which is equivalent to milligrams per kilogram (mg/kg), and as percent (%), which is approximately equivalent to 10,000 mg/kg.
2. Zinc (Zn) results were not reported for the light and heavy fraction samples due to a quality control issue during analysis.

### 4.2 Mineralogical Results

This section summarizes results of mineralogical analysis on three samples of the shallow silt/clay soils, and one composite sand and gravel sample (bulk, heavy and light fractions). Refer to Section 3 for information on the laboratory analysis performed and Appendix H.6 for the laboratory reports. The qualitative mineral identification (XRD) results are discussed first followed by the results of the semi-quantitative mineralogical analysis, which are summarized in Exhibit 5. Major element oxide/LOI (XRF) results are summarized in Exhibit 6.

The qualitative mineral identification (XRD) results indicate:

- Silt/clay bulk sample composition includes >30 weight percent (%) quartz with minor (2 to 10%) mica, plagioclase, potassium-feldspar, and illite. In some samples, chlorite (SB-1805 [10-11'] and SB-1806 [10-13']), kaolinite (SB-1806 [10-13']), maghemite (SB-1802 [10-12']), and illite-montmorillonite (SB-1805 [10-11']) were also identified as minor components. Trace (<2%) components in one or more samples include chlorite, kaolinite, amphibole, anatase, goethite, hematite, pyroxene, and magnetite.
- The clay fraction in the three silt/clay samples includes illite as major components (>30%) in SB-1802 [10-12'] and SB-1806 [10-13'], illite as a moderate component (10 to 30%) in SB-1805 [10-11'], and kaolinite as a moderate component (10 to 30%) in all three samples. Chlorite was identified as a minor component (2 to 10%) in all three samples, while illite-montmorillonite was also identified as a minor component of one sample (SB-1805 [10-11']).
- Mineralogical composition of the bulk composite (SGS-1) sand and gravel sample consists of: >30% quartz; 10 to 30% plagioclase; 2 to 10% potassium-feldspar, mica and calcite; and <2% amphibole, chlorite, tennantite, dolomite, kaolinite and ankerite. Tennantite, a copper and arsenic bearing sulfosalt typically found in hydrothermal veins, is unlikely to be present in the sample, and its tentative identification is likely an artifact of the XRD database used to characterize the samples.
- The light fraction of the sand and gravel sample (SGS-1) consists of: >30% quartz, 2 to 10% plagioclase, potassium feldspar, mica, illite, kaolinite, calcite, dolomite, chlorite, and montmorillonite, and <2% goethite, ankerite and pyrite.
- The heavy fraction of the sand and gravel sample (SGS-1) consists of: >30% garnet, 10-30% goethite, 2 to 10% quartz, rutile, pyroxene, amphibole, hematite, magnetite, ilmenite, and plagioclase, and <2% chlorite and mica.

The mineralogical composition of the sand and gravel composite sample (SGS-1) may be compared to the results for the upriver sample (Ohio River sand from New Martinsville, WV) reported by King (1932)<sup>24</sup> and summarized previously in Section 2.2.1. Major components of the heavy and light portions of both samples include garnet and quartz, respectively. Potassium and plagioclase feldspars were identified as components of both samples: the upriver sample includes common micro-perthite (may include albite and orthoclase or microcline) and very rare orthoclase, while SGS-1 includes albite (10.3 % bulk sample from semi-quantitative mineralogical analysis – see Exhibit 5), microcline (3.8 % bulk sample, 3.2 % light fraction – see Exhibit 5), and anorthite (5.8 % light fraction, 8.2 % heavy fraction – see Exhibit 5). Goethite was identified as an intermediate component (18.5% – see Exhibit 5) of the site heavy fraction, but was not identified in the upgradient sample. Both heavy samples have minor or trace rutile, magnetite, ilmenite, and mica.

The results of the semi-quantitative mineralogical analysis are summarized below in Exhibit 5, and are generally consistent with the qualitative mineral identification (XRD) results as

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<sup>24</sup> King, B. F., 1932, Mineral composition of sands from Monongahela, Allegheny, and Ohio Rivers: *Am. Mineralogist*, v. 17, no. 10, p. 485-490.

would be expected. While minerals bearing COCs as major or essential components were not identified by qualitative or the semi-quantitative XRD analyses, the COCs may substitute for other elements in these minerals (e.g. cobalt and molybdenum may substitute for iron or magnesium in ferromagnesian minerals, and lithium may substitute for sodium or potassium in clay or other silicate minerals).

### Exhibit 5 - Summary of Semi-Quantitative Mineralogical Analysis

Mineral	Weight percent (%)					
	Silt/Clay Samples			Sand and Gravel Composite Sample		
	SB-1802 (10-12')	SB-1805 (10-11')	SB-1806 (10-13)	SGS-1 (Bulk Sample)	SGS-1 (Light Fraction)	SGS-1 (Heavy Fraction)
Actinolite	-	-	-	-	-	4.0
Albite	8.2	6.4	6.1	10.3	-	-
Almandine	-	-	-	-	-	20.6
Anatase	0.5	1.0	0.9	-	-	-
Ankerite	-	-	-	0.2	0.9	-
Anorthite	-	-	-	-	5.8	8.2
Calcite	-	-	-	2.5	4.5	-
Chamosite	-	-	3.5	-	-	-
Clinochlore	1.6	4.8	-	1.8	5.0	1.3
Cummingtonite	-	-	1.8	-	-	-
Diopside	-	-	-	-	-	4.7
Dolomite	-	-	-	1.0	2.1	-
Goethite	-	1.3	1.1	-	0.6	18.5
Hematite	-	1.2	0.4	-	-	7.3
Illite	4.0	4.1	8.0	-	2.7	-
Illite-montmorillonite	-	3.5	-	-	-	-
Ilmenite	-	-	-	-	-	6.0
Kaolinite	0.6	1.6	3.6	0.7	7.5	-
Maghemite	2.7	-	-	-	-	-
Magnesiohornblende	1.5	-	-	1.8	-	-
Magnetite	-	-	0.9	0.2	-	5.4
Microcline	3.0	2.8	6.0	3.8	3.2	-
Montmorillonite	-	-	-	-	10.5	-
Muscovite	10.0	7.2	4.5	3.5	2.4	1.8
Pyrite	-	-	-	-	0.4	-
Pyrope	-	-	-	-	-	15.6
Quartz	68.0	66.1	63.2	72.4	54.4	3.3
Rutile	-	-	-	-	-	3.1
Tennantite	-	-	-	1.7	-	-
Total	100	100	100	100	100	100

Notes:

1. Mineral abundance are reported in weight percent (wt. %)
2. Abbreviations: S&G = sand and gravel; HLS = heavy-liquid separation

Major element oxide/LOI (XRF) results are summarized in Exhibit 6; we note that none of the COCs are reported as part of this analysis. LOI represents the mass of moisture and volatile material, which typically consists of combined water and carbon dioxide from carbonates and organic matter. We note that the high LOI content for the light fraction of the sand and gravel is likely largely due to the presence of organic matter, which may also contain considerable water, as carbonates (and most inorganic minerals) typically have a density of greater than 2.0.

### Exhibit 6 - Summary of Major element oxide/LOI Results

Phase	weight percent (%)					
	Silt/Clay Samples			Sand and Gravel Composite Sample		
	SB-1802 (10-12')	SB-1805 (10-11')	SB-1806 (10-13)	SGS-1 (Bulk Sample)	SGS-1 (Light Fraction)	SGS-1 (Heavy Fraction)
SiO2	79.9	76.7	76.0	86.9	29.8	22.3
Al2O3	8.02	9.62	10.1	4.46	5.01	8.68
Fe2O3	4.37	4.67	4.92	2.30	2.88	50.8
MgO	0.56	0.66	0.71	0.44	0.76	3.59
CaO	0.28	0.26	0.13	1.62	3.32	3.07
Na2O	0.97	0.66	0.65	0.76	0.39	0.10
K2O	1.68	1.79	1.81	0.97	0.65	0.21
TiO2	0.70	0.80	0.79	0.27	0.30	5.75
P2O5	0.11	0.10	0.11	0.06	0.08	0.27
MnO	0.04	0.09	0.08	0.04	0.14	0.68
Cr2O3	0.03	0.03	0.02	0.03	< 0.01	0.07
V2O5	<0.01	<0.01	0.01	<0.01	< 0.01	0.06
LOI	3.06	4.19	4.44	2.59	56.7	3.61

## 4.3 Leaching and Extraction Methods Results

### 4.3.1 Sequential Extraction Procedure

A summary of sequential extraction procedure (SEP) analytical results is provided in Table 3, and the analytical laboratory report is provided in Appendix H.2. Appendix D includes plots summarizing concentrations of each SEP step, and concentrations of each step as a percentage of total concentration. The SEP steps are:

- Step 1 - Exchangeable Fraction: An aliquot of sample is extracted with 1 Molar (M) magnesium sulfate (MgSO<sub>4</sub>), centrifuged and filtered;
- Step 2 - Carbonate Fraction: The sample residue is extracted in 1M sodium acetate/acetic acid (NaOAc/HOAc), centrifuged and filtered;
- Step 3 - Non-Crystalline Materials Fraction: The sample residue is extracted with 0.2M ammonium oxalate (pH 3), centrifuged and filtered;

- Step 4 - Metal Hydroxide Fraction: The sample residue is extracted with 1M hydroxylamine hydrochloride solution in acetic acid, centrifuged and filtered;
- Step 5 - Organic-bound Fraction: The sample residue is extracted three times with 5% sodium hypochlorite (NaOCl) (pH 9.5), centrifuged and filtered;
- Step 6 - Acid/Sulfide Fraction: The sample residue is extracted with a solution of hydrochloric acid-nitric acid (HCl-HNO<sub>3</sub>-H<sub>2</sub>O), centrifuged and filtered; and
- Step 7 - Residual Fraction: The sample residue is digested using hydrogen fluoride (HF), nitric acid (HNO<sub>3</sub>), hydrochloric acid (HCl) and boric acid (H<sub>3</sub>BO<sub>3</sub>).

Exhibit 7 summarizes leaching behavior of each analyte based on the SEP results. A few general observations include:

- Aluminum, barium and potassium are typically extracted predominantly in the residual step (7);
- Beryllium, chromium and vanadium are largely extracted in the residual step (7), with lesser amounts in the acid/sulfide (6), metal hydroxide (4) and non-crystalline (3) steps.
- Arsenic, iron, phosphorous and zinc are extracted most in the acid/sulfide step (6), then metal hydroxide (4), and lesser non-crystalline (3) and/or residual (7) steps;
- Cadmium, cobalt, copper, and nickel are extracted most in the metal hydroxide step (4), then the acid/sulfide (6), and lesser non-crystalline (3) and/or residual (7) steps;
- Molybdenum extraction is predominantly in the metal hydroxide (4) and acid/sulfide (6) steps, and lesser amounts in non-crystalline (3) step.
- Calcium extraction is commonly dominated by the carbonate step (2); with the residual (7), metal hydroxide (4) and organic bound fraction (5) steps comprising most of the remaining mass.
- Lead is approximately equally distributed between the residual (7), acid/sulfide (6), metal hydroxide (4) steps;
- Lithium extraction was greatest in the organic bound fraction (5) and residual (7) steps, with lesser amounts in the metal hydroxide (4) and acid/sulfide (6) steps. Based on our understanding of the geochemistry of lithium, we infer that lithium in the samples is not bound in the organic or sulfide phases in significant quantities, but rather, that other phases (e.g. clay minerals) containing lithium may have been vulnerable to extraction methods used at these steps.
- Manganese extraction is predominantly in the non-crystalline step (3), or the carbonate (2) and metal hydroxide (4) steps, and lesser acid/sulfide (6) and residual (7) steps;



### Exhibit 7 – Summary of SEP Results by Analyte

Analyte	Total Sum of SEP Steps Concentrations (mg/kg)	Summary of Leaching Behavior
Aluminum	19,000 to 29,000	±90% extracted in residual (7) step; <10% extracted in acid/sulfide (6) and metal hydroxide (4) steps; <1% extracted in other steps.
Antimony	ND (<3.0) to 0.23 J	Generally ND in all steps.
Arsenic	6.1 to 9.5	Most (48 to 70%) extracted in acid/sulfide (6) step, and some (24 to 44 %) extracted in metal hydroxide (4) step. ND to <10% extracted in non-crystalline (3) step. Generally <10% residual (7) and ND in other steps.
Barium	180 to 300	Typically ±95% extracted in residual (7) step, <3% extracted in non-crystalline (3) and metal-hydroxide (4) steps, except at the peripheral (SB-1808) sample, where slightly more (6 and 7%) extracted in non-crystalline (3) and metal-hydroxide (4) steps.
Beryllium	0.41 to 0.66	Most (57 to 74%) extracted in residual (7) step, some (13 to 26%) extracted in acid/sulfide (6) step, some (12 to 17%) extracted in metal hydroxide (4) step, ND in other steps, except little (4%) extracted in non-crystalline (3) step in two samples.
Cadmium	0.22 J to 0.25	Most (50 to 57%) extracted in metal hydroxide (4) step, some (28 to 50%) extracted in acid/sulfide (6) step. At three shallow sand and gravel samples only, 8 to 22% extracted in non-crystalline (3) step. ND in other steps/samples.
Calcium	5,200 to 21,000	Extracted in multiple steps and variable between samples. Typically most (30 to 50%) extracted in carbonate (2) step, and also 10 to 50% extracted in residual (7) step. Generally extracted 10 to 17% in metal hydroxide (4) step, 2 to 17% in organic-bound (5) step, ≤10% in exchangeable (1) and acid/sulfide (6) steps, and ND in non-crystalline (3) step.
Chromium	11 to 14	Most (56 to 67%) extracted in residual (7) step. 16 to 23 % extracted in acid/sulfide (6) step, and 15 to 20% extracted in metal hydroxide (4) step. 3 to 5% extracted in non-crystalline (3) step. ND in other steps
Cobalt	8.8 to 11	Typically most (37 to 62%) extracted in metal hydroxide (4) step, and some (18 to 33%) extracted in acid/sulfide (6) step. For shallower samples, 25 to 39% extracted in non-crystalline (3) step, but for deeper samples, 3 to 4% extracted in non-crystalline (3) step. 4 to 8% extracted in residual (7) step.
Copper	6.2 to 8.4	Typically most (51 to 54%) extracted at metal hydroxide (4) fraction in shallower samples, but slightly less (23 and 44%) extracted at this step at deeper samples. Some (19 to 32%) extracted at acid/sulfide (6) step, and 12 to 17% extracted at non-crystalline (3) materials step. Some (8 and 16%) extracted at carbonate (2) step in deeper samples, but ND at this step in shallower samples. Generally 9 to 11% in residual (7) step.
Iron	13,000 to 16,000	Generally most (42 to 57%) extracted in acid/sulfide (6) step, and some (23 to 36%) extracted in metal hydroxide (4) step. 13 to 21 % extracted in residual (7) step, and <5% extracted in carbonate (2) and non-crystalline (3) materials step
Lead	7.5 to 8.6	Typically distributed between metal hydroxide (4) (30 to 45%), acid/sulfide (6) (15 to 33%), and residual (7) (27 to 42%) steps. 3 to 12% extracted in non-crystalline (3) step at shallower samples only (ND in deeper samples), while 6 to 7% extracted in carbonate (2) step at deeper samples only (ND in shallower samples)

Analyte	Total Sum of SEP Steps Concentrations (mg/kg)	Summary of Leaching Behavior
Lithium	18 to 21	Most (37 to 46%) extracted in organic (5) step. Some (32 to 37%) extracted in residual (7) step, and approximately 9 to 15% extracted in each of the metal hydroxide (4) and acid/sulfide (6) steps.
Manganese	230 to 520	Variable between shallower and deeper samples. For shallower samples, typically most (44 to 60%) extracted in non-crystalline (3) step, with some (2 to 22%) extracted in the carbonate (2), metal-hydroxide (4), acid/sulfide (6) and residual (7) steps. In deeper samples, no more than 37% is extracted in any one step, typically with more extracted in the carbonate (2), metal hydroxide (4) and acid/sulfide (6) steps compared to the other steps.
Mercury	ND (<0.12)	Only analyzed for total concentrations (not analyzed after each step). Typically ND or J-flag in total.
Molybdenum	0.46 J to 1.1 J	Most extracted in metal hydroxide (4) step (26 to 52%) or acid/sulfide (6) step (30 to 52%). Some (15 to 30%) extracted in non-crystalline (3) step. ND in other steps,
Nickel	12 to 16	Typically most (43 to 52%) extracted in metal hydroxide (4) step. Some (24 to 35%) extracted in acid/sulfide (6) step, with generally less (3 to 21%) extracted in non-crystalline (3) and residual (7) steps. 9% extracted in organic step at one sample, and 2% extracted in carbonate (2) step in two samples.
Phosphorous	210 to 330	Generally distributed between acid/sulfide (6) (18 to 57%), metal-hydroxide (4) (23 to 38%), non-crystalline (3) (7 to 15%) and residual (7) (8 to 15%). 17 to 18% extracted in organic bound (5) step in two samples only.
Potassium	7,700 to 11,000	Most (88 to 91%) extracted in residual (7) step. 6 to 9% extracted in organic-bound (5) step, and <3% extracted in non-crystalline (3) and acid/sulfide (6) steps.
Selenium	1.5 to 2.8	Typically most (46 to 87%) extracted in metal hydroxide (4) step and some (ND to 46%) extracted in the carbonate (2) step, except at the peripheral (SB-1808) sample, were just 23% extracted in metal hydroxide (4) step and the rest (78%) extracted in organic step. 19 and 24% extracted in residual (7) at two samples only, and 13% extracted in the non-crystalline (3) step in one sample only.
Silver	0.11 J to 0.17 J	Detected in the residual (7) step only at J-flag concentrations. ND in other steps.
Thallium	0.48 to 0.79 J	Detected in the residual (7) step only at J-flag concentrations. ND in other steps.
Vanadium	15 to 23	Most (60 to 74%) extracted in residual (7) step. Some (16 to 26%) extracted in acid/sulfide (6) step, and some (13 to 15%) extracted in metal hydroxide (4) step. 1 to 2% extracted in non-crystalline (3) step.
Zinc	26 to 36	Generally distributed between metal hydroxide (4) (34 to 42%) and acid/sulfide (6) (26 to 44%) steps. Some (13 to 17%) extracted in residual (7) step, and some (6 to 8%) extracted in organic step. 2 to 6% extracted in non-crystalline (3) step, and 2 to 7% extracted in carbonate (2) fraction in two samples only.

Notes:

1. Total sum of SEP steps concentrations reported by laboratory and do not include non-detectable concentrations.
2. Concentrations are in milligrams per kilogram (mg/kg), which are equivalent to parts per million (ppm).
3. Abbreviations: ND = not detected above laboratory reporting limit

### 4.3.2 Partition Coefficient Analysis

A summary of  $K_d$  analytical results, including calculated  $K_d$  values, is provided in Table 4, and the analytical laboratory report is provided in Appendix D.3. Appendix E includes plots summarizing calculated  $K_d$  values for cobalt, lithium and molybdenum.

Partition coefficients were calculated as the change in soil concentration (e.g., the observed increase in soil concentration) divided by the concentration in the reacted solution (i.e., leach results). The change in soil concentration is interpreted as the amount of an analyte taken up by (or leached out from) soil. We note that the initial bulk soil composition may influence the leach results (and hence calculated  $K_d$ ), but for the purposes of this analysis, the initial soil concentrations are not included in the calculations. Calculating  $K_d$  based on the ending soil concentration (amount taken up from solution plus initial concentration) would generally yield higher estimates of  $K_d$ .

Several parameters were varied as part of these tests to help understand their impact on calculated  $K_d$  values:

- For some tests, the concentration in solution was calculated at multiple time steps from 12 to 24 hours – typically, calculated  $K_d$  values appear to be relatively stable after approximately 18 hours.
- Tests were run with solution pHs of 6.0 and 7.5 – in general this change in pH did not substantially influence calculated  $K_d$  results.
- Three initial concentrations of solution were used for each analyte – the apparent effect varied between analytes, but in general: lower initial solution concentrations yielded lower calculated  $K_d$ s for cobalt and molybdenum, and had little impact or yielded higher calculated  $K_d$ s for lithium.
- Liquid-to-solid mass ratio (L/S) was varied at 4:1, 20:1, and 100:1 – the apparent effect varied between analytes, but in general, cobalt and lithium were taken up more (higher  $K_d$ s) at higher L/S ratios, whereas molybdenum leached more (lower, more negative  $K_d$ s) at higher L/S ratios.

Cobalt generally was strongly taken up and the calculated  $K_d$  values for cobalt are generally considerably greater than those for molybdenum and lithium. Negative  $K_d$  values for molybdenum (and to a much lesser extent) lithium indicate molybdenum typically leached and was not taken up by soil, while lithium leached in only a few instances. Exhibit 8 summarizes calculated  $K_d$  values based on the results of the 24-hour leach tests and describes variability in results based on changes in the above-mentioned variables.

### Exhibit 8 – Summary of Partition Coefficient Analysis Results

Analyte	Calculated $K_d$ (ml/g)		Summary of Leaching Behavior and Leachate Concentration
	Median	Range	
Cobalt	1,192	21 to 3,395	Taken up by soil in all tested scenarios. Generally taken up more in tests with higher initial concentrations and higher L/S ratios. Calculated $K_d$ values were typically higher for downgradient (SB-1806) samples compared to the peripheral sample (SB-1808). pH 6.0 of versus 7.5 s.u. did not appear to substantially influence calculated $K_d$ results.
Lithium	2	-2 to 23	Generally taken up by soil, but sometimes leaches. Generally taken up more at higher L/S ratios, and typically leaches at lowest L/S ratio. pH of 6.0 versus 7.5 s.u. did not appear to substantially influence calculated $K_d$ results.
Molybdenum	-2	-37 to 1	Mo generally not taken up by soil in any of the tested scenarios, and typically partitions out of the soil into solution. At the lowest initial concentration, leaching of Mo increases with increasing L/S. pH of 6.0 versus 7.5 s.u. did not appear to substantially influence calculated $K_d$ results.

Notes:

1. Calculated  $K_d$  are based on the 24-hour leach results only – refer to Table 4 for results from earlier time steps.
2. Concentrations are in milliliters per gram (mL/g), which are equivalent to liters per kilogram (L/kg).
2. Abbreviations: L/S = liquid-to-solid ratio;  $K_d$  = partition coefficient

#### 4.3.3 pH Dependent Batch Leaching Test

Results of the pH leaching tests are summarized in Table 5 and plots are included in Appendix F. Refer to Appendix H.4 for the analytical laboratory report. Exhibit 9 below summarizes leaching behavior and concentrations. Results indicate that COC behavior is variable: cobalt and lithium generally leach more at acidic (lower) pH, while molybdenum generally leaches more at basic (higher) pH. Based on results of the leaching tests with pH varying between 5 and 10:

- Three analytes (arsenic, lead, and molybdenum) generally leach more at higher pH;
- Five analytes (barium, cadmium, cobalt, fluoride, and lithium) generally leach more at lower pH;
- Three analytes (chromium and selenium) leach more at both higher and lower pH;
- Four analytes (antimony, beryllium, mercury, and thallium) are typically non-detect.

### Exhibit 9 – Summary of pH Dependent Batch Leaching Test Results

Analyte	Summary of Leaching Behavior and Leachate Concentration
Antimony	Typically ND at < 2 µg/L
Arsenic	Leaching generally increases as pH increases. Limited leaching (1.4 µg/L or less) at pHs of 5 -8; increased leaching at pHs of 9 (1.3 - 2.8 µg/L) and 10 (4 - 12 µg/L)
Barium	Leaching generally decreases as pH increases; 280 - 650 µg/L at pH 5 - 6; minima at pH 8 (6.1 - 46 µg/L); 58 - 180 µg/L at pH 9 - 10.
Beryllium	Typically ND at < 1 µg/L
Cadmium	Leaching generally decreases as pH increases: 0.85 - 3.5 µg/L at pH 5; typically ND [at < 1 µg/L] at pH > 7.
Chromium	Minima in leaching (ND [at < 2 µg/L] to 2.4 µg/L) at mid-pH (7 - 9); and increased leaching (up to 2.7 - 8.1 µg/L) at higher pH (9 - 10), and (up to 0.78 - 7 µg/L) at lower pH (5 -6).
Cobalt	Leaching generally decreases as pH increases; 14 - 49 µg/L at pH 5; minima at pH 8 (ND [at < 0.5 µg/L]); 0.7 - 3.3 µg/L at pH 10.
Fluoride	Leaching typically decreases as pH increases; 0.17 - 1.5 mg/L at pH 5, and typically 0.1 to 0.2 mg/L at higher pHs.
Lead	Generally limited leaching which increases as pH increases; 0.68 - 1.8 µg/L at pH 10, possible minima (ND [at < 1 µg/L]) at mid-pH (6 -7), and up to 0.15 µg/L at pH 5.
Lithium	Leaching decreases as pH increases: 9 - 20 µg/L at pH 5; ND [at < 5 µg/L] to 3.2 µg/L at pH 10.
Mercury	ND at < 0.2 µg/L
Molybdenum	Leaching increases as pH increases: ND [at < 5 µg/L] to 2.2 µg/L at pH 5; to 11 - 20 µg/L at pH 10.
Selenium	Generally limited leaching, commonly (ND [at < 5 µg/L]); may be slightly more leaching at high pHs (0.93 to 1.8 µg/L), and low pHs (1.2 - 1.7 µg/L).
Thallium	Typically ND at < 1 µg/L

Notes:

1. Concentrations are shown in micrograms per liter (µg/L), and pH is shown in standard units (s.u.).
2. ND = non-detect

#### 4.3.4 Bottom Ash Percolation Column Leaching Test

Results of the percolation column leaching test on a composite bottom ash sample using bottom ash pond outlet water are summarized in Table 6 and plots in Appendix G. Refer to Appendix H.5 for the analytical laboratory report. Exhibit 10 summarizes leaching behavior and concentrations.

Overall, the BAP water appears to be relatively equilibrated with the bottom ash sample. For the COCs, molybdenum initially leaches out of the sample and then is relatively non-reactive, lithium is taken up by the sample, and cobalt is taken up initially and leaches subsequently. In general, based on the analytical results:

- Five analytes (arsenic, barium, molybdenum, selenium, and thallium) typically leach out of the bottom ash sample;
- Two analytes (lithium and fluoride) are typically taken up by the bottom ash sample;
- Chromium leaches initially and is taken up subsequently;

- As indicated above, cobalt is taken up initially and leaches subsequently; and
- Five analytes (antimony, beryllium, cadmium, lead, and mercury) are generally non-detect.

### Exhibit 10 – Summary of Bottom Ash Percolation Column Leaching Test Results

Analyte	Concentration in Eluent (Bottom Ash Pond Outlet Water) µg/L	Summary of Leaching Behavior and Leachate Concentration
Antimony	<2.0	Typically ND at < 2.0 µg/L
Arsenic	4.4	Leaches out - typically approx. 6 - 12 µg/L
Barium	95 [B]	Leaches out - typically approx. 110 - 140 µg/L
Beryllium	< 1.0	ND at < 1.0 µg/L
Cadmium	0.3 [J]	Typically ND at < 1.0 µg/L
Chromium	2.6 [B]	Leaches out in first sample (3.9 µg/L), is taken up in subsequent samples typically < 2 µg/L
Cobalt	0.44 [J]	Taken up in samples up to L/S = 5 (typically approx. 0.1 - 0.2 µg/L), and leaches in subsequent samples approx. 0.5 - 2 µg/L
Fluoride	570	Generally taken up approx. 200 - 500 µg/L
Lead	< 1.0	ND at < 1.0 µg/L
Lithium	31	Taken up more strongly in early samples (15 - 23 µg/L), less so in later samples (28 -29 µg/L)
Mercury	< 0.2	ND at < 0.2 µg/L
Molybdenum	25	Leaches out in first sample (39 µg/L), generally relatively constant subsequently (23 - 29 µg/L)
Selenium	2 [J]	Leaches out in decreasing amounts up to L/S = 5 (12 µg/L down to 2 µg/L), generally relatively constant subsequently (1 - 2 µg/L)
Thallium	0.32 [J]	Leaches out (0.4 - 0.9 µg/L) until last sample or two (0.12 - < 1.0 µg/L)

Notes

1. Concentrations are shown in micrograms per liter (µg/L).

2. Abbreviations:

"<" or ND indicates the analyte was not detected above the indicated laboratory reporting limit.

"J" indicates the result is an estimated value which is less than the laboratory's sample-specific reporting limit but greater than or equal to the method detection limit.

"B" indicates the analyte was detected in both the field sample and the associated laboratory blank sample.

## 5.0 GEOCHEMICAL SUMMARY

This section summarizes the results of the analyses described in Section 4.0, focusing on the COCs cobalt, lithium and molybdenum; other analytes are referenced just as they relate to COC distribution and mobility. The geochemical behavior of the COCs as evidenced by the analytical results, as well as more general sources of geochemical information on the COCs is summarized in this Section, in particular with regard to potential implications for remedial alternatives. In addition, Table 7 provides a more detailed summary of the analytical results.



## 5.1 Distribution of COCs in Soil

As described in work by others<sup>(e.g. 25,26)</sup>, concentrations of cobalt, lithium and molybdenum in groundwater are elevated in downgradient monitoring wells compared to upgradient monitoring wells. In general, COC concentrations are not substantially elevated in downgradient soil samples compared to upgradient samples, with the exception of molybdenum in downgradient sample SB-1806 (46-60'). In sand and gravel samples (summarized on Table 2), concentrations of cobalt range from 5.0 to 12 mg/kg, concentrations of lithium range from 3.6 to 6.3 mg/kg (lithium concentrations are higher [12 – 14 mg/kg] in the finer-grained shallow silt/clay soils than in the sand and gravel samples), and concentrations of molybdenum range from 0.45 J to 1.0 mg/kg (and 2.1 mg/kg in SB-1806 [46-60']). These results are generally consistent with results from the trace element analysis of the composite sand and gravel sample (SGS-1), which indicate: cobalt is present in the heavy minerals fraction at 83 mg/kg and light fraction at 19 mg/kg, and that the concentration in the bulk sample was reported as not detected at the reporting limit of 9 mg/kg; lithium is present in the bulk sand and gravel sample at 11 mg/kg, but not detected (<20 mg/kg) in the heavy and light fractions; and molybdenum is not detected (<5 mg/kg) in the bulk sample, heavy or light fractions.

While minerals bearing COCs as major or essential components were not identified by the semi-quantitative XRD analyses, the COCs may substitute for other elements in these minerals (e.g. cobalt and molybdenum may substitute for iron or magnesium in ferromagnesian minerals, and lithium may substitute for sodium or potassium in clay or other silicate minerals).

## 5.2 Summary of Site Geochemical Assessment – Cobalt, Lithium and Molybdenum

With regard to general geochemical behavior in groundwater, lithium and cobalt are typically present as positively charged cations (i.e.,  $\text{Li}^+$  and  $\text{Co}^{2+}$ ), and consequently their behavior is broadly similar. Specifically, the results of tests completed as part of this study indicate that both lithium and cobalt tend to be taken up (e.g., adsorbed) by the soils tested, although cobalt more so than lithium, at least in part reflective of the cation exchange capacity that soils typically have. In addition, both of these COCs tend to leach less from soils as pH increases. In contrast, molybdenum is typically present in groundwater as an oxyanion (e.g., hexavalent molybdenum is present in solution as molybdate –  $\text{MoO}_4^{2-}$ ). Because molybdate is negatively charged, and soils typically have relatively little anion exchange capacity, it tends to be less strongly adsorbed onto soils. Also, molybdenum leaching tends to increase as pH increase, opposite that of lithium and cobalt. Based on the SEP results, none of the COCs were detected in the exchange ion step (1) for any of the samples, indicating the general lack of the COCs as easily exchangeable ions.

<sup>25</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016.

<sup>26</sup> Statistical Analysis Summary Bottom Ash Pond, Mountaineer Plant, prepared by Geosyntec Consultants on behalf of AEP, dated January 15, 2018.

A summary of the results of the analyses described in Section 4.0 for each COC follows, along with observations regarding potentially broader implications for the mobility of the COCs at the site.

### **5.2.1 Cobalt**

Cobalt appears to be concentrated in the heavy mineral fraction (83 mg/kg), and to lesser extent the light fraction (19 mg/kg), as compared to the bulk sand and gravel (< 9 mg/kg). This distribution of cobalt is consistent with it substituting for iron, magnesium and other metals in ferromagnesian silicates, oxides and possibly sulfides, which are major components of the heavy mineral fraction (e.g., garnet, pyroxene, amphibole, hematite, magnetite, ilmenite); and cobalt's common association with organic matter which is thought to comprise a significant portion of the light fraction.

Based on the SEP results, most cobalt is extracted in the metal hydroxide step, and then the acid/sulfide, and for the shallower sand and gravel samples, the non-crystalline step. Cobalt is strongly taken up by site soils (high  $K_d$ ), and its leaching generally decreases as pH increases. This behavior is consistent with the generally relatively strong cation exchange strength, and relatively strong affinity for adsorption/co-precipitation of cobalt with manganese, iron and aluminum oxides/hydroxides both crystalline and amorphous<sup>27</sup> (Rose et al, 1979). These results are also generally consistent with the elevated concentrations of cobalt in the heavy mineral fraction, which includes oxides/hydroxides and mafic silicate minerals, that may also have weathered surfaces containing metal hydroxide and non-crystalline phases. Cobalt may also be present in trace amounts of sulfides that may potentially be present in the heavy mineral fraction.

These observations along with the typically relatively low concentrations of cobalt detected in downgradient groundwater (only one sample from MW-1607S exceeded the GWPS of 6 µg/L), indicate that so long as pHs do not become significantly more acidic than under current conditions, cobalt should be relatively immobile in site groundwater. The observation that under acidic conditions, more cobalt leached from the downgradient samples than from the peripheral sample, may indicate that the downgradient sand and gravel has more cobalt that is potentially mobile, and that this cobalt may have been adsorbed onto the soils as a result of historically higher cobalt concentrations in groundwater in this area relative to the peripheral location.

### **5.2.2 Lithium**

Lithium does not appear to be concentrated in the light or heavy mineral fractions, and was detected at 11 mg/kg in the bulk sand and gravel sample. This distribution of lithium is consistent with it being present largely in the felsic silicate minerals, which have intermediate densities and hence would be present in the bulk sample, but not the light or heavy fractions. Lithium is thought to substitute for major elements such as sodium or potassium in silicate minerals such as clays and feldspars.

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<sup>27</sup> Rose, A.W., Hawkes, H.E. and Webb, J.S. (1979) *Geochemistry in Mineral Exploration*. 2nd Edition, Academic Press, London, 658.

Based on our interpretation of the SEP results, most lithium is extracted from silicate phases (e.g. clay minerals, feldspars) that are leached in the residual, organic bound and acid/sulfide steps, and relatively minor amounts extracted in the metal hydroxide step. This interpretation is consistent with the detection of lithium in the bulk sand and gravel sample, and not in the heavy or light fractions. Lithium is generally weakly to moderately taken up by soils (low to intermediate  $K_d$ ), and its leaching decreases as pH increases. Although  $K_d$ s are generally low for the tests which had relatively elevated lithium concentrations (i.e., 120 to 250  $\mu\text{g/l}$ , similar to or greater than those observed in downgradient monitoring wells), the  $K_d$ s for the peripheral sample under these conditions are somewhat higher (3 to 6) than for the downgradient samples (0 to 4). These relatively low  $K_d$ s are consistent with the generally relatively weak cation exchange strength of lithium relative to the other monovalent cations (e.g.,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Rb}^+$ ) and divalent cations (e.g.,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Co}^{2+}$ ) (Rose et al, 1979).

These observations, along with the generally elevated lithium concentrations (relative to the GWPS of 40  $\mu\text{g/l}$ ) in groundwater in the downgradient wells, suggest that lithium is relatively mobile under site conditions. The observation that more lithium leached from the downgradient samples than from the peripheral sample under all pH conditions assessed may indicate that the downgradient sand and gravel has more potentially mobile lithium, and that this lithium may have been adsorbed onto the soils as a result of historically higher lithium concentrations in groundwater in this area relative to the peripheral location.

### **5.2.3 Molybdenum**

The lack of detected molybdenum in the bulk sand and gravel, light and heavy fractions at a reporting limit of 5 mg/kg is consistent with the low concentrations (0.45 to 2.1 mg/kg) in the individual sand and gravel samples, and the lack of enrichment in the heavy or light fractions.

Based on the SEP results, most molybdenum is extracted in the metal hydroxide and acid/sulfide steps, and lesser amounts in non-crystalline step. Typically, molybdenum leaches from soils (low/negative  $K_d$ ), and leaching increases as pH increases. These results are generally consistent with the presumed geochemical behavior of molybdenum, which is typically present in groundwater as a relatively mobile oxyanion (i.e., molybdate), and its tendency for limited to moderate adsorption onto crystalline and non-crystalline manganese, iron and aluminum oxide/hydroxide phases which may have adsorption sites for oxyanions (Rose et al, 1979), and the potential presence of molybdenum in sulfides.

These observations, along with the generally elevated molybdenum concentrations, occasionally exceeding the GWPS of 100  $\mu\text{g/l}$  and frequently greater than 50  $\mu\text{g/l}$ , in groundwater in the downgradient wells, suggest that molybdenum is relatively mobile under site conditions. The observation that more molybdenum leached from the downgradient sample SB-1806, compared to other two samples from SB-1805 and SB-1808, may indicate that the downgradient sand and gravel has more potentially mobile molybdenum, and that this molybdenum may have been adsorbed onto the soils as a result of historically higher molybdenum concentrations in groundwater in this area relative to the peripheral location.

## 6.0 ASSESSMENT OF REMEDIAL ALTERNATIVES

This section summarizes Sanborn Head's preliminary assessment of remedial alternatives for the three options provided by AEP Mountaineer based on previously summarized results. The options focus on achieving compliance with the current CCR rules and include: monitored natural attenuation (MNA); injected media; and pond closure. This preliminary assessment is based on subsurface conditions relevant to gaining an understanding of the potential effectiveness of each option; other factors such as cost and implementability were not explicitly assessed herein.

### 6.1 Monitored Natural Attenuation

This option involves routine periodic monitoring of the existing groundwater monitoring network for the same list of analytes as the current CCR monitoring program<sup>28</sup>. MNA relies on naturally occurring subsurface processes that act to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in groundwater. These processes include oxidation/reduction, precipitation, sorption, dispersion and dilution. Based on the analytical results for the COCs, especially the results of the SEP,  $K_d$  and pH leaching tests, a preliminary assessment suggests:

- Cobalt is strongly taken up by site soils in  $K_d$  tests, and cobalt is unlikely to leach from soils assuming current groundwater pH and redox conditions are maintained;
- Lithium is taken up slightly by soils but sometimes leaches in  $K_d$  tests; however, based on the interpretation that lithium is largely present in relatively stable silicate phases that do not appear to leach significantly under typical subsurface conditions, the mass of lithium available for leaching is limited, and hence lithium leaching is expected to decrease with time assuming current groundwater pH and redox conditions are maintained; and
- Molybdenum generally leaches from site soils (under the test conditions) and may continue to leach assuming current groundwater pH and redox conditions are maintained.

Stable or decreasing groundwater concentrations with time based on previously collected data would support the MNA option. Based on the eight rounds of groundwater sampling results spanning September 28, 2016 to October 10, 2017, concentrations of cobalt, lithium and molybdenum in groundwater do not appear to be trending strongly over the approximately one-year period<sup>29</sup>. Molybdenum concentrations appear to be generally decreasing, though not statistically significant, at several of the downgradient wells, including: MW-1604D, MW-1605S, MW-1605D, MW-1606S (the only location with an exceedance of the molybdenum GWPS), and MW-1606D. Lithium concentrations reported

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<sup>28</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016.

<sup>29</sup> Statistical Analysis Summary Bottom Ash Pond, Mountaineer Plant, prepared by Geosyntec Consultants on behalf of AEP, dated January 15, 2018

in the Battelle 2016 Report<sup>30</sup> for locations MW-5, MW-16, JTMN-2 and MW-4 indicate that lithium concentrations in groundwater were relatively stable from 2010 to 2015, except for a spike in lithium observed in 2014 (see Section 2.1.2). Cobalt and molybdenum concentrations are not included in the Battelle 2016 Report.

Minerals identified in the shallower silt/clay samples (see Section 4.2) such as illite or chlorite, which have relatively high cation exchange capacities, may naturally attenuate COC concentration if they are sourced from the BAP. Illite and montmorillonite are also present in the light fraction of the sand and gravel sample (SGS-1). Qualitative and semi-quantitative XRD results for the silt/clay samples and the SGS-1 sample also indicate the presence of oxides/hydroxides (e.g. goethite, hematite, ilmenite [SGS-1 heavy fraction only], maghemite [SB-1802 (10-12') sample only], and magnetite), which may adsorb or co-precipitate COCs thereby attenuating concentrations. While minerals bearing COCs as major or essential components were not identified by the semi-quantitative XRD analyses, the COCs may substitute for other elements in these minerals (e.g. cobalt and molybdenum may substitute for iron or magnesium in ferromagnesian minerals, and lithium may substitute for sodium or potassium in clay or other silicate minerals).

Maintaining current conditions is also unlikely to change the concentrations of other metals present i.e., unlike other options that may change the groundwater chemistry there are not likely to be any unintended changes because of selecting this remedial alternative.

Changing subsurface conditions may “destabilize” the three COCs primarily reviewed in this report (Co, Li, Mo) or other possible COCs, including by destabilizing the mineral phases that may be responsible for adsorbing/containing the COCs (e.g., redox changes may cause iron and manganese oxides to dissolve, pH changes may mobilize different COCs such as arsenic).

## 6.2 Injected Media

This option involves an engineered subsurface treatment such as injection of a media intended to raise or lower pH, modify redox conditions, and/or provide adsorptive media, and thereby enhance the adsorption and/or precipitation of COCs and reduce their concentrations in groundwater. Monitoring of existing monitoring wells for Appendix III/IV parameters is assumed to be part of this remedial option and the observations summarized in Section 6.1 above should also be considered.

Based on results of the pH leaching test and supported by the SEP and mineralogical results, changing pH may influence COC behavior in the following ways:

- Cobalt and lithium leaching generally decreases as pH increases; and
- Molybdenum leaching generally increases as pH increases.

Based on the SEP results, supported by  $K_a$  and mineralogical results from site samples, changing redox conditions may influence COC behavior.

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<sup>30</sup> Annual Post-Injection Monitoring Report Mountaineer Power Plant, prepared by Battelle Memorial Institute on behalf of Appalachian Power Company dba AEP, dated August 2016



- Most cobalt (37 to 62%) in soil samples is extracted in the metal-hydroxide step according to SEP results. Considering the relatively strong cation exchange strength of cobalt and relatively strong affinity for adsorption/co-precipitation with redox-sensitive metal oxides/hydroxides, changing redox conditions is anticipated to strongly influence cobalt mobility. Cobalt is also associated with the acid/sulfide SEP step (18 to 33%), and sulfide minerals are also sensitive to redox conditions.
- Most lithium is extracted from silicate phases that are leached in the residual, organic bound and acid/sulfide steps according to SEP results. Considering the relatively low to intermediate  $K_d$  and relatively weak cation exchange strength of lithium, and the relatively low association with metal oxides/hydroxides, changing redox conditions is anticipated to have limited impact on lithium mobility.
- Similar to cobalt, most molybdenum (26 to 52%) in soil samples is extracted in the metal-hydroxide step and acid/sulfide step (30 to 52%) according to SEP results. Considering molybdenum is typically present in groundwater as a relatively mobile oxyanion with limited to moderate tendency for adsorption onto redox-sensitive metal oxides/hydroxides, and may also be present in sulfides, changing redox conditions may significantly influence molybdenum mobility.

Based on the  $K_d$  results, supported by the SEP and mineralogical results, adsorptive media (e.g., clays, metal oxides/hydroxides, resin) injection is anticipated to influence COC concentrations according to:

- Based on the relatively high  $K_d$  of cobalt, and its affinity for metal hydroxides, cobalt could potentially be taken up by adsorptive media such as clays or metal oxides/hydroxides;
- Based on the low to intermediate  $K_d$  of lithium, lithium may be slightly taken up by adsorptive media such as clays or metal oxides/hydroxides, but it is unlikely to attenuate completely; and
- Based on the low  $K_d$  of molybdenum, its tendency to leach from soils, and its presumed oxyanion state, molybdenum may be more difficult to adsorb, and may require more specialized metal oxides/hydroxide or resins, if feasible at all under typical ambient subsurface conditions.

Injected media would likely influence concentrations of other metals apart from the COCs. Other Appendix III/IV parameters which exhibit decrease in leaching as pH increases include barium, cadmium, chromium, fluoride. Appendix III/IV parameters which generally increase leaching as pH increases include arsenic, lead, and selenium. The variable, and sometimes opposite, leaching behavior of COCs in response to an increase or decrease in pH, suggests that the injected media option would be unlikely to attenuate all COCs, and may cause concentrations of some other metals to increase unintentionally. If groundwater composition changes, the tendency of COCs to leach or attenuate may change in response (e.g. lower molybdenum concentrations in groundwater concentrations downgradient of a



barrier may enhance molybdenum desorption). Changing redox conditions is anticipated to have similarly variable effects on different site COCs based on differences in COC behavior. Injection of adsorptive media is unlikely to cause desorption of COCs, but may not attenuate all COCs or may attenuate COCs to varying degrees. Furthermore, because the COCs are not destroyed but only immobilized, there is concern that over time they will again become mobile.

### 6.3 Pond Closure

This option includes ceasing operation of the BAP CCR Unit and also potentially remediating the existing BAPs by implementing an impermeable cap or liner system and/or excavating solid material. This option assumes that the BAP is the primary and active source of COCs sampled in downgradient monitoring wells, and that therefore, closing the BAP would reduce the amount of COCs added to groundwater by limiting the amount of water passing through the ash relative to current conditions. Monitoring of existing monitoring wells for Appendix III/IV parameters is assumed to be part of this remedial option and the observations summarized in Section 6.1 above should also be considered.

The results presented herein do not suggest the presence of a substantial naturally-occurring source of COCs at downgradient locations. This study did not assess other potential sources of COCs to groundwater. Broadly, based on the ash leaching tests, the BAP outlet water sample appeared in general equilibrium with the ash sample. The sample had concentrations of cobalt, lithium and molybdenum at 0.44 J, 31, and 25  $\mu\text{g/l}$ , respectively. These concentrations are below the respective GWPS of 6, 40, and 100  $\mu\text{g/l}$ . Based on the leaching test, cobalt was generally taken up initially and subsequently leached, lithium was taken up strongly initially and subsequently leached, and molybdenum leached initially and subsequently was relatively constant. Ash composition, including COC concentrations, may have changed over time. The current BAP conditions as evidenced by the sample of ash and water described herein, may have lower concentrations of the COCs than historical ash and water.

In addition to potentially contributing COCs to groundwater, the BAP may act to influence groundwater pH and redox state, which could mobilize or attenuate COCs from another source. Groundwater and soil pH are generally similar between upgradient and downgradient samples. However, it is anticipated that the BAP may create higher pH conditions that may help to immobilize some COCs and mobilize others. Regarding redox conditions, if the BAP contributes relatively aerated surface water to the subsurface, the BAP could contribute to oxic/aerobic groundwater conditions depending on microbial activity. Limiting the amount of water passing through the BAP might lead to more anoxic/anaerobic conditions.

Pond closure may include capping with an impermeable cap, capping with a permeable layer, or no cap. As part of the pond closure option, the ability of the existing BAP clay liner and/or shallow overburden soils to attenuate COCs could be further evaluated. For example, boring logs indicate the presence of cohesive silt/clay soils at relatively shallow depths (10 to 13 ft) near the BAP. Based on mineralogical results, these soils contain clays such as illite and chlorite that may naturally attenuate site COCs due to the relatively high cation exchange

capacity of the clays. Based on COC concentrations in groundwater, the attenuation capacity of these existing silt/clay materials may be expended; however, the potential for enhancing natural attenuation capacity of existing materials could be further evaluated if capping is considered an alternative.

Adding an impermeable feature (e.g. cap, liner) may change pH, redox conditions and temperature near the BAP, which could affect groundwater metal concentrations, and changing stormwater management may locally influence groundwater flow conditions, and could result in the negative impacts to mobility discussed above for the other potential remedial alternatives. Because of the variable mobility behavior of cobalt, lithium and molybdenum (as well as other Appendix IV parameters that are not currently a concern), the influence of remediation options that manipulate subsurface conditions on other pH or redox sensitive analytes should factor into consideration of the pond closure alternatives.

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## TABLES

**TABLE 1**  
**Summary of Analytical Results - Groundwater**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Sample	Collection Date	Appendix III							Appendix IV														
		Boron mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	TDS mg/L	pH SU	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Selenium µg/L	Thallium µg/L	Radium 226+228 pCi/L	
Background UPL		0.684	192	57.7	0.2989	613.3	1003	7.77 to 8.258	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Background LPL		-	-	-	-	-	-	5.6 to 7.255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
USEPA MCL		NS	NS	NS	4.0	NS	NS	NS	6	10	2000	4	5	100	NS	15 (AL)	NS	2	NS	50	2	5	
USEPA GWPS		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6	15	40	NS	100	NS	NS	NS	NS	
<b>Upgradient Monitoring Wells</b>																							
MW-1601A	9/28/2016	0.211	141	21.8	0.170	130	538	7.55	0.05	0.62	46.6	0.005 U	0.01 J	0.300	0.116	0.132	2.0	0.002 U	2.61	1.30	0.053	0.44	
	11/1/2016	0.170	122	17.3	0.190	136	534	7.22	0.05 J	0.61	45.2	0.005 U	0.02 J	1.30	0.0860	0.108	1.0	0.002 U	2.36	1.10	0.058	2.01	
	12/19/2016	0.196	130	20.4	0.180	141	544	7.20	0.05 J	0.65	47.0	0.005 U	0.02 J	0.806	0.282	0.383	0.2 U	0.002 U	0.93	1.10	0.04 J	1.54	
	2/20/2017	0.253	117	31.0	0.200	135	568	7.16	0.03 J	0.55	41.4	0.005 U	0.02 J	0.198	0.132	0.139	5.0	0.002 U	1.42	1.40	0.070	0.31	
	3/27/2017	0.515	119	42.1	0.190	148	530	7.06	0.03 J	0.49	40.2	0.005 U	0.01 J	0.225	0.0970	0.069	6.0	0.002 U	2.85	1.00	0.03 J	0.50	
	4/18/2017	0.259	130	55.3	0.190	169	580	7.13	0.03 J	0.59	47.5	0.004 U	0.01 J	0.170	0.0930	0.052	7.0	0.003 J	1.53	1.50	0.04 J	0.81	
	5/15/2017	0.224	159	74.4	0.180	197	676	7.71	0.04 J	0.79	56.9	0.004 U	0.02 J	0.166	0.154	0.141	0.2 U	0.002 U	2.04	1.30	0.04 J	1.28	
	6/12/2017	0.285	138	57.7	0.180	170	586	6.91	0.04 J	0.61	49.0	0.004 U	0.02 J	0.152	0.0980	0.063	4.0	0.002 U	1.13	1.50	0.04 J	0.60	
	10/30/2017	0.224	137	49.4	0.190	169	564	7.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	0.515	159	74.4	0.200	197	676	7.71	0.05 J	0.79	56.9	0.005 U	0.02 J	1.30	0.282	0.383	7.0	0.003 J	2.85	1.50	0.070	2.01	
Min	0.170	117	17.3	0.170	130	530	6.91	0.03 J	0.49	40.2	0.004 U	0.01 J	0.152	0.086	0.052	0.2 U	0.002 U	0.93	1.00	0.030 J	0.31		
Average	0.260	133	41.0	0.186	155	569	7.22	0.04	0.61	46.7	0.005	0.02	0.415	0.132	0.136	3.2	0.002	1.86	1.28	0.046	0.94		
MW-1602	9/28/2016	0.141	75	8.0	0.170	167	412	7.26	0.02 J	0.40	27.1	0.005 U	0.02 J	0.200	0.217	0.255	13.0	0.002 U	0.90	0.08 J	0.092	0.28	
	11/1/2016	0.115	71	8.7	0.180	178	424	6.59	0.02 J	0.35	28.7	0.005 U	0.02 J	0.600	0.108	0.070	14.0	0.002 U	1.48	0.10	0.116	2.09	
	12/19/2016	0.120	75	9.9	0.180	188	470	6.93	0.02 J	0.43	28.9	0.005 U	0.01 J	1.65	0.225	0.272	8.0	0.002 U	0.56	0.08 J	0.02 J	0.71	
	2/20/2017	0.093	70	9.8	0.190	193	494	6.53	0.01 U	0.35	26.9	0.005 U	0.01 J	0.194	0.0520	0.052	13.0	0.002 U	0.63	0.10	0.02 J	0.75	
	3/27/2017	0.240	87	12.0	0.190	231	504	6.28	0.01 J	0.34	29.9	0.005 U	0.02 J	0.456	0.0590	0.063	19.0	0.002 U	1.49	0.20	0.01 J	0.68	
	4/17/2017	0.107	91	12.1	0.200	248	520	6.66	0.02 J	0.36	32.1	0.004 U	0.01 J	0.240	0.0490	0.087	17.0	0.002 J	0.66	0.10	0.01 J	0.34	
	5/15/2017	0.115	105	12.6	0.190	273	598	7.04	0.02 J	0.42	33.2	0.004 U	0.02 J	0.136	0.0720	0.078	9.0	0.002 U	1.28	0.10	0.04 J	1.91	
	6/12/2017	0.153	94	11.8	0.200	269	588	6.75	0.03 J	0.36	33.1	0.004 U	0.01 J	0.408	0.0660	0.061	18.0	0.002 U	0.53	0.10	0.02 J	0.29	
	10/30/2017	0.093	78	8.4	0.230	184	468	6.67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	0.240	105	12.6	0.230	273	598	7.26	0.03 J	0.43	33.2	0.005 U	0.02 J	1.65	0.225	0.272	19.0	0.002 J	1.49	0.20	0.116	2.09	
Min	0.093	70	8.0	0.170	167	412	6.28	0.01 U	0.34	26.9	0.004 U	0.01 J	0.136	0.049	0.052	8.0	0.002 U	0.53	0.08 J	0.010 J	0.28		
Average	0.131	83	10.4	0.192	215	498	6.75	0.02	0.38	30.0	0.005	0.02	0.486	0.106	0.117	13.9	0.002	0.94	0.11	0.041	0.88		
MW-1603	9/28/2016	0.327	124	15.7 J	0.070 J	388	618	7.27	0.02 J	0.36	29.5	0.005 U	0.02 J	0.300	0.317	0.253	21.0	0.002 U	1.21	0.10	0.02 J	0.09	
	11/2/2016	0.334	146	22.8 J	0.080 J	483	814	6.56	0.02 J	0.36	34.1	0.005 U	0.01 J	0.400	0.166	0.131	22.0	0.002 U	2.47	0.40	0.04 J	2.59	
	12/19/2016	0.495	164	30.1 J	0.100 J	504	908	7.41	0.03 J	0.40	33.1	0.005 U	0.01 J	2.37	0.134	0.084	10.0	0.002 U	0.36	0.30	0.063	0.97	
	2/20/2017	0.543	169	27.4 J	0.100 J	485	962	6.78	0.01 J	0.37	31.7	0.005 U	0.01 J	0.229	0.105	0.077	12.0	0.002 U	0.37	0.40	0.02 J	0.38	
	3/28/2017	0.781	181	25.2 J	0.100 J	476	918	6.60	0.02 J	0.36	32.9	0.005 U	0.01 J	0.545	0.0930	0.080	20.0	0.002 U	0.72	0.20	0.01 U	0.21	
	4/17/2017	0.519	170	22.9 J	0.100 J	474	910	6.93	0.03 J	0.52	33.7	0.005 J	0.01 J	0.304	0.377	0.308	18.0	0.003 J	0.27	0.20	0.01 J	0.62	
	5/15/2017	0.546	187	24.7 J	0.100 J	470	910	7.38	0.03 J	0.43	33.0	0.004 U	0.01 J	0.415	0.101	0.079	12.0	0.002 U	0.71	0.10	0.02 J	1.61	
	6/12/2017	0.535	176	20.5 J	0.100 J	482	878	6.95	0.03 J	0.35	32.0	0.004 U	0.01 J	0.963	0.0850	0.059	21.0	0.002 U	0.29	0.10	0.01 J	0.78	
	10/30/2017	0.360	171	13.1 J	0.100 J	553	872	6.58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	0.781	187	30.1	0.100	553	962	7.41	0.03 J	0.52	34.1	0.005 J	0.02 J	2.37	0.377	0.308	22.0	0.003 J	2.47	0.40	0.063	2.59	
Min	0.327	124	13.1	0.070	388	618	6.56	0.01 J	0.35	29.5	0.004 U	0.01 J	0.229	0.085	0.059	10.0	0.002 U	0.27	0.10	0.010 U	0.09		
Average	0.493	165	22.5	0.094	479	866	6.94	0.02	0.39	32.5	0.005	0.01	0.691	0.172	0.134	17.0	0.002	0.80	0.23	0.024	0.91		
MW-1608	9/27/2016	0.150	93.8	6.6	0.270	70.6	368	7.39	0.10	0.82	42.0	0.020 J	0.03	0.900	1.21	0.881	3.0	0.002 U	2.35	1.20	0.03 J	0.45	
	11/1/2016	0.113	86.2	6.4	0.300	64.3	352	7.26	0.04 J	0.53	33.4	0.005 U	0.02 J	0.600	0.254	0.232	4.0	0.002 U	2.16	1.30	0.081	2.28	
	12/19/2016	0.118	83.0	4.3	0.260	58.3	338	7.32	0.04 J	0.68	32.2	0.009 J	0.02	2.78	0.588	0.405	0.2 U	0.002 U	1.94	1.10	0.03 J	0.38	
	2/22/2017	0.156	83.3	4.4	0.250	94.4	398	7.07	0.03 J	0.52	32.4	0.005 U	0.01 J	0.364	0.240	0.205	3.0	0.002 U	1.40	1.50	0.053	1.24	
	3/27/2017	0.238	80.3	5.3	0.240	112	350	6.77	0.03 J	0.56	31.4	0.005 U	0.01 J	0.335	0.330	0.274	6.0	0.002 U	2.49	1.30	0.04 J	0.42	
	4/17/2017	0.233	101	7.1	0.230	168	424	7.01	0.04 J	0.50	35.3	0.004 U	0.01 J	0.223	0.196	0.173	6.0	0.002 J	1.89	1.30	0.01 J	0.13	
	5/15/2017	0.200	102	8.6	0.230	208	475	7.75	0.04 J	0.49	35.1	0.004 U	0.01 J	0.151	0.0980	0.073	6.0	0.002 U	2.08	1.00	0.01 J	0.86	
	6/12/2017	0.169	110	8.2	0.210	204	486	6.66	0.03 J	0.49	36.4	0.004 U	0.01 J	0.277	0.0400	0.024	16.0	0.002 U	1.57	1.10	0.02 J	0.15	
	10/31/2017	0.140	94.7	5.1	0.220	131	430	7.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	0.238	110.0	8.6	0.300	208	486	7.75	0.10	0.82	42.0	0.020 J	0.03	2.78	1.210	0.881	16.0	0.002	2.49	1.50	0.081	2.28	
Min	0.113	80.3	4.3	0.210	58.3	338	6.66	0.03 J	0.49	31.4	0.004 U	0.01 J	0.151	0.040	0.024	0.2 U	0.002 U	1.40	1.00	0.010 J	0.13		
Average	0.169	92.7	6.2	0.246	123	402	7.15	0.04	0.57	34.8	0.007	0.01	0.704										

**TABLE 1**  
**Summary of Analytical Results - Groundwater**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Sample	Collection Date	Appendix III							Appendix IV														
		Boron mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	TDS mg/L	pH SU	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Selenium µg/L	Thallium µg/L	Radium 226+228 pCi/L	
Background UPL		0.684	192	57.7	0.2989	613.3	1003	7.77 to 8.258	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Background LPL		-	-	-	-	-	-	5.6 to 7.255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
USEPA MCL		NS	NS	NS	4.0	NS	NS	NS	6	10	2000	4	5	100	NS	15 (AL)	NS	2	NS	50	2	5	
USEPA GWPS		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6	15	40	NS	100	NS	NS	NS	NS	
<b>Downgradient Monitoring Wells</b>																							
MW-1604S	9/26/2016	2.12	178	83.9	0.200	602	1280	7.04	0.04 J	0.39	29.4	0.005 U	0.03	0.200	0.358	0.114	34.0	0.002 U	3.20	3.10	0.03 J	0.14	
	11/1/2016	1.90	167	99.4	0.210	626	1310	7.10	0.04 J	0.46	27.2	0.005 U	0.04	0.300	0.307	0.065	35.0	0.002 U	2.47	2.50	0.02 J	0.77	
	12/20/2016	2.35	165	99.9	0.190	618	1300	7.19	0.04 J	0.42	26.6	0.005 U	0.04	1.970	0.390	0.093	23.0	0.002 U	2.71	2.70	0.03 J	0.53	
	2/21/2017	3.08	168	112	0.210	634	1430	7.04	0.03 J	0.42	26.7	0.005 U	0.04	0.379	0.501	0.140	33.0	0.002 U	2.52	2.20	0.03 J	0.92	
	3/28/2017	4.04	180	116	0.200	663	1420	6.94	0.03 J	0.37	31.6	0.005 U	0.03	0.692	0.308	0.055	42.0	0.002 U	2.53	2.20	0.119	0.59	
	4/19/2017	3.68	191	130	0.210	716	1500	7.01	0.03 J	0.44	28.9	0.004 U	0.04	0.158	0.317	0.051	41.0	0.003 J	2.53	1.70	0.02 J	0.72	
	5/16/2017	3.63	202	122	0.190	708	1510	7.67	0.04 J	0.51	32.2	0.004 U	0.04	0.098	0.317	0.100	33.0	0.002 U	2.54	2.00	0.04 J	2.58	
	6/13/2017	3.48	182	112	0.200	685	1400	7.53	0.03 J	0.41	28.7	0.004 U	0.04	0.149	0.308	0.033	38.0	0.002 U	2.41	2.50	0.02 J	0.60	
	10/30/2017	2.17	167	85.3	0.210	544	1150	7.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	4.04	202	130	0.210	716	1510	7.67	0.04 J	0.51	32.2	0.005 U	0.04	1.970	0.501	0.140	42.0	0.003 J	3.20	3.10	0.119	2.58	
Min	1.90	165	83.9	0.190	544	1150	6.94	0.03 J	0.37	26.6	0.004 U	0.03	0.098	0.307	0.033	23.0	0.002 U	2.41	1.70	0.020 J	0.14		
Average	2.94	178	107	0.202	644	1367	7.18	0.04	0.43	28.9	0.005	0.04	0.493	0.351	0.081	34.9	0.002	2.61	2.36	0.039	0.85		
MW-1605S	9/27/2016	8.30	224	150	0.240	965	1910	7.45	0.16	1.38	49.6	0.020 J	0.13	0.600	3.16	2.180	86.0	0.002 U	25.8	1.10	0.174	0.78	
	11/1/2016	6.55	220	159	0.250	1010	1930	7.34	0.07	0.93	38.2	0.009 J	0.08	0.700	1.26	0.793	84.0	0.002 U	23.9	0.90	0.055	2.69	
	12/20/2016	7.30	279	173	0.220	1180	2160	7.35	0.07 J	0.88	37.0	0.010 U	0.08	2.850	0.861	0.410	76.0	0.002 U	22.9	0.70	0.05 J	0.34	
	2/21/2017	9.04	249	179	0.250	1110	2220	7.19	0.04 J	0.86	36.0	0.007 J	0.08	0.390	1.10	0.636	68.0	0.002 U	17.5	1.10	0.055	0.79	
	3/28/2017	10.8	261	212	0.250	1110	2250	7.05	0.03 J	0.63	32.5	0.005 U	0.06	0.349	0.448	0.181	76.0	0.002 U	15.4	1.00	0.102	0.47	
	4/18/2017	8.69	244	180	0.230	1100	2120	7.36	0.06 J	0.74	31.9	0.008 U	0.08	0.245	0.715	0.285	67.0	0.003 J	20.8	3.00	0.04 J	0.83	
	5/16/2017	8.75	251	217	0.260	1060	2160	7.74	0.06 J	0.88	33.3	0.008 U	0.08	0.585	0.647	0.382	76.0	0.002 U	18.6	1.70	0.06 J	2.73	
	6/13/2017	8.80	218	191	0.240	1000	1980	7.77	0.05 J	0.75	30.8	0.008 U	0.08	0.387	0.708	0.541	71.0	0.002 U	17.8	1.70	0.05 J	0.61	
	10/31/2017	5.88	212	222	0.250	1040	2000	7.18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	10.8	279	222	0.260	1180	2250	7.77	0.16	1.38	49.6	0.020 J	0.13	2.850	3.160	2.180	86.0	0.003 J	25.8	3.00	0.174	2.73	
Min	5.9	212	150	0.220	965	1910	7.05	0.03 J	0.63	30.8	0.005 U	0.06	0.245	0.448	0.181	67.0	0.002 U	15.4	0.70	0.040 J	0.34		
Average	8.2	240	187	0.243	1064	2081	7.38	0.07	0.88	36.2	0.009	0.08	0.763	1.112	0.676	75.5	0.002	20.3	1.40	0.073	1.15		
MW-1606S	9/27/2016	5.25	219	182	0.500	621	1470	5.99	0.16	0.88	76.7	0.005 U	0.08	0.200	0.466	0.234	116	0.002 U	112	1.20	0.074	0.59	
	11/2/2016	4.57	183	183	0.570	638	1470	7.24	0.17	0.94	69.7	0.005 U	0.07	0.400	0.432	0.207	103	0.002 U	112	1.00	0.060	1.55	
	12/20/2016	5.35	200	170	0.460	621	1420	7.33	0.16	0.83	71.6	0.005 U	0.07	1.260	0.280	0.084	102	0.002 U	101	0.90	0.063	1.66	
	2/21/2017	5.03	211	231	0.460	578	1500	7.13	0.15	0.88	77.2	0.005 U	0.08	0.384	0.372	0.158	108	0.002 U	93.1	0.70	0.086	0.99	
	3/28/2017	6.67	217	226	0.450	589	1500	7.03	0.14	0.78	75.7	0.005 U	0.06	0.742	0.258	0.096	126	0.002 U	90.1	0.70	0.100	0.95	
	4/18/2017	5.80	228	217	0.430	615	1540	7.20	0.16	0.86	74.2	0.004 U	0.07	0.134	0.234	0.070	117	0.002 J	92.4	0.80	0.062	1.30	
	5/16/2017	5.72	228	227	0.450	635	3230	7.74	0.16	0.90	74.1	0.004 U	0.07	0.093	0.241	0.062	110	0.002 U	90.2	0.90	0.069	2.17	
	6/13/2017	6.12	230	230	0.450	643	1540	7.39	0.16	0.81	77.1	0.008 U	0.09	0.178	0.281	0.090	118	0.002 U	95.7	0.90	0.070 J	1.28	
	10/31/2017	9.54	226	187	0.460	644	1410	7.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	9.54	230	231	0.570	644	3230	7.74	0.17	0.94	77.2	0.008 U	0.09	1.260	0.466	0.234	126	0.002 J	112	1.20	0.100	2.17	
Min	4.57	183	170	0.430	578	1410	5.99	0.14	0.78	69.7	0.004 U	0.06	0.093	0.234	0.062	102	0.002 U	90.1	0.70	0.060	0.59		
Average	6.01	216	206	0.470	620	1676	7.13	0.16	0.86	74.5	0.005	0.07	0.424	0.321	0.125	113	0.002	98.3	0.89	0.073	1.31		
MW-1607S	9/27/2016	-	-	-	-	-	-	7.55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	10/31/2016	1.38	126	90.8	0.310	213	670	-	0.46	1.86	56.7	0.010 J	0.06	0.800	2.59	1.40	98.0	0.003 J	48.4	7.10	0.060	2.50	
	11/2/2016	1.35	126	90.6	0.320	214	698	7.55	0.45	1.30	55.5	0.005 U	0.04	0.400	0.752	0.264	92.0	0.002 U	50.4	7.00	0.050 J	1.34	
	12/21/2016	1.02	129	92.7	0.330	246	716	7.70	0.84	11.2	114	0.123	0.22	3.100	20.1	11.0	88.0	0.012	45.7	9.40	0.150	2.81	
	2/21/2017	1.27	131	91.9	0.290	244	746	7.52	0.42	1.19	63.9	0.007 J	0.03	0.325	1.21	0.267	91.0	0.002 U	41.3	9.00	0.069	1.97	
	3/28/2017	1.70	131	93.1	0.280	233	706	7.44	0.43	1.17	66.8	0.005 U	0.02	0.390	0.942	0.134	110	0.002 U	39.2	9.20	0.052	1.15	
	4/18/2017	1.65	135	92.6	0.300	225	678	7.58	0.55	1.62	67.6	0.010 J	0.06	0.514	2.60	1.25	102	0.003 J	45.1	8.90	0.058	1.63	
	5/16/2017	1.64	133	97.5	0.290	221	746	8.23	0.50	1.17	63.7	0.004 U	0.03	0.226	0.851	0.159	94.0	0.002 U	48.1	9.10	0.050 J	2.41	
	6/14/2017	1.74	136	96.3	0.270	229	708	7.46	0.48	1.10	62.9	0.004 U	0.03	0.200	0.936	0.138	106	0.002 U	46.1	9.40	0.050 J	1.02	
	10/31/2017	1.32	165	100	0.280	343	860	7.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Max	1.74	165	100	0.330	343	860	8.23	0.84	11.2	114	0.123	0.22	3.100	20.1	11.0	110	0.012	50.4	9.40	0.150	2.81		
Min	1.02	126	90.6	0.270	213	670	7.44	0.42	1.10	55.5	0.004 U	0.02	0.200	0.752	0.134	88.0	0.002 J	39.2	7.00	0.050 J	1.02		
Average	1.45	135	93.9	0.297	241	725	7.61	0.52	2.58	68.9													

**TABLE 1**  
**Summary of Analytical Results - Groundwater**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Sample	Collection Date	Appendix III							Appendix IV														
		Boron mg/L	Calcium mg/L	Chloride mg/L	Fluoride mg/L	Sulfate mg/L	TDS mg/L	pH SU	Antimony µg/L	Arsenic µg/L	Barium µg/L	Beryllium µg/L	Cadmium µg/L	Chromium µg/L	Cobalt µg/L	Lead µg/L	Lithium µg/L	Mercury µg/L	Molybdenum µg/L	Selenium µg/L	Thallium µg/L	Radium 226+228 pCi/L	
Background UPL		0.684	192	57.7	0.2989	613.3	1003	7.77 to 8.258	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Background LPL		-	-	-	-	-	-	5.6 to 7.255	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
USEPA MCL		NS	NS	NS	4.0	NS	NS	NS	6	10	2000	4	5	100	NS	15 (AL)	NS	NS	50	2	NS	5	
USEPA GWPS		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6	15	40	NS	100	NS	NS	NS	NS	
MW-1604D	9/26/2016	3.54	306	111	0.180	865	1650	7.28	0.14	0.48	29.1	0.005 U	0.14	0.400	1.76	0.106	59.0	0.002 U	19.8	0.90	0.235	1.38	
	11/1/2016	2.98	277	116	0.190	866	1580	7.30	0.15	0.59	28.4	0.005 U	0.17	0.500	1.78	0.0390	57.0	0.036	20.0	1.00	0.261	1.06	
	12/20/2016	3.07	289	118	0.170	863	1630	7.41	0.14	0.57	30.3	0.005 U	0.17	0.798	1.92	0.020 J	45.0	0.002 U	20.8	1.00	0.283	1.45	
	2/21/2017	3.01	260	111	0.210	823	1640	7.20	0.11	0.45	26.2	0.005 U	0.13	0.297	1.85	0.020 J	50.0	0.002 U	17.4	0.70	0.264	0.82	
	3/28/2017	4.18	293	112	0.190	814	1660	7.16	0.13	0.41	28.9	0.005 U	0.13	0.416	1.74	0.0220	64.0	0.002 U	18.2	0.70	0.336	0.81	
	4/19/2017	2.97	269	109	0.200	797	1570	7.19	0.12	0.49	27.9	0.004 U	0.09	0.323	1.60	0.584	51.0	0.003 J	17.4	0.70	0.217	1.54	
	5/16/2017	2.95	300	112	0.180	828	1610	7.87	0.13	0.54	27.5	0.004 U	0.10	0.079	1.60	0.0270	52.0	0.002 U	18.1	0.50	0.231	3.49	
	6/13/2017	2.98	283	118	0.180	856	1620	7.52	0.15	0.46	27.9	0.008 U	0.15	0.180	1.95	0.030 J	58.0	0.002 U	18.3	0.80	0.256	1.06	
	10/30/2017	2.60	295	116	0.200	833	1570	7.21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	4.18	306	118	0.210	866	1660	7.87	0.15	0.59	30.3	0.008 U	0.17	0.798	1.95	0.584	64.0	0.036	20.8	1.00	0.336	3.49	
Min	2.60	260	109	0.170	797	1570	7.16	0.11	0.41	26.2	0.004 U	0.09	0.079	1.60	0.020 J	45.0	0.002 U	17.4	0.50	0.217	0.81		
Average	3.14	286	114	0.189	838	1614	7.35	0.13	0.50	28.3	0.005	0.14	0.374	1.78	0.106	54.5	0.006	18.8	0.79	0.260	1.45		
MW-1605D	9/27/2016	12.2	462	195	0.180	1480	2650	7.60	0.03 J	2.29	31.5	0.010 U	0.04	0.100	1.91	0.080	85.0	0.002 U	54.6	0.20	0.06 J	1.06	
	11/2/2016	9.96	381	195	0.190	1500	2510	7.37	0.03 J	2.48	30.6	0.010 U	0.04	0.200	1.79	0.044	78.0	0.002 U	52.4	0.20	0.05 J	1.93	
	12/20/2016	9.35	341	168	0.180	1290	2300	7.37	0.03 J	2.26	28.2	0.010 U	0.04 J	2.290	1.75	0.030 J	63.0	0.002 U	54.7	0.30	0.05 J	2.66	
	2/21/2017	9.16	318	163	0.200	1190	2290	7.31	0.04 J	2.23	25.9	0.005 U	0.03	0.282	1.84	0.021	71.0	0.002 U	46.8	0.20	0.138	1.03	
	3/28/2017	11.6	344	169	0.200	1200	2350	7.16	0.04 J	2.01	27.9	0.005 U	0.03	0.556	1.69	0.020 J	86.0	0.002 U	44.6	0.20	0.090	0.58	
	4/18/2017	9.06	360	172	0.200	1180	2280	7.48	0.03 J	2.25	25.8	0.008 U	0.02 J	0.127	1.69	0.020 J	77.0	0.002 J	43.2	0.20 J	0.04 J	0.82	
	5/16/2017	8.77	374	187	0.200	1130	2240	7.90	0.03 J	2.45	26.3	0.004 U	0.02 J	0.099	1.63	0.010 J	75.0	0.002 U	48.1	0.20	0.04 J	3.43	
	6/13/2017	9.09	351	196	0.170	1190	2260	-	0.04 J	1.99	27.2	0.008 U	0.04	0.120	1.86	0.020 J	81.0	0.002 U	45.5	0.40	0.05 J	0.67	
	10/31/2017	7.83	324	198	0.210	1170	2170	7.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	12.2	462	198	0.210	1500	2650	7.90	0.04 J	2.48	31.5	0.010 U	0.04	2.290	1.91	0.080	86.0	0.002 J	54.7	0.40	0.138	3.43	
Min	7.83	318	163	0.170	1130	2170	7.16	0.03 J	1.99	25.8	0.004 U	0.02 J	0.099	1.63	0.010 J	63.0	0.002 U	43.2	0.20	0.040 J	0.58		
Average	9.67	362	183	0.192	1259	2339	7.44	0.03	2.25	27.9	0.008 U	0.03	0.472	1.77	0.031	77.0	0.002	48.7	0.24	0.065	1.52		
MW-1606D	9/27/2016	4.29	278	190	0.250	813	1710	7.16	0.19	0.71	64.0	0.005 J	0.07	0.300	2.20	0.522	129	0.002 U	81.4	1.80	0.123	8.46	
	11/2/2016	3.97	252	201	0.280	796	1720	7.43	0.19	0.84	62.6	0.005 U	0.07	0.900	1.92	0.491	120	0.002 U	81.2	4.70	0.092	3.66	
	12/20/2016	4.96	260	206	0.240	796	1690	7.54	0.16	0.63	58.4	0.005 U	0.06	0.736	1.52	0.164	110	0.002 U	83.2	3.60	0.094	1.18	
	2/21/2017	5.48	242	190	0.260	759	1670	7.33	0.16	0.51	52.6	0.005 U	0.07	0.300	1.33	0.0820	109	0.002 U	76.6	4.10	0.119	1.71	
	3/28/2017	6.90	247	187	0.260	739	1700	7.22	0.15	0.44	53.6	0.005 U	0.05	0.541	1.17	0.0870	130	0.002 U	73.3	3.60	0.113	1.46	
	4/18/2017	5.46	274	104	0.260	385	1690	7.42	0.25	1.38	64.2	0.010 J	0.08	0.853	4.26	2.04	119	0.004 J	71.5	4.10	0.097	1.21	
	5/16/2017	5.26	278	218	0.260	764	1730	8.00	0.19	0.63	56.7	0.031	0.07	0.163	1.39	0.162	124	0.002 U	79.1	5.90	0.095	3.18	
	6/13/2017	5.90	262	219	0.240	752	1680	7.47	0.16	0.52	52.0	0.008 U	0.08	0.153	1.46	0.0840	132	0.002 U	77.8	8.10	0.090 J	1.03	
	10/31/2017	7.03	287	213	0.240	770	1590	7.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	7.03	287	219	0.280	813	1730	8.00	0.25	1.38	64.2	0.031	0.08	0.900	4.26	2.040	132	0.004 J	83.2	8.10	0.123	8.46	
Min	3.97	242	104	0.240	385	1590	7.16	0.15	0.44	52.0	0.005 U	0.05	0.153	1.17	0.082	109	0.002 U	71.5	1.80	0.090 J	1.03		
Average	5.47	264	192	0.254	730	1687	7.43	0.18	0.71	58.0	0.009	0.07	0.493	1.91	0.454	122	0.002	78.0	4.49	0.103	2.74		
MW-1607D	9/27/2016	1.64	141	88.3	0.540	285	744	6.90	0.04 J	0.91	117	0.005 U	0.02 J	0.300	0.439	0.179	68.0	0.002 U	96.2	0.10	0.05 J	0.86	
	11/2/2016	1.42	155	103	0.610	376	856	7.77	0.03 J	1.02	155	0.005 U	0.02 J	0.700	0.396	0.0580	69.0	0.002 U	91.1	0.07 J	0.04 J	4.00	
	12/20/2016	1.46	187	118	0.500	474	1050	7.72	0.03 J	1.02	168	0.005 U	0.01 J	2.070	0.526	0.0380	75.0	0.002 U	89.6	0.03 J	0.04 J	1.69	
	2/21/2017	1.54	165	107	0.510	415	1010	7.62	0.03 J	1.14	133	0.005 U	0.00 U	0.090	0.481	0.0410	72.0	0.002 U	87.7	0.03 J	0.04 J	0.88	
	3/29/2017	1.89	162	106	0.520	393	938	7.64	0.05	1.24	140	0.008 J	0.03	0.602	0.805	0.628	87.0	0.002 J	85.9	0.50	0.062	1.87	
	4/18/2017	1.58	168	104	0.520	383	904	7.62	0.03 J	1.00	126	0.004 U	0.01 U	0.133	0.414	0.0700	79.0	0.002 J	81.8	0.05 J	0.02 J	1.54	
	5/16/2017	1.54	156	102	0.520	347	876	8.41	0.03 J	1.11	129	0.004 U	0.01 U	0.078	0.399	0.0410	87.0	0.002 U	91.2	0.04 J	0.02 J	1.27	
	6/14/2017	1.50	159	104	0.490	365	872	7.57	0.03 J	0.98	131	0.004 U	0.01 U	0.141	0.439	0.1240	88.0	0.002 U	90.8	0.03 J	0.04 J	1.76	
	10/31/2017	1.76	214	138	0.470	626	1290	7.58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Max	1.89	214	138	0.610	626	1290	8.41	0.05	1.24	168	0.008 J	0.03	2.070	0.805	0.628	88.0	0.002 J	96.2	0.50	0.062	4.00	
Min	1.42	141	88.3	0.470	285	744	6.90	0.03 J	0.91	117	0.004 U	0.00 U	0.078	0.396	0.038	68.0	0.002 U	81.8	0.03	0.020 J	0.86		
Average	1.59	167	108	0.520	407	949	7.65	0.03	1.05	137	0.005	0.01	0.514	0.487	0.147	78.1	0.002	89.3	0.11	0.039	1.73		



**TABLE 1**  
**Summary of Analytical Results - Groundwater**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Notes:

1. Analytical results are compiled from Appendix I of the Annual Groundwater Monitoring Report, prepared by American Electric Power Service Corporation on behalf of Appalachian Power Company, dated January 2018. Averages were calculated to include reporting limits and estimated (J-flag) concentrations, so averages may be biased high.

2. UPLs and LPLs refer to Upper Prediction Limits and Lower Prediction Limits referenced from the Statistical Analysis Summary Bottom Ash Pond Report, prepared by Geosyntec Consultants on behalf of American Electric Power, dated January 15, 2018.

USEPA MCLs refer to Maximum Contaminant Levels (MCLs), accessed via <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>.

USEPA GWPS refer to Groundwater Protection Standards as defined in 40 CFR 257 Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Amendments to the National Minimum Criteria (Phase One, Part One), effective August 29, 2018.

2. Concentrations are presented in micrograms per liter ( $\mu\text{g/L}$ ), which are equivalent to parts per billion (ppb); milligrams per liter (mg/L), which are equivalent to parts per million (ppm); or standard units (SU).

3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.

"J" indicates the result is an estimated value which is less than the laboratory's sample-specific reporting limit but greater than or equal to the method detection limit.

**Bold** indicates an exceedance of an USEPA MCL or GWPS.

**TABLE 2**  
**Summary of Analytical Results - Soil**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Analyte	Units	SB-1802			SB-1805				SB-1806			SB-1808
		10-12'	60-66'	66-72'	9-11'	50-60'	60-66'	66-78'	46-60'	64-70'	70-76'	45-57'
		06/26/2018	06/26/2018	06/26/2018	06/18/2018	06/19/2018	06/19/2018	06/19/2018	06/25/2018	06/25/2018	06/25/2018	06/27/2018
<b>General Chemistry Parameters</b>												
Percent Moisture	%	21.9	9.1	15	19.3	15.8	14.9	14.3	12.8	13	12	11.9
pH	SU	5.2 HF	7 HF	7.2 HF	7 HF	8.2 HF	8.3 HF	8.8 HF	8.5 HF	8.6 HF	8.6 HF	8.4 HF
<b>Metals</b>												
Antimony	mg/kg	0.21 J	0.23	0.11 J	0.23 J	0.19 J	0.21 J	0.16 J	0.22 J	0.14 J	0.13 J	0.17 J
Arsenic	mg/kg	15 F1	3.1	3.4	12	5.4	4.6	6.1	7.9	4.6	4.6	5.6
Barium	mg/kg	41	23	9.9	52	15	13	11	15	6.5	6.9	29
Beryllium	mg/kg	0.42	0.26	0.12	0.60	0.21	0.25	0.26	0.16	0.17	0.16	0.19
Boron	mg/kg	2.4 J	1.6 J	0.95 J	2.3 J	2.2 J	3.1 J	2.5 J	2.3 J	2.4 J	2.2 J	1.1 J
Cadmium	mg/kg	0.17	0.12	0.035 J	0.089 J	0.046 J	0.10 J	0.086 J	0.10 J	0.042 J	0.043 J	0.072 J
Calcium	mg/kg	380	570	390	1,100	5,500	11,000	23,000	11,000	24,000	19,000	1,900
Chromium	mg/kg	12	3.7	2.8	15	5.6	4.8	6.1	5.9	4.9	5.1	4.8
Cobalt	mg/kg	8.4	12	5.0	9.3	6.2	6.0	8.3	7.6	8.2	7.9	6.5
Lead	mg/kg	12 B	3.7 B	3.4 B	12 B	5.6 B	6.7 B	7.2 B	6.1 B	5.1 B	5.1 B	5.3 B
Lithium	mg/kg	12 B	4.9 B	3.6 B	14 B	4.7 B	4.1 B	6.1 B	5.7 B	5.6 B	6.3 B	4.0 B
Mercury	mg/kg	0.012 J	<0.032	<0.038	0.02 J	0.01 J	0.011 J	<0.033	<0.038	<0.037	<0.037	<0.039
Molybdenum	mg/kg	1.7	0.62	0.45 J	1.0	0.93	0.81	0.89	2.1	1.0	0.93	0.89
Selenium	mg/kg	0.63 J	0.2 J	0.15 J	0.79	0.3 J	1.6	0.3 J	0.41 J	0.32 J	0.53 J	0.22 J
Thallium	mg/kg	0.16	0.09 J	0.049 J	0.17	0.071 J	0.067 J	0.053 J	0.078 J	0.047 J	0.042 J	0.055 J
<b>Anions</b>												
Chloride	mg/kg	<12	<11	<12	<12	6.9 J	11 J	13	11	15	16	<11
Fluoride	mg/kg	<1.2	<1.1	<1.2	0.73 J	0.63 J	0.76 J	<1.1	0.65 J	<1.1	<1.1	0.58 J
Sulfate	mg/kg	230	20	38	140	56	89	130	56	64	76	34
<b>Radium</b>												
Radium 226	pCi/L	0.856 ± 0.177	0.461 ± 0.134	0.412 ± 0.132	0.901 ± 0.186	0.544 ± 0.149	0.397 ± 0.124	0.467 ± 0.131	0.478 ± 0.138	0.499 ± 0.137	0.315 ± 0.11	0.485 ± 0.136
Radium 228	pCi/L	0.513 ± 0.262	<0.181 ± 0.286	0.532 ± 0.307	0.493 ± 0.251	<0.138 ± 0.253	<0.491 ± 0.325	<0.337 ± 0.241	<0.293 ± 0.268	<-0.0355 ± 0.23	0.426 ± 0.264	0.360 ± 0.233

Notes:

1. Samples were collected by Sanborn Head on the dates indicated and submitted to TestAmerica Laboratories, Inc. (TestAmerica) of Pittsburgh, Pennsylvania for analysis of metals by USEPA Methods 6020A/7471B, pH by USEPA Method 9045D, and percent moisture by Standard Method 2540G.
2. Concentrations are presented in milligrams per kilogram (mg/kg), which are equivalent to parts per million (ppm); percent (%); standard units (SU); or picocuries per gram (pCi/g).
3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.  
"J" indicates the result is an estimated value which is less than the laboratory's sample-specific reporting limit but greater than or equal to the method detection limit.  
"HF" indicates the analyte is a field parameter with a holding time of 15 minutes, and the test was performed by the laboratory at the request of Sanborn Head.  
"F1" indicates the MS and/or MSD recovery was outside acceptance limits.  
"B" indicates the analyte was detected in both the field sample and the associated laboratory blank sample.

**TABLE 3**  
**Summary of Analytical Results - Sequential Extraction Procedure**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Location	Depth	Date	Analysis Step	Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Li	Mn	Hg	Mo	Ni	P	K	Se	Ag	Tl	V	Zn
SB-1805	50-60'	6/19/2018	SEP Step 1	<48 U	<14 U	<2.4 U	1.1 J	<1.2 U	<1.2 U	360 J	<2.4 U	<12 U	<6.0 U	<24 U	<2.4 U	<12 U	<3.6 U		<9.6 U	<9.6 U	<72 U	<1,200 U	<2.4 U	<4.8 U	<8.4 U	<12 U	<4.8 U
		6/19/2018	SEP Step 2	16 J*	<11 U	<1.8 *U	1.3 J*	<0.90 *U	<0.90 U	1,500 *	<1.8 U	<9.0 U	<4.5 U	15 J*	<1.8 U	<9.0 U	13		<7.2 U	0.25 J	<54 *U	<900 U	0.66 JB	<3.6 U	<6.3 U	<9.0 U	2.4 J
		6/19/2018	SEP Step 3	70	<3.6 U	0.50 J	2.7 JB	0.024 J	0.045 JB*	6.5 JB*	0.51 J	2.4 J	1.5	390	0.93 *	<3.0 U	110 B		0.11 J	1.8 J	32	66 JB	<0.60 U	<1.2 *U	<2.1 U	0.46 J	2.0 B
		6/19/2018	SEP Step 4	900	<3.6 U	2.8 B	5.3	0.085 J	0.13 J	520 B	2.4	2.3 J	4.7	4,700	3.2	2.0 J	41		0.39 J	6.0	74	<300 U	0.96 *B	<1.2 U	<2.1 U	3.0	15 B
		6/19/2018	SEP Step 5	41 J*	<54 U	<9.0 U	<45 *U	<4.5 *U	<4.5 U	95 J*	<9.0 U	<45 *U	<22 U	<90 *U	<9.0 *U	8.8 JB*	<13 *U		<36 U	<36 U	39 J*	680 JB	<9.0 U	<18 U	<31 *U	<45 U	2.4 J
		6/19/2018	SEP Step 6	990	<3.6 U	3.0	2.5 J	0.07 J	0.064 J	58 J	1.9	1.2 J	1.7	5,500	1.3	1.7 J	34		0.26 J	3.0	38	170 J	<0.60 U	<1.2 U	<2.1 U	3.4	9.3
		6/19/2018	SEP Step 7	19,000	0.23 J	<0.60 U	190	0.36	<0.30 U	2,600 J	7.3	0.36 J	0.84 J	2,500	2.6	6.3	35		<2.4 U	1.3 J	23 B	7,100	0.51 J	0.13 J	0.53 J	13	4.6 J
		6/19/2018	SEP Sum of Steps 1-7	21,000	0.23 J	6.3	210	0.54	0.23 J	5,200	12	6.2	8.8	13,000	8.0	19	230		0.75 J	12	210	8,000	2.1	0.13 J	0.53 J	20	36
	6/19/2018	Total (ICP)	26,000	<3.6 U	6.8	260	0.54	0.11 J	5,700	12	5.9	9.0	13,000	8.0	9.7	210 B	<0.12 U	0.92 J	12 B	190 B	8,200	<0.60 U	0.15 J*	0.89 J	20	35	
	6/19/2018	Total (ICP/MS)		0.19 J	5.4	15	0.21	0.046 J	5,500	5.6	6.2			5.6 B	4.7 B			0.010 J	0.93			0.30 J		0.071 J			
	66-78'	6/19/2018	SEP Step 1	<46 U	<14 U	<2.3 U	<11 U	<1.1 U	<1.1 U	360 J	<2.3 U	<11 U	<5.7 U	<23 U	<2.3 U	<11 U	5.0		<9.1 U	<9.1 U	<68 U	<1,100 U	<2.3 U	<4.6 U	<8.0 U	<11 U	<4.6 U
		6/19/2018	SEP Step 2	14 J*	<10 U	<1.7 *U	0.53 J*	<0.86 *U	<0.86 U	9,100 *	<1.7 U	<8.6 U	1.7 J	58 *	0.54 J	<8.6 U	140		<6.8 U	<6.8 U	<51 *U	<860 U	<1.7 U	<3.4 U	<6.0 U	<8.6 U	<3.4 U
		6/19/2018	SEP Step 3	28	<3.4 U	<0.57 U	0.85 JB	<0.29 U	<0.29 *U	6.7 JB*	0.58	0.23 J	1.3 J	170	<0.57 *U	<2.9 U	32 B		0.099 J	0.36 J	24	64 JB	0.20 J	<1.1 *U	<2.0 U	0.22 J	0.51 JB
		6/19/2018	SEP Step 4	790	<3.4 U	1.7 B	3.4	0.074 J	0.11 J	3,300 B	2.0	4.7	2.5	3,500	2.4	2.1 J	100		0.17 J	7.1	56	<290 U	1.3 *B	<1.1 U	<2.0 U	2.1 J	9.1 B
6/19/2018		SEP Step 5	<170 *U	<51 U	<8.6 U	<43 *U	<4.3 *U	<4.3 U	3,100 J*	<8.6 U	<43 *U	1.4 J	<86 *U	<8.6 *U	8.7 JB*	7.4 J*		<34 U	1.4 J	<260 *U	650 JB	<8.6 U	<1.7 U	<30 *U	<43 U	2.2 J	
6/19/2018		SEP Step 6	1,400	<3.4 U	3.7	2.6 J	0.12 J	0.11 J	960	2.8	2.6 J	3.4	8,400	2.4	3.0	62		0.19 J	4.8	130	150 J	<0.57 U	<1.1 U	<2.0 U	3.8	12	
6/19/2018		SEP Step 7	17,000	<3.4 U	0.65 B	170	0.27 J	<0.29 U	1,800 J	7.5	0.41 J	1.1 J	2,800	2.6	6.8	33		<2.3 U	1.3 J	30 B	6,800	<0.57 U	0.12 J	0.48 J	11	4.0 J	
6/19/2018		SEP Sum of Steps 1-7	20,000	<3.0 U	6.1	180	0.47	0.22 J	19,000	13	7.9	11	15,000	7.9	21	380		0.46 J	15	240	7,700	1.5	0.12 J	0.48 J	18	27	
6/19/2018	Total (ICP)	30,000	<3.4 U	15	230	0.46	0.20 J	26,000	13	8.5	12	14,000	9.6	12	330 B	<0.11 U	1.0 J	14 B	280 B	9,100	0.23 J	0.18 J*	0.84 J	18	30		
6/19/2018	Total (ICP/MS)		0.16 J	6.1	11	0.26	0.086 J	23,000	6.1	8.3			7.2 B	6.1 B			<0.033 U	0.89			0.30 J		0.053 J				
SB-1806	46-60'	6/25/2018	SEP Step 1	<45 U	<14 U	<2.3 U	1.0 J	<1.1 U	<1.1 U	430 J	<2.3 U	<11 U	<5.6 U	<23 U	<2.3 U	<11 U	0.16 J		<9.0 U	<9.0 U	<68 U	<1,100 U	<2.3 U	<4.5 U	<7.9 U	<11 U	<4.5 U
		6/25/2018	SEP Step 2	10 J*	<10 U	<1.7 *U	2.3 J*	<0.85 *U	<0.85 U	7,000 *	<1.7 U	0.21 J	<4.2 U	31 *	<1.7 U	<8.5 U	55		<6.8 U	0.35 J	<51 *U	<850 U	1.3 JB	<3.4 U	<5.9 U	<8.5 U	0.80 J
		6/25/2018	SEP Step 3	46	<3.4 U	0.42 J	1.8 JB	<0.28 U	0.019 JB*	6.6 JB*	0.46 J	2.0 J	1.2 J	250	0.27 J*	<2.8 U	170 B		0.33 J	2.5	27	62 JB	<0.56 U	<1.1 *U	<2.0 U	0.32 J	0.81 JB
		6/25/2018	SEP Step 4	870	<3.4 U	2.9 B	5.8	0.077 J	0.13 J	1,900 B	2.1	3.2	5.0	4,200	2.8	2.3 J	73		0.48 J	6.8	85	<280 U	1.5 *B	<1.1 U	<2.0 U	2.6 J	12 B
		6/25/2018	SEP Step 5	38 J*	<51 U	<8.5 U	<42 *U	<4.2 *U	<4.2 U	1,100 J*	<8.5 U	<42 *U	<21 U	<85 *U	<8.5 *U	7.5 JB*	3.9 J*		<34 U	<34 U	<250 *U	630 JB	<8.5 U	<1.7 U	<30 *U	<42 U	2.1 J
		6/25/2018	SEP Step 6	1,300	<3.4 U	5.5	2.4 J	0.097 J	0.10 J	320	2.4	2.0 J	2.5	7,700	1.9	2.5 J	51		0.33 J	4.4	120	150 J	<0.56 U	<1.1 U	<2.0 U	4.3	13
		6/25/2018	SEP Step 7	27,000	0.2 J	0.61 B	290	0.49	<0.28 U	3,000	9.4	0.67 J	1.1 J	3,300	3.6	6.9	45		<2.3 U	2.4	41 B	10,000	<0.56 U	0.17 J	0.79 J	15	5.6 J
		6/25/2018	SEP Sum of Steps 1-7	29,000	0.2 J	9.5	300	0.66	0.25	14,000	14	8.1	9.7	16,000	8.6	19	390		1.1 J	16	270	11,000	2.8	0.17 J	0.79 J	23	34
	6/25/2018	Total (ICP)	22,000	0.52 J	25	250	0.58	1.0	15,000	11	16	12	34,000	9.1	10	760 B	<0.11 U	7.0	27 B	430 B	7,600	<0.56 U	0.18 J*	0.86 J	24	64	
	6/25/2018	Total (ICP/MS)		0.22 J	7.9	15	0.16	0.10 J	11,000	5.9	7.6			6.1 B	5.7 B			<0.038 U	2.1			0.41 J		0.078 J			
	70-76'	6/25/2018	SEP Step 1	<45 U	<14 U	<2.3 U	<11 U	<1.1 U	<1.1 U	360 J	<2.3 U	<11 U	<5.7 U	<23 U	<2.3 U	<11 U	4.7		<9.1 U	<9.1 U	<68 U	<1,100 U	<2.3 U	<4.5 U	<7.9 U	<11 U	<4.5 U
		6/25/2018	SEP Step 2	11 J*	<10 U	<1.7 *U	0.63 J*	<0.85 *U	<0.85 U	10,000 *	<1.7 U	0.83 J	0.83 J	63 *	0.46 J	<8.5 U	80		<6.8 U	<6.8 U	<51 *U	<850 U	0.65 JB	<3.4 U	<6.0 U	<8.5 U	<3.4 U
		6/25/2018	SEP Step 3	26	<3.4 U	0.18 J	0.34 JB	<0.28 U	<0.28 *U	6.6 JB*	0.62	0.28 J	1.2 J	220	<0.57 *U	<2.8 U	20 B		0.14 J	0.35 J	23	62 JB	<0.57 U	<1.1 *U	<2.0 U	0.18 J	0.49 JB
		6/25/2018	SEP Step 4	750	<3.4 U	1.6 B	2.7 J	0.061 J	0.11 J	3,400 B	1.6	4.9	4.0	3,400	2.5	2.2 J	65		0.17 J	6.8	86	<280 U	0.83 *B	<1.1 U	<2.0 U	2.0 J	9.0 B
6/25/2018		SEP Step 5	39 J*	<51 U	<8.5 U	<43 *U	<4.3 *U	<4.3 U	2,900 J*	<8.5 U	<43 *U	<21 U	<85 *U	<8.5 *U	7.0 JB*	3.1 J*		<34 U	<34 U	<260 *U	620 JB	<8.5 U	<1.7 U	<30 *U	<43 U	1.9 J	
6/25/2018		SEP Step 6	1,300	<3.4 U	4.7	2.7 J	0.10 J	0.10 J	960	2.5	2.5 J	3.2	7,400	2.5	2.9	59		0.34 J	4.6	190	140 J	<0.57 U	<1.1 U	<2.0 U	3.9	11	
6/25/2018		SEP Step 7	17,000	<3.4 U	0.22 JB	200	0.25 J	<0.28 U	3,100	6.2	0.33 J	0.87 J	1,700	2.0	6.7	39		<2.3 U	1.2 J	25 B	7,300	0.35 J	0.11 J	0.63 J	9.0	3.5 J	
6/25/2018		SEP Sum of Steps 1-7	19,000	<3.0 U	6.7	210	0.41	0.22 J	21,000	11	7.9	10	13,000	7.5	19	270		0.65 J	13	330	8,100	1.8	0.11 J	0.63 J	15	26	
6/25/2018	Total (ICP)	29,000	<3.4 U	4.4	170	0.38	0.16 J	46,000	14	8.4	10	13,000	6.0	12	670 B	<0.11 U	0.69 J	14 B	240 B	6,500	0.83	0.21 J*	0.45 J	17	36		
6/25/2018	Total (ICP/MS)		0.13 J	4.6	6.9	0.16	0.043 J	19,000	5.1	7.9			5.1 B	6.3 B			<0.037 U	0.93			0.53 J		0.042 J				
SB-1808	45-57'	6/25/2018	SEP Step 1	<50 U	<15 U	<2.5 U	1.7 J	<1.2 U	<1.2 U	540 J	<2.5 U	<12 U	<6.2 U	<25 U	<2.5 U	<12 U	<3.7 U		<9.9 U	<9.9 U	<75 U	<1,200 U	<2.5 U	<5.0 U	<8.7 U	<12 U	<5.0 U
		6/25/2018	SEP Step 2	13 J*	<11 U	<1.9 *U	2.5 J*	<0.93 *U	<0.93 U	2,400 *	<1.9 U	<9.3 U	<4.7 U	14 J*	<1.9 U	<9.3 U	20		<7.5 U	<7.5 U	<56 *U	<930 U	<1.9 U	<3.7 U	<6.5 U	<9.3 U	<3.7 U
		6/25/2018	SEP Step 3	63	<3.7 U	0.55 J	14 B	0.024 J	0.05 JB*	7.4 JB*	0.39 J	3.2	1.4 J	300	0.6 J*	<3.1 U	310 B		0.18 J	2.9	32	66 JB	<0.62 U	<1.2 *U	<2.2 U		

**TABLE 4**  
**D4646 LEAF Metals Results and Partition Coefficient Calculations**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Soil Sample ID	Bulk Soil Concentration			Solution pH	Mass Solid	Volume Liquid	Liquid/Solid Ratio	Initial Solution Concentration			Leach Time	Solution Leach Results				Change in Soil Concentration			K <sub>d</sub> (Adsorbed/Remaining)		
	mg/kg							s.u.	g	mL		mL:g	µg/L			µg/L			s.u.	µg/g (or mg/kg)	
	Co	Mo	Li	Co	Mo	Li	Co				Mo		Li	pH	Co	Mo	Li	Co		Mo	Li
SB-1806 (46-60')	7.6	6.5	7.9	6	20	398.4	20:1	18	110	120	12 Hour	0.36	130	120	NA	0.4	0	0.0	976	-3	0
					20	398.4	20:1	18	110	120	18 Hour	0.18	130	110	NA	0.4	0	0.2	1972	-3	2
					20	398.4	20:1	18	110	120	22 Hour	0.28	130	110	NA	0.4	0	0.2	1261	-3	2
					20	398.4	20:1	18	110	120	Rep 1	0.22	130	100	NA	0.4	0	0.4	1610	-3	4
					20	398.4	20:1	18	110	120	Rep 2	0.22	130	110	NA	0.4	0	0.2	1610	-3	2
					20	398.4	20:1	18	110	120	Rep 3	0.22	130	110	NA	0.4	0	0.2	1610	-3	2
					20	398.4	20:1	36	210	240	12 Hour	0.38	250	250	NA	0.7	-1	0	1867	-3	-1
					20	398.4	20:1	36	210	240	18 Hour	0.22	230	220	NA	0.7	0	0.4	3240	-2	2
					20	398.4	20:1	36	210	240	22 Hour	0.21	240	220	NA	0.7	-1	0.4	3395	-2	2
					20	398.4	20:1	36	210	240	Rep 1	0.36	240	220	NA	0.7	-1	0.4	1972	-2	2
				20	398.4	20:1	36	210	240	Rep 2	0.25	230	210	NA	0.7	0	0.6	2849	-2	3	
				20	398.4	20:1	36	210	240	Rep 3	0.28	240	220	NA	0.7	-1	0.4	2541	-2	2	
				20	398.4	20:1	17	110	130	12 Hour	0.35	130	130	NA	0.3	0	0.0	948	-3	0	
				20	398.4	20:1	17	110	130	18 Hour	0.20	130	110	NA	0.3	0	0.4	1673	-3	4	
				20	398.4	20:1	17	110	130	22 Hour	0.17	130	110	NA	0.3	0	0.4	1972	-3	4	
				20	398.4	20:1	17	110	130	Rep 1	0.22	130	110	NA	0.3	0	0.4	1519	-3	4	
				20	398.4	20:1	17	110	130	Rep 2	0.30	130	110	NA	0.3	0	0.4	1109	-3	4	
				20	398.4	20:1	17	110	130	Rep 3	0.25	130	110	NA	0.3	0	0.4	1335	-3	4	
				20	398.4	20:1	36	220	250	12 Hour	0.39	240	240	NA	0.7	0	0.2	1819	-2	1	
				20	398.4	20:1	36	220	250	18 Hour	0.25	240	240	NA	0.7	0	0.2	2849	-2	1	
				20	398.4	20:1	36	220	250	22 Hour	0.21	240	230	NA	0.7	0	0.4	3395	-2	2	
				20	398.4	20:1	36	220	250	Rep 1	0.32	240	230	NA	0.7	0	0.4	2221	-2	2	
				20	398.4	20:1	36	220	250	Rep 2	0.31	230	220	NA	0.7	0	0.6	2293	-1	3	
				20	398.4	20:1	36	220	250	Rep 3	0.25	240	230	NA	0.7	0	0.4	2849	-2	2	
				5	499	100:1	9.2	9.4	8.6	Rep 1	0.44	15	8.2	9.7	0.9	-1	0.0	1987	-37	5	
				5	499	100:1	9.2	9.4	8.6	Rep 2	0.44	14	8.1	9.7	0.9	0	0.0	1987	-33	6	
				5	499	100:1	9.2	9.4	8.6	Rep 3	0.43	14	8.3	9.7	0.9	0	0.0	2035	-33	4	
				20	398.3	20:1	9.2	9.4	8.6	Rep 1	0.26	31	7.6	9.5	0.2	0	0.0	685	-14	3	
20	398.3	20:1	9.2	9.4	8.6	Rep 2	0.27	32	7.6	9.5	0.2	0	0.0	659	-14	3					
20	398.3	20:1	9.2	9.4	8.6	Rep 3	0.28	31	7.5	9.5	0.2	0	0.0	634	-14	3					
40	159.6	4:1	9.2	9.4	8.6	Rep 1	0.30	120	10	9.0	0.0	0	0	118	-4	-1					
40	159.6	4:1	9.2	9.4	8.6	Rep 2	0.22	110	9.8	9.0	0.0	0	0	163	-4	0					
40	159.6	4:1	9.2	9.4	8.6	Rep 3	0.24	110	11	9.0	0.0	0	0	149	-4	-1					

**TABLE 4**  
**D4646 LEAF Metals Results and Partition Coefficient Calculations**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Soil Sample ID	Bulk Soil Concentration			Solution pH	Mass Solid	Volume Liquid	Liquid/Solid Ratio	Initial Solution Concentration			Leach Time	Solution Leach Results				Change in Soil Concentration			K <sub>d</sub> (Adsorbed/Remaining)		
	mg/kg							s.u.	g	mL		mL:g	µg/L			µg/L			s.u.	µg/g (or mg/kg)	
	Co	Mo	Li	Co	Mo	Li	Co				Mo		Li	pH	Co	Mo	Li	Co		Mo	Li
SB-1806 (70-76')	7.9	0.93	6.3	6	20	399.2	20:1	18	110	120	12 Hour	0.30	110	120	NA	0.4	0	0	1178	0	0
					20	399.2	20:1	18	110	120	18 Hour	0.15	110	120	NA	0.4	0	0	2375	0	0
					20	399.2	20:1	18	110	120	22 Hour	0.16	120	120	NA	0.4	0	0	2226	-2	0
					20	399.2	20:1	18	110	120	Rep 1	0.28	120	120	NA	0.4	0	0	1263	-2	0
					20	399.2	20:1	18	110	120	Rep 2	0.22	120	120	NA	0.4	0	0	1613	-2	0
					20	399.2	20:1	18	110	120	Rep 3	0.23	120	120	NA	0.4	0	0	1542	-2	0
					20	399.2	20:1	36	210	240	12 Hour	0.42	220	260	NA	0.7	0	0	1691	-1	-2
					20	399.2	20:1	36	210	240	18 Hour	0.22	220	230	NA	0.7	0	0.2	3246	-1	1
					20	399.2	20:1	36	210	240	22 Hour	0.27	230	240	NA	0.7	0	0	2641	-2	0
					20	399.2	20:1	36	210	240	Rep 1	0.39	220	230	NA	0.7	0	0.2	1823	-1	1
					20	399.2	20:1	36	210	240	Rep 2	0.34	220	230	NA	0.7	0	0.2	2093	-1	1
					20	399.2	20:1	36	210	240	Rep 3	0.22	220	240	NA	0.7	0	0	3246	-1	0
				20	399.2	20:1	17	110	130	12 Hour	0.28	110	120	NA	0.3	0	0.2	1192	0	2	
				20	399.2	20:1	17	110	130	18 Hour	0.18	110	120	NA	0.3	0	0.2	1865	0	2	
				20	399.2	20:1	17	110	130	22 Hour	0.17	120	120	NA	0.3	0	0.2	1976	-2	2	
				20	399.2	20:1	17	110	130	Rep 1	0.33	110	110	NA	0.3	0	0.4	1008	0	4	
				20	399.2	20:1	17	110	130	Rep 2	0.21	120	120	NA	0.3	0	0.2	1596	-2	2	
				20	399.2	20:1	17	110	130	Rep 3	0.28	120	110	NA	0.3	0	0.4	1192	-2	4	
				20	399.2	20:1	36	220	250	12 Hour	0.37	220	250	NA	0.7	0	0	1922	0	0	
				20	399.2	20:1	36	220	250	18 Hour	0.36	230	250	NA	0.7	0	0	1976	-1	0	
				20	399.2	20:1	36	220	250	22 Hour	0.28	230	240	NA	0.7	0	0.2	2546	-1	1	
				20	399.2	20:1	36	220	250	Rep 1	0.35	230	230	NA	0.7	0	0.4	2033	-1	2	
				20	399.2	20:1	36	220	250	Rep 2	0.42	220	230	NA	0.7	0	0.4	1691	0	2	
				20	399.2	20:1	36	220	250	Rep 3	0.31	230	240	NA	0.7	0	0.2	2298	-1	1	
				5	499	100:1	8	10	9.7	Rep 1	0.44	12	9.2	9.7	0.8	0	0.0	1715	-17	5	
				5	499	100:1	8	10	9.7	Rep 2	0.37	11	9.0	9.7	0.8	0	0.1	2058	-9	8	
				5	499	100:1	8	10	9.7	Rep 3	0.30	12	9.8	9.7	0.8	0	0	2562	-17	-1	
				20	399.2	20:1	8	10	9.7	Rep 1	0.44	19	9.4	9.5	0.2	0	0.0	343	-9	1	
				20	399.2	20:1	8	10	9.7	Rep 2	0.42	18	9.3	9.6	0.2	0	0.0	360	-9	1	
				20	399.2	20:1	8	10	9.7	Rep 3	0.35	17	8.7	9.6	0.2	0	0.0	436	-8	2	
40	159.6	4:1	8	10	9.7	Rep 1	0.089	50	13	9.1	0.0	0	0	355	-3	-1					
40	159.6	4:1	8	10	9.7	Rep 2	0.17	49	12	9.1	0.0	0	0	184	-3	-1					
40	159.6	4:1	8	10	9.7	Rep 3	0.22	49	12	9.1	0.0	0	0	141	-3	-1					

**TABLE 4**  
**D4646 LEAF Metals Results and Partition Coefficient Calculations**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Soil Sample ID	Bulk Soil Concentration			Solution pH	Mass Solid	Volume Liquid	Liquid/Solid Ratio	Initial Solution Concentration			Leach Time	Solution Leach Results				Change in Soil Concentration			K <sub>d</sub> (Adsorbed/Remaining)		
	mg/kg							s.u.	g	mL		mL:g	µg/L			µg/L			s.u.	µg/g (or mg/kg)	
	Co	Mo	Li	Co	Mo	Li	Co				Mo		Li	Co	Mo	Li	Co	Mo		Li	Co
SB-1808 (45-57')	6.5	0.89	4	6	20	399.2	20:1	18	110	120	12 Hour	0.70	110	110	NA	0.3	0	0.2	493	0	2
					20	399.2	20:1	18	110	120	18 Hour	0.46	110	100	NA	0.4	0	0.4	761	0	4
					20	399.2	20:1	18	110	120	22 Hour	0.52	110	100	NA	0.3	0	0.4	671	0	4
					20	399.2	20:1	18	110	120	Rep 1	0.56	110	100	NA	0.3	0	0.4	622	0	4
					20	399.2	20:1	18	110	120	Rep 2	0.57	110	100	NA	0.3	0	0.4	610	0	4
					20	399.2	20:1	18	110	120	Rep 3	0.61	110	100	NA	0.3	0	0.4	569	0	4
					20	399.2	20:1	36	210	240	12 Hour	0.78	210	230	NA	0.7	0	0.2	901	0	1
					20	399.2	20:1	36	210	240	18 Hour	0.78	210	210	NA	0.7	0	0.6	901	0	3
					20	399.2	20:1	36	210	240	22 Hour	0.69	220	220	NA	0.7	0	0.4	1021	-1	2
					20	399.2	20:1	36	210	240	Rep 1	0.88	210	210	NA	0.7	0	0.6	797	0	3
					20	399.2	20:1	36	210	240	Rep 2	0.63	210	200	NA	0.7	0	0.8	1121	0	4
					20	399.2	20:1	36	210	240	Rep 3	0.85	220	210	NA	0.7	0	0.6	825	-1	3
				20	399.2	20:1	17	110	130	12 Hour	0.61	110	110	NA	0.3	0	0.4	536	0	4	
				20	399.2	20:1	17	110	130	18 Hour	0.57	110	100	NA	0.3	0	0.6	575	0	6	
				20	399.2	20:1	17	110	130	22 Hour	0.45	110	110	NA	0.3	0	0.4	734	0	4	
				20	399.2	20:1	17	110	130	Rep 1	0.65	120	110	NA	0.3	0	0.4	502	-2	4	
				20	399.2	20:1	17	110	130	Rep 2	0.67	110	100	NA	0.3	0	0.6	486	0	6	
				20	399.2	20:1	17	110	130	Rep 3	0.65	110	100	NA	0.3	0	0.6	502	0	6	
				20	399.2	20:1	36	220	250	12 Hour	0.72	210	230	NA	0.7	0.2	0.4	978	1	2	
				20	399.2	20:1	36	220	250	18 Hour	0.63	220	210	NA	0.7	0	0.8	1121	0	4	
				20	399.2	20:1	36	220	250	22 Hour	0.75	220	220	NA	0.7	0	0.6	938	0	3	
				20	399.2	20:1	36	220	250	Rep 1	0.67	220	220	NA	0.7	0	0.6	1053	0	3	
				20	399.2	20:1	36	220	250	Rep 2	0.68	220	210	NA	0.7	0	0.8	1037	0	4	
				20	399.2	20:1	36	220	250	Rep 3	0.56	210	210	NA	0.7	0.2	0.8	1263	1	4	
				5	499	100:1	8	10	9.7	Rep 1	1.1	11	8.0	9.5	0.7	0	0.2	626	-9	21	
				5	499	100:1	8	10	9.7	Rep 2	0.90	11	8.2	9.4	0.7	0	0.1	787	-9	18	
				5	499	100:1	8	10	9.7	Rep 3	1.0	11	7.9	9.4	0.7	0	0.2	699	-9	23	
				20	399.2	20:1	8	10	9.7	Rep 1	1.1	13	5.4	9.2	0.1	0	0.1	125	-5	16	
				20	399.2	20:1	8	10	9.7	Rep 2	1.4	12	5.3	9.3	0.1	0	0.1	94	-3	17	
				20	399.2	20:1	8	10	9.7	Rep 3	0.70	13	5.1	9.2	0.1	0	0.1	208	-5	18	
40	159.6	4:1	8	10	9.7	Rep 1	0.76	22	3.3	8.6	0.0	0	0.0	38	-2	8					
40	159.6	4:1	8	10	9.7	Rep 2	1.3	22	3.5	8.6	0.0	0	0.0	21	-2	7					
40	159.6	4:1	8	10	9.7	Rep 3	0.78	22	3.6	8.6	0.0	0	0.0	37	-2	7					

Notes:

1. Samples were collected by Sanborn Head on June 25 and 27, 2018. Samples were analyzed by modified ASTM Method D4646 by TestAmerica Laboratories, Inc. in Pittsburgh, Pennsylvania.
2. K<sub>d</sub> (partition coefficient) calculated as the change in soil concentration divided by the solution leach results.
3. "Rep 1," "Rep-2," and "Rep-3" refers to results after three repetitions of a 24-hour leaching test.
4. Soil concentrations are presented in milligrams per kilogram (mg/kg); solution concentrations are presented in micrograms per liter (µg/L); pH is presented in standard units (s.u.); liquid/solid ratio is presented in milliliters of solution to grams of solid (mL:g); K<sub>d</sub> is presented in milliliters per gram (ml/g). Soil sample ID depths refer to feet below ground surface.
5. NA = not analyzed.
5. Red shading indicates a higher resultant concentration in solution compared to initial solution concentration.

**TABLE 5**  
**Summary of Analytical Results - pH Leaching Test**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Sample	Collection Date	pH	ORP	SpCond	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Fluoride	Lead	Lithium	Mercury	Molybdenum	Selenium	Thallium
		SU	milliVolts	µmhos/cm	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
SB-1805 (66-78') PH 5.0	6/19/2018	5.5	220	9,500	<2	0.97 J	480	0.31 J	3.5	0.78 J	33	1000	0.13 J	17	<0.2	2.0 J	1.2 J	0.11 J
SB-1805 (66-78') PH 6.0	6/19/2018	6.2	210	3,500	<2	1.4	500	<1	1.6	1.3 JB	14	130 J	<1	10	<0.2	3.5 J	<5	<1
SB-1805 (66-78') PH 7.0	6/19/2018	7.0	280	1,100	<2	0.79 J	99	<1	0.24 J	<2	1.8	130	<1	8.5	<0.2	5.3	<5	<1
SB-1805 (66-78') PH 8.0	6/19/2018	7.9	260	430	<2	0.46 J	46	<1	<1	<2	<0.5	170	<1	7.5	<0.2	8.2	<5	<1
SB-1805 (66-78') PH NATURAL	6/19/2018	9.2	230	100	<2	1.3	170	<1	<1	0.87 J	0.24 J	170	0.32 J	4.7 J	<0.2	9.3	1.3 J	<1
SB-1805 (66-78') PH 10.0	6/19/2018	10.0	550	140	<2	4.0	110	<1	<1	2.7 B	0.70	75 J	0.68 J	3.1 J	<0.2	11	0.93 J	<1
SB-1806 (64-70') PH 5.0	6/25/2018	5.3	230	11,000	<2	1.3	280	0.30 J	1.6	1.2 J	49	1500	0.15 J	20	<0.2	2.2 J	1.7 J	0.072 J
SB-1806 (64-70') PH 6.0	6/25/2018	6.2	170	3,500	<2	1.1	350	<1	0.50 J	1.4 JB	17	280	<1	10	<0.2	5.4	<5	<1
SB-1806 (64-70') PH 7.0	6/25/2018	7.1	310	1,200	<2	0.74 J	34	<1	<1	<2	1.4	62 J	<1	8.0	<0.2	11	<5	0.10 J
SB-1806 (64-70') PH 8.0	6/25/2018	8.0	270	430	<2	0.76 J	12	<1	<1	<2	<0.5	160	0.12 J	7.8	<0.2	17	1.1 J	<1
SB-1806 (64-70') PH NATURAL	6/25/2018	9.3	210	77	2.4	1.7	180	<1	<1	1.0 J	0.50	160	0.43 J	3.7 J	<0.2	18	1.7 J	<1
SB-1806 (64-70') PH 10.0	6/25/2018	10.1	160	120	<2	5.5	110	<1	<1	3.6 B	1.5	60 J	1.1	3.2 J	<0.2	20	1.8 J	<1
SB-1808 (45-57') PH 5.0	6/27/2018	5.4	290	3,300	<2	0.70 J	650	<1	0.85 J	7.0 B	14	170 J	<1	9.2	<0.2	<5	<5	<1
SB-1808 (45-57') PH 6.0	6/27/2018	6.0	270	2,600	<2	0.64 J	460	<1	0.40 J	5.1 B	6.7	91 J	<1	7.4	<0.2	1.4 J	<5	<1
SB-1808 (45-57') PH 7.0	6/27/2018	7.3	270	650	<2	0.34 J	23	<1	<1	2.4	0.18 J	97 J	<1	4.5 J	<0.2	6.0	<5	<1
SB-1808 (45-57') PH 8.0	6/27/2018	8.2	250	220	<2	0.74 J	6.1 J	<1	<1	2.2	<0.5	110	<1	<5	<0.2	11	<5	<1
SB-1808 (45-57') PH NATURAL	6/27/2018	9.0	210	61	<2	2.8	130	<1	<1	2.3	0.85	210	0.50 J	<5	<0.2	11	<5	<1
SB-1808 (45-57') PH 10.0	6/27/2018	9.9	120	83	<2	12	58	<1	<1	8.1 B	3.3	380	1.8	<5	<0.2	13	<5	<1

Notes:

1. Sample were collected by Sanborn Head on the dates indicated and submitted to TestAmerica Laboratories, Inc. (TestAmerica) of Pittsburgh, Pennsylvania for pH dependent batch leaching tests by USEPA Method 1313. Leachate is analyzed analyzed for fluoride by USEPA Method 9056A, metals by USEPA Methods 6020A/7470A, pH by USEPA Method 9040C, oxidation reduction potential (ORP) by Standard Method 2580B, and specific conductance by Standard Method 2510B.
2. Concentrations are presented in micrograms per liter (µg/L), which are equivalent to parts per billion (ppb); millivolts (mV); standard units (SU); micromhos per centimeter (µmhos/cm); or milliliters per gram (ml/g).
3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.  
"J" indicates the result is an estimated value which is less than the laboratory's sample-specific reporting limit but greater than or equal to the method detection limit.



**TABLE 6**  
**Summary of Analytical Results - Ash Column Leach**  
**AEP Mountaineer Plant**  
**New Haven, West Virginia**

Analyte	Units	B01	BA-01								
		T01	T02	T03	T04	T05	T06	T07	T08	T09	
<b>General Chemistry Parameters</b>											
ORP	mV	180	210	210	190	150	150	560	120	120	88
pH	SU	7.1	7.7	7.7	7.8	7.8	7.8	7.8	7.7	7.7	7.4
Spec. Cond.	µmhos/cm	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100	1,100
S L/S	ml/g-dry		0.17	0.46	0.93	1.43	1.91	4.58	5.15	10.00	10.50
<b>Metals</b>											
Antimony	µg/L	<2.0	1.1 J	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	<2.0	<2.0
Arsenic	µg/L	4.4	5.7	6.9	7.6	6.7	6.4	6.8	13	4.5 B	11 B
Barium	µg/L	95 B	140 B	140 B	140 B	110	120	95	96	120	120
Beryllium	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cadmium	µg/L	0.3 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.13 J	<1.0	<1.0
Chromium	µg/L	2.6 B	3.9 B	2.4 B	1.8 JB	<2.0	<2.0	<2.0	0.71 J	1.1 JB	1.3 JB
Cobalt	µg/L	0.44 J	0.2 J	0.14 J	0.13 J	<0.50	<0.50	<0.50	0.8	2.1	0.56
Lead	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.16 J	<1.0	<1.0
Lithium	µg/L	31	15	17	23	23	28	28	29	29	28
Mercury	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Molybdenum	µg/L	25	39	26	25	23	24	24	27	29	29
Selenium	µg/L	2 J	12	9.2	8.1	5.4	4.6 J	3 J	2 J	<5.0	1.1 J
Thallium	µg/L	0.32 J	0.41 J	0.66 J	0.8 J	0.73 J	0.76 J	0.93 J	0.68 J	0.12 J	<1.0
<b>Anions</b>											
Fluoride	µg/L	570	380	350	610	410	400	420	440	510	230

Notes:

1. Sample were collected by Sanborn Head on June 20, 2018 and submitted to TestAmerica Laboratories, Inc. (TestAmerica) of Pittsburgh, Pennsylvania for percolation column leaching test by USEPA Method 1314. Water collected from the outlet of Bottom Ash Pond (West) by American Electric Power on June 18, 2018 was used as the aqueous sample in the Method 1314 analysis. Leachate is extracted from the percolation column at multiple time-steps (T-01 through T09) and associated cumulative liquid to solid ratio (L/S) and analyzed for fluoride by USEPA Method 9056A, metals by USEPA Methods 6020A/7470A, pH by USEPA Method 9040C, oxidation reduction potential (ORP) by Standard Method 2580B, and specific conductance by Standard Method 2510B.

2. Concentrations are presented in micrograms per liter (µg/L), which are equivalent to parts per billion (ppb); millivolts (mV); standard units (SU); micromhos per centimeter (umhos/cm); or milliliters per gram (ml/g).

3. "<" indicates the analyte was not detected above the indicated laboratory reporting limit.

"J" indicates the result is an estimated value which is less than the laboratory's sample-specific reporting limit but greater than or equal to the method detection limit.

"B" indicates the analyte was detected in both the field sample and the associated laboratory blank sample.

**TABLE 7  
Review of Analytical Results  
AEP Mountaineer Plant  
New Haven, West Virginia**

Analysis	Purpose of Analysis	Summary of Results		
		Cobalt	Lithium	Molybdenum
Bulk Appendix III/IV Parameters in Soil	Broadly define soil chemistry	<ul style="list-style-type: none"> <li>Concentrations are generally similar between samples, ranging from 5.0 to 12 mg/kg.</li> <li>No substantial differences were detected between upgradient, downgradient and peripheral samples or between samples of different depths.</li> </ul>	<ul style="list-style-type: none"> <li>Concentrations in the sand and gravel samples are generally similar between samples, ranging from 3.7 to 6.3 mg/kg. Concentrations are slightly higher in clay samples, ranging from 12 to 14 mg/kg.</li> <li>For sand and gravel samples, no substantial difference between upgradient, downgradient and peripheral samples, or between samples of different depths.</li> </ul>	<ul style="list-style-type: none"> <li>Concentrations are relatively low and generally similar between samples, ranging from 0.62 to 2.1 mg/kg.</li> <li>For sand and gravel samples, shallow downgradient sample SB-1806 (46 - 60") is higher (2.1 mg/kg) than the other sand and gravel samples (0.45 to 1.0 mg/kg).</li> </ul>
Sequential Extraction Procedure	Evaluate the mineral/solid phases that contaminants are associated with and what attenuation mechanisms may be responsible for retardation/immobilization	Typically most extracted in metal hydroxide (4) step, and some extracted in acid/sulfide (6) step. For shallower samples, non-crystalline (3) step is also significant, but for deeper samples is minor. Residual step (7) is relatively minor for all samples.	Most extracted in organic bound fraction (5) step, and residual (7) step. Lesser amounts extracted in metal hydroxide (4) and acid/sulfide (6) steps. Based on our understanding of the geochemistry of lithium, it is not thought to be bound in the organic or sulfide phases in significant quantities, but rather, that other phases (e.g. clay minerals) containing lithium may have been vulnerable to extraction methods used at these steps.	Most extracted in the metal hydroxide (4) and acid/sulfide (6) steps, and lesser amounts in non-crystalline (3) step.
Partition Coefficient (K <sub>d</sub> )	Calculated K <sub>d</sub> values for site soils may be applied to groundwater seepage velocity rate to account for retardation (i.e., slower migration) of dissolved contaminant due to partitioning between dissolved and solid phases	<ul style="list-style-type: none"> <li>Taken up in all three samples and under the different test conditions. Generally taken up more in tests with higher initial concentrations and higher L/S ratios.</li> <li>Calculated K<sub>d</sub>s were typically higher at samples from downgradient (SB-1806) samples compared to the peripheral sample (SB-1808), and ranged up to 3,395 ml/g.</li> </ul>	<ul style="list-style-type: none"> <li>Generally taken up by soil, but sometimes leaches. Generally taken up more at higher L/S ratios, and typically leaches at lowest L/S ratio. pH (6 vs. 7.5) not a significant factor.</li> <li>Calculated K<sub>d</sub>s for Li range from negative values (-2 ml/g) - i.e., desorbs; to low to intermediate positive values (up to 23 ml/g).</li> </ul>	<ul style="list-style-type: none"> <li>Generally not taken up and typically leached in the tested scenarios. At the lowest initial concentration, leaching of Mo increases with increasing L/S. pH (6 vs. 7.5) not a significant factor.</li> <li>Calculated K<sub>d</sub>s for Mo were generally 0 or negative (i.e., desorbs), ranging from -37 to 1 ml/g.</li> </ul>
pH Dependent Batch Leaching Test	Establish metal mobility at different pHs that are either naturally occurring or controlled by modification of Site groundwater chemistry	<ul style="list-style-type: none"> <li>Leaching generally decreases as pH increases.</li> <li>Somewhat more Co leached from the two downgradient/deeper S&amp;G samples (SB-1805, SB-1806), compared to the peripheral/shallower sample from SB-1808.</li> </ul>	<ul style="list-style-type: none"> <li>Leaching decreases as pH increases.</li> <li>More Li leached from the two downgradient/deeper S&amp;G samples (SB-1805, SB-1806), compared to the peripheral/shallower sample from SB-1808.</li> </ul>	<ul style="list-style-type: none"> <li>Leaching increases as pH increases.</li> <li>Somewhat more Mo leached from the downgradient/deeper S&amp;G sample SB-1806, compared to other two samples from SB-1805 and SB-1808.</li> </ul>
Percolation Column Leaching Test	Assess source concentrations of Appendix IV parameters that may be derived from leaching of bottom ash materials	<ul style="list-style-type: none"> <li>Cobalt was generally taken up in early samples and leached in subsequent samples. The BAP water appears to be in approximate equilibrium with Co in the bottom ash sample.</li> </ul>	<ul style="list-style-type: none"> <li>Lithium was generally taken up from pond water by the bottom ash sample.</li> </ul>	<ul style="list-style-type: none"> <li>Molybdenum was generally constant (not leached or taken up), except in the first sample (which indicated leaching).</li> </ul>
Mineralogy of S&G mineral fractions	Gain an understanding of types of minerals present in Site samples, including those that may contain the COCs or that the COCs may adsorb onto.	<p>While minerals containing COCs as major or essential components were not identified by qualitative or the semi-quantitative XRD analyses, the COCs may substitute for other elements in these minerals (e.g., cobalt and molybdenum may substitute for iron or magnesium in ferromagnesian minerals, and lithium may substitute for sodium or potassium in clay minerals). Minerals and other phases that may serve as adsorption or exchange sites for the COCs were identified in the sand and gravel samples, including: carbonates (calcite, dolomite, ankerite), clay minerals (illite, kaolinite, montmorillonite), iron oxides/hydroxides (hematite, magnetite, goethite), and LOI/organic matter (loss on ignition - the light separate fraction from the sand and gravel composite had 56.7% LOI, and is likely largely due to the presence of organic matter, which may also contain considerable water, as carbonates [and most inorganic minerals] have a density of greater than 2.0 gm/cc).</p> <p>Cobalt was detected at 19 and 83 mg/kg in the light and heavy fraction samples, respectively, and not detected (&lt; 9 mg/kg) in the bulk sample. This distribution of Co is consistent with it substituting for Fe, Mg and other metals in ferromagnesian silicates and oxides, which are major components of the heavy mineral fraction (e.g., garnet, pyroxene, amphibole, hematite, magnetite, ilmenite); and Co's common association with organic matter which is thought to comprise a significant portion of the light fraction.</p>	<p>Lithium was detected at 11 mg/kg in the bulk sample, and was not detected (&lt;20 mg/kg) in the light and heavy fraction samples. This distribution of Li is consistent with it being present largely in the felsic silicate minerals, which have intermediate densities and hence would be present in the bulk sample, but not the light or heavy fractions. Lithium is thought to substitute for major elements such as Na or K in silicate minerals such as clays and feldspars.</p>	<p>Molybdenum was not detected (&lt; 5 mg/kg) in the three samples, and hence does not appear to be enriched in the heavy or light fractions. The absence of detected Mo in the composite bulk, light and heavy fractions at a reporting limit of 5 mg/kg is also consistent with the concentration reported for the individual sand and gravel samples of 0.45 to 2.1 mg/kg.</p>
Summary		Co concentrations in soil are not elevated in samples downgradient of the BAP compared to samples from other locations. Co appears to be concentrated in the heavy mineral fraction, and to lesser extent the light fraction, as compared to the bulk sand and gravel. Most Co is extracted in the metal hydroxide step, and then the acid/sulfide, and for the shallower sand & gravel samples, the non-crystalline step. Co is strongly taken up by site soils (high K <sub>d</sub> ), and its leaching generally decreases as pH increases. More Co leached from the downgradient samples than from the peripheral sample. The pond water appears in approximate equilibrium with bottom ash for Co.	Li concentrations in soil are not elevated in samples downgradient of the BAP compared to samples from other locations; concentrations are higher in the finer-grained shallow silt/clay soils than in the sand and gravel samples. Li does not appear to be concentrated in the light or heavy mineral fractions. Most Li is extracted in the organic bound and residual steps, with lesser amounts extracted in the metal hydroxide and acid/sulfide steps; however, we interpret that the Li extracted in the organic and acid/sulfide steps is likely contained in other phases (e.g. clay minerals) that may have been vulnerable to extraction methods used at these steps. Li is generally weakly to moderately taken up by soils (low to intermediate K <sub>d</sub> ), and its leaching decreases as pH increases. More Li leached from the downgradient samples than from the peripheral sample. Lithium was generally taken up from pond water by the bottom ash sample.	Mo concentration in shallow downgradient sample SB-1806 (46 - 60") is higher (2.1 mg/kg) than the other sand and gravel samples (0.45 to 1.0 mg/kg). Mo was not detected (< 5 mg/kg) in the three sand and gravel density fractions, and hence does not appear to be enriched in the heavy or light fractions. Most Mo is extracted in the metal hydroxide and acid/sulfide steps, with lesser amounts extracted in the non-crystalline step. Typically Mo leaches from soils (low/negative K <sub>d</sub> ), and leaching increases as pH increases. More Mo leached from the downgradient sample SB-1806, compared to other two samples from SB-1805 and SB-1808. The pond water appears in approximate equilibrium with bottom ash for Mo.

Notes:

1. A subset of samples were analyzed by each method - refer to text, analytical summary tables (Tables 2 through 6), and analytical laboratory reports for additional information.

2. Concentrations are described in units of micrograms per liter (µg/L) and milligrams per kilogram (mg/kg).

3. Abbreviations:

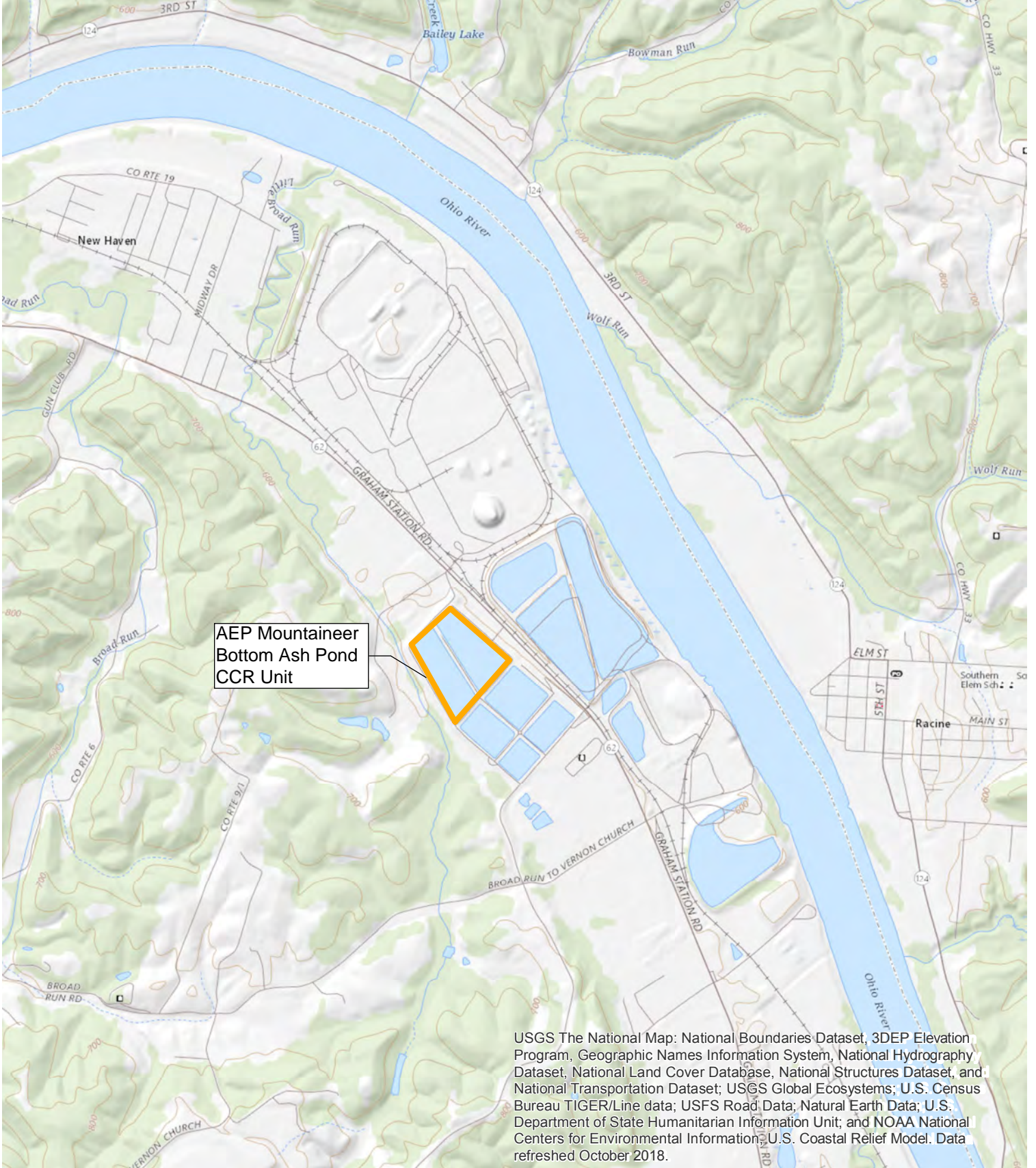
Co = cobalt

Mo = molybdenum

Li = Lithium

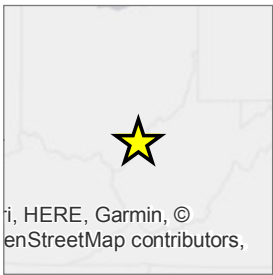
S&G = sand and gravel

## FIGURES

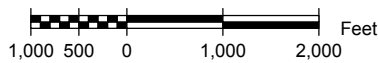


AEP Mountaineer  
Bottom Ash Pond  
CCR Unit

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information U.S. Coastal Relief Model. Data refreshed October 2018.



Drawn By: E. Wright  
Designed By: A. Ashton  
Reviewed By: C. Crocetti  
Project No: 4345.00  
Date: December 2018



**SANBORN HEAD**

Figure 1

# Locus Plan

Bottom Ash Pond

AEP Mountaineer Plant  
New Haven, West Virginia





Figure 2  
**Exploration Location Plan**

Bottom Ash Pond  
 Geochemical Assessment

AEP Mountaineer Plant  
 New Haven, West Virginia

Drawn By: L. Corenthal/E. Wright  
 Designed By: A. Ashton  
 Reviewed By: C. Crocetti  
 Project No: 4345.00  
 Date: December 2018

**Figure Narrative**

This figure shows the approximate location of soil borings installed in June 2018 as part of the Bottom Ash Pond (BAP) geochemical assessment at American Electric Power's (AEP) Mountaineer Plant in Mason County, West Virginia. The location of key site features pertinent to this report including the main plant area, BAP complex, and coal combustion residual (CCR) unit are also shown.

**Notes**

1. Locations of the monitoring wells and CCR Unit are referenced from the Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation Report, prepared by Arcadis U.S., Inc., on behalf of AEP, dated October 27, 2016. Locations of other BAP Complex features are referenced from 2017 Dam & Dike Inspection Report, prepared by AEP, dated November 2017.

2. Locations of soil borings are approximate and were referenced from prominent site features by Sanborn Head in June 2018.

**Legend**

- CCR Unit
- ◆ Soil Boring (June 2018)

**BAP Monitoring Well**

- ◆ Downgradient
- ◆ Upgradient

- ◆ Other Well, Monitoring Well, or Piezometer (Used for BAP Water Level Monitoring)

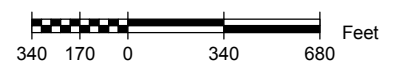
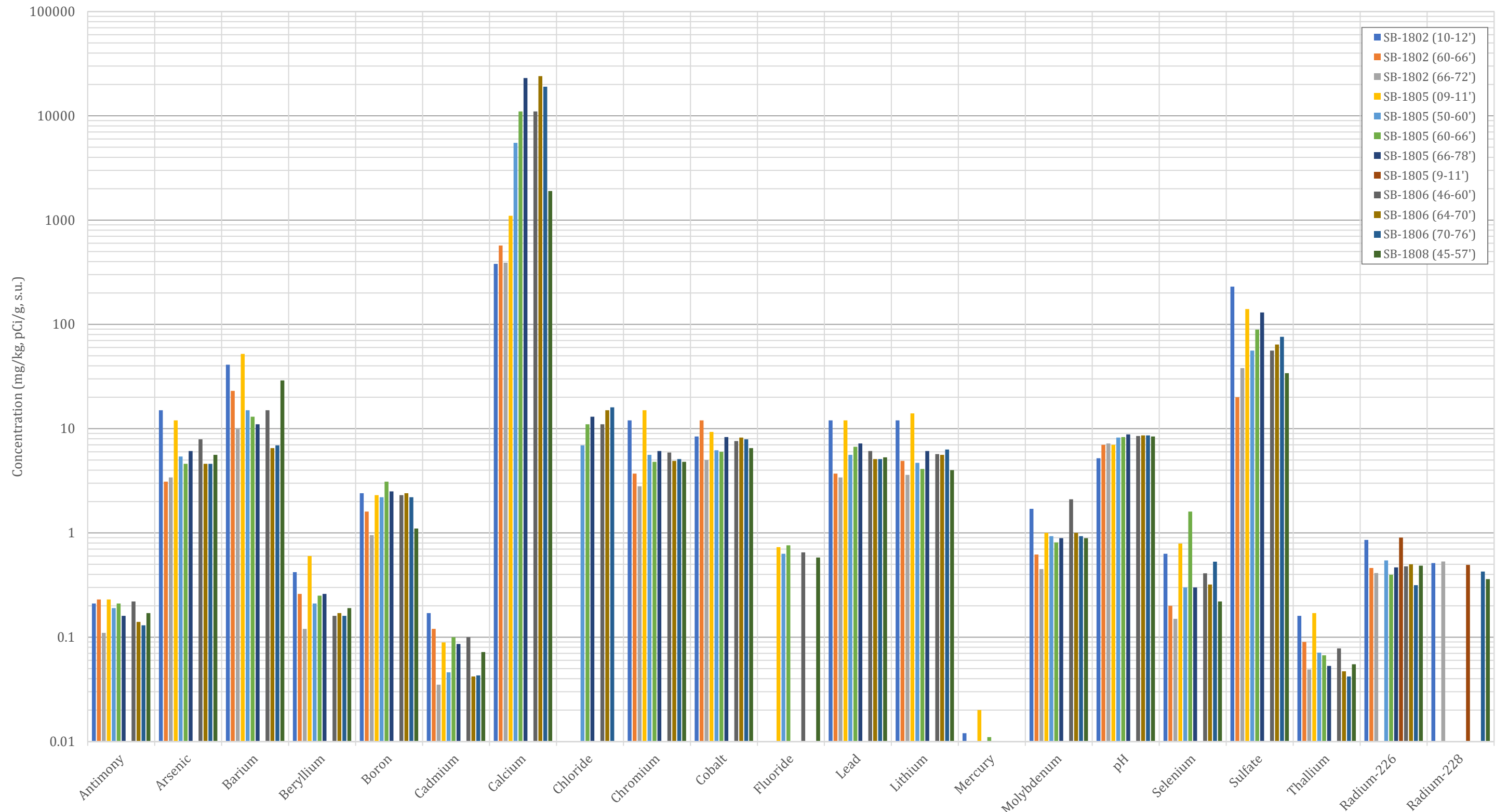




Figure 3  
 Summary of Bulk Soil Appendix III/IV Concentrations  
 AEP Mountaineer Plant  
 New Haven, West Virginia



NDs are plotted as zero; Qualified results are plotted as their estimated value.  
 Refer to Table 2 for more information.

**APPENDIX A**  
**LIMITATIONS**



## **APPENDIX A LIMITATIONS**

1. The conclusions and recommendations described in this report are based in part on the data obtained from a limited number of soil samples from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until further investigation or remediation is initiated. If variations or other latent conditions then appear evident, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more gradual. For specific information, refer to the exploration logs.
3. Quantitative laboratory analyses were performed as part of the investigation as noted within the report. The analyses were performed for specific parameters that were selected during the course of this study. It must be noted that additional compounds not searched for during the current study may be present in soil and groundwater at the site. Sanborn Head has relied upon the data provided by the analytical laboratory, and has not conducted an independent evaluation of the reliability of these data. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their distribution within the groundwater and soil may occur due to the passage of time, seasonal water table fluctuations, recharge events, and other factors.
4. The conclusions and recommendations contained in this report are based in part upon various types of chemical data as well as historical and hydrogeologic information developed by previous investigators. While Sanborn Head has reviewed that data and information as stated in this report, any of Sanborn Head's interpretations, conclusions, and recommendations that have relied on that information will be contingent on its validity. Should additional chemical data, historical information, or hydrogeologic information become available in the future, such information should be reviewed by Sanborn Head and the interpretations, conclusions and recommendations presented herein should be modified accordingly.
5. This report has been prepared for the exclusive use of American Electric Power (AEP) for specific application for assisting with remediation design for the Bottom Ash Pond Coal Combustion Residual Unit at AEP's Mountaineer Plant, New Haven, West Virginia, in accordance with generally accepted hydrogeologic practices. No other warranty, express or implied, is made.
6. The analyses and recommendations contained in this report are based on the data obtained from the referenced subsurface explorations. The explorations indicate subsurface conditions only at the specific locations and times, and only to the depths penetrated. They do not necessarily reflect strata variations that may exist between

such locations. The validity of the recommendations is based in part on assumptions Sanborn Head has made about conditions at the site. Such assumptions may be confirmed only during remediation. If subsurface conditions different from those described become evident, the recommendations in this report must be re-evaluated. ***It is advised that Sanborn Head be retained to monitor the remediation in order to help confirm that our assumptions and recommendations are valid or to modify them accordingly.***

7. In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by Sanborn Head. Sanborn Head is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or re-use of the subsurface data or engineering analyses without the express written authorization of Sanborn Head.

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**APPENDIX B**  
**FIELD DOCUMENTATION**

**APPENDIX B.1**  
**SAMPLING AND ANALYSIS PLAN**

**BOTTOM ASH POND CCR UNIT  
SAMPLING AND ANALYSIS PLAN  
AEP'S MOUNTAINEER PLANT  
NEW HAVEN, WEST VIRGINIA**

This sampling and analysis plan (SAP) outlines protocols to be followed to collect and submit solid samples for laboratory analysis in support of the Bottom Ash Pond (BAP) Geochemical Assessment at the above referenced site. This SAP has been developed in accordance with Sanborn Head & Associates' (Sanborn Head's) proposal for geochemical assessment dated February 2, 2018. This SAP includes collection of soil samples from proposed soil borings to be located near existing monitoring wells. Analysis methods, sample locations and depths, and shipping addresses are summarized in Table 1. Proposed soil boring locations are shown on Figure 1. The proposed locations are positioned near to existing monitoring well locations, which are referenced from the Ash Pond System-CCR Groundwater Monitoring Well Network (GWMWN) Evaluation Report<sup>1</sup>. Proposed laboratory analyses will include the following:

***TestAmerica Pittsburgh***

- Bulk analysis of Appendix III/IV parameters
- Partition coefficient ( $K_d$ ) analysis for cobalt, lithium, and molybdenum
- pH dependent batch leaching test
- Percolation column leaching test

Some components of the analytical program performed by TestAmerica Pittsburgh are proposed to be modified from the standard method, including:

1. For the partition coefficient analysis, Sanborn Head anticipates requesting three concentration points (cobalt: 20 µg/L, 40 µg/L and spike<sup>2</sup>; lithium: 130 µg/l, 250 µg/l, and spike; molybdenum: 110 µg/l, 220 µg/l and spike) and two pH points (6.0 and 7.5); however, depending on the concentration of cobalt, lithium and molybdenum in the samples submitted for bulk analysis, these specifications may be modified. Therefore, Sanborn Head will request that TestAmerica first report the results of the Appendix III/IV analysis before initiating the partition coefficient analysis.
2. The pH dependent batch testing will be a modified U.S. EPA Method 1313 to reduce the number of pH values to the following: 5.0, 6.0, 7.0, 8.0, 9.0, and the natural pH of the material (leached with DI water).

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<sup>1</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, Graham Station Road, Mason County, New Haven, West Virginia, prepared by Arcadis on behalf of American Electric Power, dated October 27, 2016.

<sup>2</sup> Spike indicates the maximum concentration absorbed during the previous two concentration level analyses

3. For the percolation column leaching test, BAP surface water will be used instead of laboratory provided water. Therefore, for this test, the sampler will collect a sample of bottom ash pond surface water (pond water) into laboratory provided containers to be submitted along with the bottom ash sample (BA-01). The pond water will be used instead of distilled water in the leaching test.

### ***TestAmerica Knoxville***

- Sequential Extraction Procedure (SEP) and geochemical analysis at multiple consecutive extraction steps

As shown in Exhibit 1, split samples of the three sand and gravel samples not proposed for SEP analysis (including SB-1802 [61-71'], SB-1805 [60-66'], and SB-1806 [66-69']) will be submitted to TestAmerica Knoxville to hold pending the bulk analysis results reported by TestAmerica Pittsburgh. If elevated concentrations of Appendix III/IV parameters are detected in a sample that is not already proposed for analysis by SEP, then these samples may be added to the list for SEP analysis.

### ***SGS Minerals***

- Clay mineralogy analysis
- Sand and gravel mineralogy analysis by heavy and light bulk mineral fractions

The two sand and gravel samples submitted to SGS Minerals will first be analyzed by XRD, XRF and ICP-MS as bulk samples. The samples will then be separated into two (heavy and bulk minerals) or three (heavy, light, and bulk minerals) density fractions depending on the composition of the sample determined from the bulk analysis. The heavy mineral fraction (and if applicable the light mineral fraction) will be analyzed by XRD, XRF and ICP-MS; separately the bulk mineral fraction will be analyzed by ICP-MS for a second time.

The method of separation and whether the sample is separated into heavy, light, and/or bulk fractions will depend on the composition of the whole sample and will be determined in conjunction with the laboratory. Components of the analytical program that may vary based on whole sample composition include:

1. Currently a liquid separation method is proposed, but if there is a large fraction of magnetic minerals in the whole sample, magnetic separation may be used instead; and
2. If there is little or no coal fraction in a sample, then the light fraction will not be separated from the bulk fraction so just the heavy and bulk fractions will be separated and analyzed independently.

### **Soil Boring Installation & Sample Collection**

A licensed WV drilling contractor will drill up to four (4) soil borings at the approximate locations indicated on Figure 1 (SB-1802, SB-1805, SB-1806, and SB-1808). At location SB-1805, which is proposed to be located in between MW-1604S/D and MW-1605 S/D, a ground penetrating radar survey in a 25 by 25 ft area around the proposed boring location is recommended for utility clearance purposes. For the other proposed locations (SB-1802, SB-

1806 and SB-1808) the GPR survey results mentioned in the 2016 GWMN Report should be referenced and compared with any updated information from facility personnel. Boring locations will be pre-drilled for utility clearance by a contractor to a depth of 8 feet using a hand-auger or air knife technique to a diameter at least 10 percent larger than the largest diameter tooling to be used during drilling. The total depth of each boring is shown in Exhibit 1.

**Exhibit 1 – Summary of proposed sampling depths and laboratory analyses**

Location	Bulk App III/IV	Kd Analysis	pH Leaching Test	Perc. Column Leaching Test	SEP	Clay XRD	Heavy, light, bulk XRD, XRF, ICP-MS
SB-1802 (10-12')	X					X	
SB-1802 (61-71')	X				H		
SB-1805 (9-10')	X					X	
SB-1805 (50-60')	X				X		X
SB-1805 (60-66')	X				H		
SB-1805 (69-76')	X		X		X		X
SB-1806 (10-13')						X	
SB-1806 (50-54')	X	X			X		
SB-1806 (66-69')	X		X		H		
SB-1806 (72-76')	X	X			X		
SB-1808 (46-56')	X	X	X		X		
BA-01				X			
<b>Total</b>	<b>10</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>2</b>

Notes:

1. Refer to Table 1 for a summary of analyses and additional guidance on sample collection and shipment.
2. X = submit for analysis; H = submit sample but hold for analysis pending results of Bulk Appendix III/IV parameters
3. For planning purposes, the soil borings are assumed to be at a similar ground elevation as the nearby monitoring wells. If the ground elevations differ, the depths below ground surface will be offset accordingly.
4. The naming convention is referenced from the GWMN Evaluation Report.

Borings should be advanced using a drilling method capable of advancing to the depth intervals specified in Exhibit 1 i.e., using hollow stem auger drilling. Reference should be made to American Society for Testing and Materials (ASTM) D1452-16 Standard Practice for Soil Exploration and Sampling by Auger Borings. To achieve collection of sufficient sample volume, and recovery of sample, from the specified intervals, a minimum 3-inch diameter split spoon should be used for sample collection. Split spoon sampling should be conducted following ASTM D1586-11 Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils. Collection of shallow cohesive samples (where applicable) may be performed using a Shelby tube sampling device, and sampling should follow ASTM D1587-15 Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for



Geotechnical Purposes. Other suitable drilling/sampling methods (e.g., direct-push, rotosonic) of similar diameter may be substituted following discussion with AEP and Sanborn Head. If an alternative drilling method to hollow stem auger is used, it should follow the appropriate standard for drilling i.e., ASTM D6282-14 Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations for direct-push drilling, or ASTM D6914-16 Standard Practice for Sonic Drilling for Site Characterization and the Installation of Subsurface Monitoring Devices for rotosonic drilling.

After collection of shallow clay samples (where applicable), the soil borings should be advanced to a depth approximately 5 feet above the static water table. Soil samples should then be collected continuously from a depth approximately 5 feet above the static water table to the depths specified in Exhibit 1. Clay samples may be collected using a hand auger (or similar manual sampling device) if clay soils are observed in the pre-drill interval (i.e., 0-8 feet bgs) but are not present beneath the pre-drill interval. Soil samples should be logged by the observing geologist or engineer using the Unified Soil Classification System or Modified Burmister System. Soil samples selected for laboratory analysis will be collected following the procedures described below. The location of the soil borings should be determined after drilling, using tape measurements from existing monitoring wells or other suitable survey method.

Following completion, soil borings will be backfilled with cement/bentonite grout by tremie line. Downhole drilling equipment will be decontaminated by rinsing with water between locations. Investigation derived waste (i.e. soil cuttings and drill water) will be disposed of at a location to be determined and facilitated by AEP personnel.

With the exception of samples collected for clay fraction mineralogy analysis, samples collected from the target depth intervals specified in Exhibit 1/Table 1 will be placed into stainless steel mixing bowls and homogenized. Fractions coarser than fine gravel (i.e., greater than approximately 3/4-inch) should be removed by hand or sieve from the sample. The samples will then be transferred into laboratory provided containers, which should include the following information:

- Unique sample location identifier (boring location and sample depth; e.g. SB-1802 [0-2'])
- Date/time of collection
- Requested analysis

The stainless-steel mixing bowls will be decontaminated between collection of each sample by using an Alconox®/distilled water wash followed by a distilled water rinse. Decontamination water will be disposed of on the ground near the soil borings.

To ship the samples, a chain-of-custody form must be completed and included in each shipment; three forms, one for each laboratory, are included in Attachment A. Upon receipt of the samples at the laboratory, the chain-of-custody form(s) will be signed and copied by the laboratory and included in the laboratory report.

For shipping, additional packaging materials, such as corrugated cardboard or bubble wrap, should be placed between glass containers to prevent breakage. Refer to Table 1 or the chains of custody in Attachment A for mailing addresses.

## **Enclosures**

Table 1 – Sample & Shipping Guidance

Table 2 – Descriptions of Target Sample Depth Intervals from Nearby Boring Logs

Figure 1 – Proposed Exploration Location Plan

Attachment A – Blank Chain of Custody Forms

**TABLE 1**  
**Sample and Shipping Guidance**  
**Bottom Ash Pond Geochemical Assessment**  
AEP Mountaineer  
New Haven, West Virginia

Analysis	Laboratory method(s)	Reported Analytes	Number of Samples	Minimum Sample Amount	Length of 3-inch O.D. sample (inches)	Sample Identifications (Location [depth in feet below ground surface])	Laboratory Shipping Address	Additional Comments
Bulk Analysis of Appendix III/IV Parameters	-Solids 2540G (percent moisture) -EPA 6020A (CCR App III/IV by ICP-MS) -EPA 7471B (Mercury) -EPA 9056A (Chloride, fluoride, sulfate) -EPA 9045D (pH) -EPA 9315 (Radium 226) -EPA 9320 (Radium 228)	Percent moisture/solids Appendix III & IV metals by ICP-MS (As, Ba, Be, B, Ca, Cd, Cr, Co, Li, Mo, Pb, Sb, Se, Tl) Mercury Cl, F, SO <sub>4</sub> pH Radium-226, Radium-228	10	One 4 oz. jar + One 8 oz. jar for radium-226 and -228	3	SB-1802 (10-12') SB-1802 (61-71') SB-1805 (9-10') SB-1805 (50-60') SB-1805 (60-66') SB-1805 (69-76') SB-1806 (50-54') SB-1806 (66-69') SB-1806 (72-76') SB-1808 (46-56')	TestAmerica Pittsburgh 301 Alpha Drive RIDC Park Pittsburgh, PA 15238 Phone: (412) 963-7058	Homogenize sample over the indicated depth interval; remove the fraction larger than fine gravel (i.e., greater than 3/4-inch) by hand or sieve prior to placing sample in laboratory container(s).
Partition Coefficient (K <sub>d</sub> ) Analysis	ASTM D4646-16 (modified to two pH points [6.0 & 7.5] and three concentration points [Co: 20 ug/l, 40 ug/l, + spike; Li: 130 ug/l, 250 ug/l + spike; Mo: 110 ug/l, 220 ug/l + spike])	K <sub>d</sub> -Co, K <sub>d</sub> -Li, K <sub>d</sub> -Mo	3	Two 32 oz. jars	16	SB-1806 (50-54') SB-1806 (72-76') SB-1808 (46-56')		
pH Dependent Batch Leaching Test	USEPA Method 1313 (modified to 6 pH points [5.0, 6.0, 7.0, 8.0, 9.0, and the natural pH of the material])	Metals by ICP-MS (As, Ba, Be, Cd, Cr, Co, Li, Mo, Pb, Sb, Se, Tl,) Mercury Fluoride pH Redox potential Specific Conductance	3	Two 32 oz. jars	16	SB-1805 (69-76') SB-1806 (66-69') SB-1808 (46-56')		
Percolation Column Leaching Test	USEPA Method 1314	Metals by ICP-MS (As, Ba, Be, Cd, Cr, Co, Li, Mo, Pb, Sb, Se, Tl,) Mercury Fluoride pH Redox potential Specific Conductance	1	One 32 oz. jar	N/A	BA-01		Collect a sample of fresh bottom ash from the ash stream before the ash enters the pond with the assistance of facility personnel. Fill an additional laboratory provided container(s) with surface water from the Bottom Ash Pond near the inflow and submit along with the ash sample.
Sequential Extraction Procedure	Method 6010B SEP (TAL ICP-MS) Method 7470A SEP (Mercury CVAA)	Metals by ICP-MS (Ag, Al, As, Ba, Be, Ca, Cd, Cr, Co, Cu, Fe, K, Li, Mn, Mo, Ni, P, Pb, Sb, Se, Tl, V, Zn) Mercury	5	One 4 oz. jar	1	SB-1805 (50-60') SB-1805 (69-76') SB-1806 (50-54') SB-1806 (72-76') SB-1808 (46-56')	TestAmerica Knoxville 5815 Middlebrook Pike Knoxville, TN 37921 Phone: (865) 291-3000	Subset of samples for bulk analysis of Appendix III/IV parameters
Clay fraction mineralogy analysis	Clay fraction separation followed by clay XRD analysis of clay fraction	Clay mineralogy	3	~18 ounces (500 grams)	3	SB-1802 (10-12') SB-1805 (9-10') SB-1806 (10-13')	SGS Minerals 185 Concession Street Lakefield, Ontario	Submit for initial head assay <sup>4</sup> analysis first; subsequent

**TABLE 1**  
**Sample and Shipping Guidance**  
**Bottom Ash Pond Geochemical Assessment**  
AEP Mountaineer  
New Haven, West Virginia

Analysis	Laboratory method(s)	Reported Analytes	Number of Samples	Minimum Sample Amount	Length of 3-inch O.D. sample (inches)	Sample Identifications (Location [depth in feet below ground surface])	Laboratory Shipping Address	Additional Comments
Bulk fraction and heavy mineral fraction mineralogy analysis of sand and gravel	Head assay <sup>4</sup> analyzed by semi-quantitative XRD, XRF, and ICP-MS; Mineral separation at one or two specific gravities (SG) (21 and 3.0 g/cm <sup>3</sup> ) depending on head assay results; Analysis of heavy fraction (SG >3.0 g/cm <sup>3</sup> ) by semi-quantitative XRD, DRF and ICP-MS, and light fraction (<2.1 g/cm <sup>3</sup> ), if present, by ICP-MS.	Mineralogy, Metals by ICP (Ag, Al, As, Ba, Be, Bi, Ca, Cd, Co, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Sn, Sr, Tl, Ti, V, Y, Zn) Mercury Fluorine Sulfur	2	106 ounces (3 kilograms)	20	SB-1805 (50-60') SB-1805 (69-76')	Canada K012H0 Phone: (405) 652-2000	analytical steps dependent on head sample results

Notes:

1. Refer to Table 2 for a description of the targeted soil intervals for each sample ID. Homogenized sample intervals may be submitted for multiple analyses.
2. Laboratory containers will be shipped to the AEP Mountaineer facility prior to sample collection.
3. Sample length assumes full recovery. For samples submitted to SGS Minerals, where sample amount was indicated by the laboratory in grams, a soil density of 1.3 grams per cubic centimeter (g/cm<sup>3</sup>) was assumed.
4. Head assay indicates analysis of the sand and gravel sample by semi-quantitative x-ray diffraction (XRD), x-ray fluorescence (XRF), and inductively coupled plasma mass spectrometry (ICP-MS) before separation into separate density fractions.

**TABLE 2**  
**Descriptions of Target Sample Depth Intervals from Nearby Boring Logs**  
**Bottom Ash Pond Geochemical Assessment**

AEP Mountaineer  
New Haven, West Virginia

<b>Analysis</b>	<b>Sample ID</b>	<b>Description from Corresponding MW-1600 Series Log</b>
Bulk Analysis of Appendix III/IV Parameters	SB-1802 (10-12')	MW-1602 (10-12'): Silt, trace clay; wet; soft; rapid dilatancy; dark yellowish brown
	SB-1802 (61-71')	MW-1602 (61-71'): Sand, some silt, trace fine rounded gravel; wet; loose; sand is fine to coarse (SP)
	SB-1805 (9-10')	MW-1605D (10-12') Clay with silt, medium to high plasticity; slow dilatancy; dry; soft; brown
	SB-1805 (50-60')	MW-1605D (50-60'): Sand, medium to coarse; subangular to subround; little silt; moderate to poorly graded; wet; light yellowish brown; black discoloration from 59 to 60'
	SB-1805 (60-66')	MW-1605D (60-66'): Sand, fine to coarse (fine to medium from 64-66'), angular to subround; little to some silt (60-62'), trace to little silt (64-66'), trace coal fragments (62-62.5'); well graded (60-62'), poorly sorted (62-66'); wet; grayish brown (60-62') pale brown (62-66')
	SB-1805 (69-76')	MW-1605D (69-76') Sand, coarse; small pebbles, subround; poorly sorted; wet; very pale brown
	SB-1806 (50-54')	MW-1606D (50-56'): Sand, medium to coarse, trace fine sand/silt, small pebbles from 52-56'; subangular to subround; poorly graded; wet;
	SB-1806 (66-69')	MW-1606D (66-69'): Sand, fine to coarse, subangular to subround; moderate to well graded; wet; light brownish gray
	SB-1806 (72-76')	MW-1606D (72-75'): Sand, medium to coarse, subround; poorly graded; wet; yellowish brown
	SB-1808 (46-56')	MW-1808 (46-49.5'): sand, little to some silt, some gravel, wet; loose; unstratified; gravel is fine to coarse; fine fraction is fine to rounded; sand is subrounded to round; includes trace coal fragments up to 2 cm in size MW-1808 (49.5-52'): silty sand; wet; loose; unstratified; sand is fine to medium; brown MW-1808 (52-56'): Sand with silt; wet; loose; unstratified; sand is fine to coarse grades to fine to medium; at 53.5' coal fragments up to 2 cm in size; from 54-56' no coal fragments
Partition Coefficient (K <sub>d</sub> ) Analysis	SB-1806 (50-54')	See above
	SB-1806 (72-76')	
	SB-1808 (46-56')	
pH Dependent Batch Leaching Test	SB-1805 (69-76')	See above
	SB-1806 (66-69')	
	SB-1808 (46-56')	
Percolation Column Leaching Test	BA-01	N/A
Sequential Extraction Procedure	SB-1805 (50-60')	See above
	SB-1805 (69-76')	
	SB-1806 (50-54')	
	SB-1806 (72-76')	
	SB-1808 (46-56')	
Clay fraction mineralogy analysis	SB-1802 (10-12')	See above
	SB-1805 (9-10')	See above
	SB-1806 (10-13')	MW-1606D (10-13'): Sand, very fine; little silt; little clay; moist; light yellowish brown
Bulk fraction and heavy mineral fraction mineralogy analysis of sand and gravel	SB-1805 (49-59')	See above
	SB-1805 (69-76')	





Figure 1

# Proposed Exploration Location Plan

BAP Geochemical Assessment

AEP Mountaineer

New Haven, West Virginia

Drawn By: L. Corenthall  
 Designed By: A. Ashton  
 Reviewed By: C. Crocetti  
 Project No: 4345.00  
 Date: April 2018

## Figure Narrative

This figure depicts the general area in and around American Electric Power's (AEP) Mountaineer Plant in Mason County near the town of New Haven, West Virginia. The location of key site features pertinent to this report including the main plant area, bottom ash pond (BAP), and coal combustion residual (CCR) unit are shown.

### Notes:

1. Locations of the monitoring wells and CCR Unit are referenced from the Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation Report, prepared by Arcadis U.S., Inc., on behalf of American Electric Power, dated October 27, 2016.

## Legend

- CCR Unit
- ◆ Proposed Boring

### Monitoring Well

- ◆ Downgradient
- ◆ Upgradient





**ATTACHMENT A**  
**CHAINS OF CUSTODY**





**SAMPLE SUBMISSION FORM (PROCESS MINERALOGY SERVICES)**

P.O. Box 4300, 185 Concession St., Lakefield, ON. K0L 2H0, Phone (705) 652-2019 Fax (705) 652-7724

**CLIENT INFORMATION**

<b>Send report to:</b>		<b>Invoice sent to:</b>		Send to: same as report <input checked="" type="checkbox"/>
Name: Andrew Ashton		Name: Accounting		
Company: Sanborn, Head & Associates, Inc.		Company: Sanborn, Head & Associates, Inc.		
Mailing Address: 20 Foundry Street		Mailing Address: same		
Concord, NH				
E-mail: aashton@sanbornhead.com		E-mail: accounting@sanbornhead.com		
Phone: 603-415-6173	Fax:	Phone: 603-229-1900	Fax:	

**SAMPLE INFORMATION**

<b>Mineralogy Contact:</b> Chris Gunning	<b>PO#:</b> 4345
<b>Additional Sampling Instructions:</b> Samples 1, 2 and 3: centrifuge and Clay XRD Samples 4 and 5: SQ XRD, WRA and ICP-MS, then hold for next steps	<b>Quote:</b>
	<b>NORM:</b>
	<b>Asbestos:</b>
	<b>Warnings:</b>

**TEST REQUIREMENTS**

Gold Department		Heavy Liquid Separation		Optical Mineralogy		QEM		SEM	
XRD	X	Other (Specify):							

Sample Identifier		Sample Identifier
1	SB-1802 (10-12')	17
2	SB-1805 (9-10')	18
3	SB-1806 (10-13')	19
4	SB-1805 (50-60')	20
5	SB-1805 (69-76')	21
6		22
7		23
8		24
9		25
10		26
11		27
12		28
13		29
14		30
15		31
16		32

Samples will be disposed of after 6 months after final report issued unless requested otherwise. Additional storage and shipping costs will be charged to the client. If the samples should be returned, please provide courier account information.

Authorization to Perform work:	Date:
--------------------------------	-------

**LABORATORY INFORMATION (TO BE FILLED IN BY SGS STAFF)**

Sample condition upon receipt:	Received Date:	Login Date:
	LIMS #:	Login by:
	Project #:	Sample Rect. #





**APPENDIX B.2**  
**BORING LOGS**



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

# Log of Boring SB-1802

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/26/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/26/18

Date Finished: 06/26/18

Logged By: L. Corenthal

Checked By: A. Ashton

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
0							---0'---		No samples collected 0 to 9 ft.
2									
4									
6									
8									
9	S-01	9 - 11	1 3 2 2	24/21	PID: NM		---9'---	S-01 (9 to 11'): Medium stiff, brown, SILT, trace fine Sand, trace Clay. Moist. Seam brown/black fine to medium Sand at approximately 9.2 feet.	
11	S-02	11 - 13	1 1 1 1	24/24	PID: NM		SILT	S-02A (11 to 12.2'): Soft, brown, Clayey SILT, trace fine Sand. Wet.	
12.2							---13'---	S-02B (12.2 to 13'): Soft, brown, fine SAND and SILT. Wet. Stratified.	
13								No samples collected from 13 to 50 feet. Stratum descriptions based on auger returns.	
14									
16									
18									
20							SAND		
22									
24									



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

### Log of Boring SB-1802

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/26/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/26/18

Date Finished: 06/26/18

Logged By: L. Corenthal

Checked By: A. Ashton

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
26									
28									
30									
32									
34									
36									
38							SAND		
40									
42									
44									
46									
48									
50									No samples collected from 13 to 50 feet. Stratum descriptions based on auger returns.

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

# Log of Boring SB-1802

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/26/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/26/18

Date Finished: 06/26/18

Logged By: L. Corenthal

Checked By: A. Ashton

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
50	S-03	50 - 52	4 9 14 17	24/19	PID: NM		-----50'-----	S-03 (50 to 52'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
52	S-04	52 - 54	5 9 12 11	24/15	PID: NM			S-04 (52 to 54'): Medium dense, brown, fine to coarse SAND, trace Gravel. Moist. 6 inch layer with some Gravel from 52 - 52.5 feet.	
54	S-05	54 - 56	2 4 3 7	24/14	PID: NM			S-05 (54 to 56'): Loose, brown, fine to coarse SAND, trace Silt. Wet. Little Gravel at approximately 55 feet.	
56	S-06	56 - 58	1 2 3 5	24/12	PID: NM			S-06 (56 to 58'): Loose, brown, fine to coarse SAND, trace Silt, trace Gravel. Wet. 6 inch layer with some Gravel at approximately 57.5 - 58 feet.	Start introducing water into layers due to heaving sand.
58	S-07	58 - 60	1 3 7 8	24/10	PID: NM		FINE TO COARSE SAND	S-07 (58 to 60'): Loose, brown, fine to coarse SAND, trace Silt, trace Gravel. Wet. Seam of black fine to medium Sand at approximately 58.2 feet.	
60	S-08	60 - 62	1 2 3 4	24/7	PID: NM			S-08 (60 to 62'): Loose, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
62	S-09	62 - 64	2 4 5 9	24/11	PID: NM			S-09 (62 to 64'): Loose, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
64	S-10	64 - 66	3 5 7 9	24/3	PID: NM			S-10 (64 to 66'): Medium dense, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
66	S-11	66 - 68	1 3 4 7	24/9	PID: NM		-----66'-----	S-11 (66 to 68'): Loose, brown/gray, fine to medium SAND, trace Silt. Wet.	
68	S-12	68 - 70	4 6 10 11	24/2	PID: NM		FINE TO MEDIUM SAND	S-12 (68 to 70'): Medium dense, brown/gray, fine to medium SAND, trace Silt. Wet.	Repeat S-12 Pen/Rec = 24"/5"
70	S-13	70 - 72	4 5 7 13	24/15	PID: NM		-----70'----- FINE TO COARSE SAND	S-13 (70 to 72'): Medium dense, gray/brown, fine to coarse SAND, trace Silt. Wet.	Repeat S-13 Pen/Rec = 24"/9".
72							-----72'-----	Boring terminated at 72 feet. No refusal encountered.	
74								NOTES: 1. Approximately 300 gallons of potable water was introduced to the augers during drilling starting at 50 feet due to running sands.	





Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

## Log of Boring SB-1802

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

### Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/26/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/26/18

Date Finished: 06/26/18

Logged By: L. Corenthal

Checked By: A. Ashton

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
76								<p>2. Continuous sampling started approximately 5 ft above the water table based on a water level measurement collected by Sanborn Head on 6/26/2018 at 8:50 AM at MW-1602 of 57.91 ft below Top of PVC Riser.</p> <p>3. Upon completion, the borehole was backfilled by piping a bentonite mix (consisting of 275 gallons of potable water and 250 pounds of bentonite) using a hose through augers to approximately 2 ft bgs and placing bentonite chips from 0 to 2 ft bgs.</p>	
78									
80									
82									
84									
86									
88									
90									
92									
94									
96									
98									
100									

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

# Log of Boring SB-1805

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18

Date Finished: 06/21/18

Logged By: L. Corenthal

Checked By: A. Ashton

### Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Drill Rate (min/ft)	Sample Information				Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log Description		
0							----0'----		
2									
4									
5 - 6.5		S-01	5 - 6.5	2 2 3	18/18	PID: NM	SILT & CLAY	S-01 (5 to 6.5'): Medium stiff, reddish brown, SILT & CLAY, seam of fine Sand. Moist.	
6									
8									
10							-----10'-----		
10 - 11.5		S-02	10 - 11.5	2 2 4	18/18	PID: NM	CLAYEY SILT	S-02A (10 to 11'): Medium stiff, reddish brown, Clayey SILT. Moist.	
11							-----11'-----		
11.5 - 16.5								S-02B (11 to 11.5'): Loose, reddish brown, fine to coarse SAND, some Silt. Moist.	
12									
14									
15 - 16.5		S-03	15 - 16.5	2 2 2	18/14	PID: NM		S-03 (15 to 16.5'): Very loose, brown, fine SAND, little Silt. Moist. Stratified at approximately 16 feet.	
16									
18									
18							FINE TO COARSE SAND		
20									
20 - 21.5		S-04	20 - 21.5	8 12 12	18/12	PID: NM		S-04 (20 to 21.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
22									
24									



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

### Log of Boring SB-1805

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18

Date Finished: 06/21/18

Logged By: L. Corenthal

Checked By: A. Ashton

#### Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Drill Rate (min/ft)	Sample Information				Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log Description		
26		S-05	25 - 26.5	4 7 8	18/10	PID: NM		S-05 (25 to 26.5'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
30		S-06	30 - 31.5	4 15 10	18/11	PID: NM		S-06 (30 to 31.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
36		S-07	35 - 36.5	4 4 7	18/9	PID: NM		S-07 (35 to 36.5'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
38		S-08	36.5 - 38.5	4 6 8 8	24/11	PID: NM	FINE TO COARSE SAND	S-08 (36.5 to 38.5'): Medium dense, brown/black, fine to coarse SAND, trace Silt. Moist.	
40		S-09	38.5 - 40.5	3 5 5 7	24/12	PID: NM		S-09 (38.5 to 40.5'): Loose, brown/black, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
42		S-10	40.5 - 42.5	3 6 5 7	24/13	PID: NM		S-10 (40.5 to 42.5'): Medium dense, brown/black, fine to coarse SAND, trace Gravel, trace Silt. Moist.	
44		S-11	42.5 - 44.5	3 4 8 7	24/0	PID: NM		S-11 (42.5 to 44.5'): No recovery.	
46		S-12	44.5 - 46.5	7 6 3 8	24/4	PID: NM		S-12 (44.5 to 46.5'): Loose, brown, fine to medium SAND, trace Silt. Wet.	
48		S-13	46.5 - 48.5	2 3 6 8	24/11	PID: NM		S-13 (46.5 to 48.5'): Loose, brown, fine to coarse SAND, trace Silt. Wet.	
50		S-14	48.5 - 50.5	1 3 5 7	24/11	PID: NM		S-14 (48.5 to 50.5'): Loose, brown, fine to medium SAND, trace Silt. Wet.	



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

### Log of Boring SB-1805

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18

Date Finished: 06/21/18

Logged By: L. Coenthal

Checked By: A. Ashton

#### Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
50		S-15	50.5 - 52	3 5 7	18/9	PID: NM	FINE TO COARSE SAND	S-15 (50.5 to 52'): Medium dense, brown, fine to coarse SAND, little Silt. Wet.	At S-15 switch to 3 inch split spoon (18 inches long) from 2 inch split spoon (24 inches long) to increase sample volume.	
52		S-16	52 - 53.5	1 3 5	18/0	PID: NM		S-16 (52 to 53.5'): No recovery.		
54		S-17	53.5 - 55	1 6 10	18/6	PID: NM		S-17 (53.5 to 55'): Medium dense, brown, fine to coarse SAND, trace Silt. Wet.		
56		S-18	55 - 56.5	2 4 7	18/7	PID: NM		S-18 (55 to 56.5'): Medium dense, grayish brown, fine to coarse SAND, trace Silt. Wet.		
58		S-19	56.5 - 58	1 3 7	18/0	PID: NM		S-19 (56.5 to 58'): No recovery.		
60		S-20	58 - 59	NM	12/18	PID: NM		S-20 (58 to 59'): Brown, fine to coarse SAND, little Silt, trace Gravel. Wet.		S-20 sampled by Shelby tube, no recovery and refusal after 1 foot. Then collected with 2 inch split spoon and switch to 2 inch split spoon after S-20.
62		S-21	59 - 60.5	3 8 6	18/14	PID: NM		S-21 (59 to 60.5'): Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel. Wet. Seam black fine to medium SAND at 60 feet.		
64		S-22	60.5 - 62	6 7 11	18/22	PID: NM		S-22 (60.5 to 62'): Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel. Wet.		
66		S-23	62 - 63.5	2 6 9	18/13	PID: NM		S-23 (62 to 63.5'): Medium dense, brown, fine to coarse SAND, trace Silt, trace Gravel. Wet.		
68		S-24	63.5 - 65	3 5 7	18/12	PID: NM		S-24 (63.5 to 65'): Medium dense, brown, fine to coarse SAND, some Silt. Wet.		
70		S-25	65 - 66.5	3 6 7	18/18	PID: NM		S-25 (65 to 66.5'): Medium dense, brown, fine to medium SAND, little Silt. Wet.		Start introducing Bentonite/water mix due to heaving sands.
72		S-26	66.5 - 68	8 11 9	18/18	PID: NM		S-26 (66.5 to 68'): Medium dense, gray/brown, fine to coarse SAND, little Silt, trace Gravel. Wet.		
74		S-27	68 - 69.5	3 6 9	18/14	PID: NM		S-27 (68 to 69.5'): Medium dense, gray, fine to coarse SAND, little Silt, trace Gravel. Wet.		
76		S-28	69.5 - 71	10 11 15	18/15	PID: NM		S-28 (69.5 to 71'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.		
78		S-29	71 - 72.5	10 13 19	18/11	PID: NM		S-29 (71 to 72.5'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.		
80		S-30	72.5 - 74	8 12 10	18/11	PID: NM		S-30 (72.5 to 74'): Medium dense, gray, fine to coarse SAND, trace Gravel, trace Silt. Wet.		
82		S-31	74 - 75.5	11 13 14	18/10	PID: NM		S-31 (74 to 75.5'): Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt. Wet.		



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

# Log of Boring SB-1805

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18

Date Finished: 06/21/18

Logged By: L. Corenthal

Checked By: A. Ashton

### Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00.LOBS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Drill Rate (min/ft)	Sample Information					Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
76		S-32	75.5 - 77	8 12 15	18/13	PID: NM			S-32 (75.5 to 77'): Medium dense, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
78		S-33	77 - 78.5	7 10 14	18/11	PID: NM			S-33 (77 to 78.5'): Medium dense, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
80		S-34	78.5 - 80	7 9 10	18/0	PID: NM			S-34 (78.5 to 80'): No recovery.	
82		S-35	80 - 81.5	4 5 12	18/0	PID: NM		FINE TO COARSE SAND	S-35 (80 to 81.5'): No recovery.	
84		S-36	81.5 - 83	19 18 17	18/10	PID: NM			S-36 (81.5 to 83'): Dense, brown, fine to coarse SAND, some Gravel, trace Silt. Wet.	
84		S-37	83 - 83.9	17 50/5"	11/10	PID: NM			S-37 (83 to 83.9'): Very dense, brown, fine to coarse SAND, some Gravel, little Silt. Wet. Sandstone in tip.	
84.7	NM	S-38 C-01	84.5 - 84.7 84.7 - 89.3	50/2"	2/7 55/39	PID: NM			S-38 (84.5 to 84.7'): Very dense, gray, fine to medium SAND. Wet.	Auger refusal at 84.7 ft. Begin PWL coring.
86		C-01	84.7 to 89.3'						C-01 (84.7 to 89.3'): Medium hard, medium gray, fine to medium-grained, slightly micaceous Sandstone, with very thin to thin horizontal partings spaced 2 to 3 inches apart. Thin horizontal black lenses fine to medium grained carbonaceous Sandstone between 86 and 86.4 feet. Brown fine grained sandstone cobble in upper 0.2 feet.. Moderately fractured. REC=71%. RQD=0%.	
90	8	C-02	89.3 - 94.3		60/27				C-02 (89.3 to 94.3'): Medium hard to very soft, medium gray, fine to medium-grained, slightly micaceous Sandstone, with very thin to thin horizontal partings spaced 2 to 3 inches apart. Very soft, medium spaced Sandstone layers are 2 to 4 inches. Soft, medium spaced horizontal Silty Clay inclusions. Extremely fractured to sound. REC=45%. RQD=45%.	
94	7	C-03	94.3 - 99.3		60/60			SANDSTONE	C-03 (94.3 to 99.3'): Medium hard to very soft, medium gray, fine to medium-grained, slightly micaceous Sandstone, with thin to medium partings spaced 1 inch to 13 inches apart. Thin horizontal layers of very soft fine to medium grained Sandstone from 94.3 to 96.9 feet. Moderately fractured. REC=100%. RQD=62%.	
100	6	C-04	99.3 - 104.3		60/60				C-04 (99.3 to 104.3'): Medium hard to very soft, gray, fine to medium-grained,	



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

### Log of Boring SB-1805

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18

Date Finished: 06/21/18

Logged By: L. Corenthal

Checked By: A. Ashton

#### Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Drill Rate (min/ft)	Sample Information				Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log Description		
100								SANDSTONE, with very thin to thin partings spaced 1 inch to 11 inches apart. Thin horizontal layers of very soft fine to medium grained Sandstone between 100.5 and 101.5 feet.. Extremely fractured to sound. REC=100%. RQD=38%.	
102									
104	3	C-05	104.3 - 109.3		60/60			C-05 (104.3 to 109.3'): Medium hard to hard, gray, very fine to fine-grained, SANDSTONE, Medium spaced moderately dipping to low angle to low angle black fine grained Sandstone lenses from 104.3 to 108.3 feet. Very soft gray fine to medium-grained very thin to thin horizontal partings spaced 2 to 4 inches apart from 108.3 to 109.3 feet. Broken platy dark gray zone at 108.3 feet. Moderately fractured to sound. REC=100%. RQD=80%.	
106									
108									
110	NM	C-06	109.3 - 114.3		60/60		SANDSTONE	C-06 (109.3 to 114.3'): Medium hard to soft, gray, very fine to medium-grained, SANDSTONE, very thin to thin horizontal low angle partings spaced less than 1 inch to 3 inches apart. Black fine to medium-grained very thin to thin spaced Sandstone lenses from 109.3 to 109.9.. Extremely fractured. REC=100%. RQD=0%.	
112									
114	5	C-07	114.3 - 119.3		60/60			C-07 (114.3 to 119.3'): Medium hard to soft, light medium gray, very fine to medium-grained, SANDSTONE, very thin to medium horizontal partings spaced 1 to 6 inches apart. Black fine to medium-grained very thin to medium spaced sandstone lenses from 114.3 to 117 feet. Extremely fractured to sound. REC=100%. RQD=52%.	
116									
118									
120	4	C-08	119.3 - 124.3		60/60		SHALE	C-08 (119.3 to 124.3'): Medium hard to soft, light gray, very fine to medium-grained, SANDSTONE, with thin horizontal partings spaced 2 to 5 inches apart and very thinly spaced clack horizontal lenses. Bed of very soft to soft, dark gray, very fine grained Silty clay Shale with very thin to thin partings spaced less than 1 inch to 5 inches apart. Shale from 119.6 to 122.3 feet.. Extremely fractured to slightly fractured. REC=100%. RQD=38%.	
122									
124	8	C-09	124.3 - 129.3		60/53		SANDSTONE	C-09A (124.3 to 125.3'): Medium hard, light gray, very fine to medium-grained,	





Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

# Log of Boring SB-1805

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: HWT Casing with advancer, 3 1/4" ID HSA, PWL Coring

Sampling Method: 2" O.D and 3" O.D. Split Spoon with automatic hammer; 2" OD Shelby tube; NQ2 5-ft long core barrel

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis/K. Fowler

Date Started: 06/18/18

Date Finished: 06/21/18

Logged By: L. Corenthal

Checked By: A. Ashton

### Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	07:00	38.7'	Ground Surface	0'	133.8'	~ 14 hours

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Drill Rate (min/ft)	Sample Information				Stratum		Geologic Description	Remarks
		Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log Description		
126							SANDSTONE	SANDSTONE, with very thin to thin black lenses. Sound. REC=88%. RQD=65%.	
128							COAL	C-09B (125.3 to 129.3'): Very soft to soft, black, very fine grained, COAL, with thinly spaced horizontal partings, very soft gray very fine grained horizontal Clay-rich zone from 125.5 to 125.8 feet, very thin to thin Clay lenses with Pyrite throughout. Vertical crack with calcite mineralization from 127.6 to 129.8 feet. Extremely to moderately fractured.	
130	NM	C-10	129.3 - 131.8		30/30			C-10A (129.3 to 130.4'): Very soft to soft, black, very fine grained, COAL, with thin to very thin horizontal partings. Vertical cracks with calcite mineralization from 129.2 to 129.8 feet and 130.0 to 130.3 feet. Extremely to moderately fractured.	
132	NM	C-11	131.8 - 133.8		24/20		SHALE	C-10B (130.4 to 131.8'): Very soft to medium hard, dark gray, very fine grained, SILTY CLAY SHALE, with very thin to thin horizontal partings. Clay rich zone from 130.4 to 130.8 feet. Slight Organic sheen. Extremely fractured. C-11 (131.8 to 133.8'): Very soft to medium hard, dark gray, very fine grained, SILTY CLAY SHALE, with very thin horizontal, bedding. slight Organic sheen. Extremely to moderately fractured. REC=83%. RQD=0%.	
134								Boring terminated at 133.8 feet. No refusal encountered.	
136									
138									
140									
142									
144									
146									
148									
150									

**NOTES:**

- Approximately 5200 gallons of potable water was introduced during drilling upon completion of coring (approximately 3,200 gallons was used to advance to top of bedrock from a combination of potable wells and the plant fire suppression system; approximately 2,000 gallons of water from the plant fire suppression system was used during bedrock coring).
- Continuous sampling started approximately 5 ft above the water table based on a water level measurement collected by Sanborn Head on 6/18/2018 at 15:20 at MW-1605S of 44.84 ft below Top of PVC Riser and at 15:34 at MW-1604S of 51.99 ft below Top of PVC Riser.
- Advanced HWT casing to 29 ft bgs. Due to damage to casing advancer at 29 ft, advanced 3 1/4" ID hollow stem augers to 30 ft bgs to auger refusal at 84.7 ft bgs. Advanced HWT casing with roller bit advancer to 84.7 ft and began PWL coring at 84.7 ft.
- Approximately 1 week following completion of sample collection, the borehole was completed as a monitoring well by Terracon Consultants, Inc. Monitoring well installation was not observed by Sanborn Head personnel.



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

# Log of Boring SB-1806

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/22/18

Date Finished: 06/22/18

Logged By: L. Corenthal

Checked By: A. Ashton

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks	
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description			
0							----0'----		No samples collected 0 to 10 ft.	
2										
4										
6										
8										
10	S-01	10 - 11.5	2 2 3	18/19	PID: NM		----10'----	S-01 (10 to 11.5'): Medium stiff, reddish brown, SILT and fine Sand. Moist. Slightly stratified.		
12	S-02	11.5 - 13	2 4 4	18/4	PID: NM		SILT & FINE SAND	S-02 (11.5 to 13'): Loose, reddish brown, fine SAND, some Silt, trace Clay. Moist.		
14	S-03	13 - 14.5	7 11 10	18/16	PID: NM		----13'----	S-03 (13 to 14.5'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.		
16										No samples collected from 14.5 to 37 feet. Stratum descriptions based on auger returns.
18										
20							FINE TO COARSE SAND			
22										
24										
26										



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

### Log of Boring SB-1806

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/22/18

Date Finished: 06/22/18

Logged By: L. Corenthal

Checked By: A. Ashton

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
26									
28									
30									
32									
34									
36									
37 - 39	S-04	37 - 39	2 3 4 4	24/16	PID: NM			S-04 (37 to 39'): Loose, brown, fine to medium SAND, trace Silt. Moist.	
39 - 41	S-05	39 - 41	2 5 5 6	24/16	PID: NM		FINE TO COARSE SAND	S-05 (39 to 41'): Loose, brown, fine to coarse SAND, trace Silt. Moist.	
41 - 43	S-06	41 - 43	2 4 5 5	24/22	PID: NM			S-06 (41 to 43'): Loose, brown, fine to medium SAND, trace Silt. Moist.	
43 - 44.5	S-07	43 - 44.5	3 5 7	18/24	PID: NM			S-07 (43 to 44.5'): Medium dense, brown/black, fine to coarse SAND, trace Silt. Wet.	
44.5 - 46.5	S-08	44.5 - 46.5	1 3 3 4	24/16	PID: NM			S-08 (44.5 to 46.5'): Loose, brown, fine to coarse SAND, trace Silt. Wet.	Start introducing water to augers due to heaving sand.
46.5 - 48.5	S-09	46.5 - 48.5	1 2 2 4	24/12	PID: NM			S-09 (46.5 to 48.5'): Very loose, brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
48.5 - 50.5	S-10	48.5 - 50.5	WOH/6" 1 4 6	24/17	PID: NM			S-10 (48.5 to 50.5'): Loose, brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
50.5 - 52	S-11	50.5 - 52	1 3 4	18/7	PID: NM			S-11 (50.5 to 52'): Loose, brown, fine to coarse SAND, trace Silt. Wet.	S-11 sampled using a 3 inch OD, 18 inch long split spoon.
52									



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

# Log of Boring SB-1806

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

### Groundwater Readings

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/22/18

Date Finished: 06/22/18

Logged By: L. Corenthal

Checked By: A. Ashton

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
52	S-12	52 - 54	5 8 11 12	24/13	PID: NM	FINE TO COARSE SAND	S-12 (52 to 54'): Medium dense, brown, fine to coarse SAND, trace Silt, trace Gravel. Wet. Seam of black Sand at approximately 52.8 feet.		
54	S-13	54 - 56	2 8 12 12	24/15	PID: NM		S-13 (54 to 56'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Wet. Seam of black Sand at 54.8 feet.		
56	S-14	56 - 58	3 7 11 15	24/12	PID: NM		S-14 (56 to 58'): Medium dense, brown, fine to coarse SAND, little Silt. Wet.		
58	S-15	58 - 60	2 3 6 9	24/12	PID: NM		S-15 (58 to 60'): Loose, brown/gray, fine to coarse SAND, little Silt. Wet.		
60	S-16	60 - 62	2 8 12 13	24/17	PID: NM		S-16 (60 to 62'): Medium dense, brown, fine to coarse SAND, trace Silt. Wet.		
62	S-17	62 - 64	2 8 15 13	24/16	PID: NM		S-17 (62 to 64'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.		
64	S-18	64 - 66	2 3 12 19	24/15	PID: NM		S-18 (64 to 66'): Medium dense, brown/gray, fine to coarse SAND, trace Gravel, trace Silt. Wet.		
66	S-19	66 - 68	2 3 5 5	24/12	PID: NM		S-19 (66 to 68'): Loose, brown/gray, fine to coarse SAND, trace Silt. Wet.	Repeat S-19 Pen/Rec = 24"/12".	
68	S-20	68 - 70	4 5 5 5	24/15	PID: NM		S-20 (68 to 70'): Loose, brown/gray, fine to coarse SAND, trace Silt. Wet. Coarse Sand & Gravel at 69.7 feet. Sandstone Cobble at tip.	Repeat S-20 Pen/Rec = 24"/20".	
70	S-21	70 - 72	4 4 3 5	24/19	PID: NM		S-21 (70 to 72'): Loose, brown/gray, fine to coarse SAND, little Gravel, trace Silt. Wet.	Repeat S-21 Pen/Rec = 24"/0".	
72	S-22	72 - 74	4 4 3 5	24/22	PID: NM		S-22 (72 to 74'): Loose, brown/gray, fine to coarse SAND, trace Gravel, trace Silt. Wet. Fine to coarse Sand, little Gravel from 73.4 to 74.	Repeat S-22 Pen/Rec = 24"/17".	
74	S-23	74 - 76	3 6 7 14	24/14	PID: NM		S-23 (74 to 76'): Medium dense, brown, fine to coarse SAND, trace Gravel, trace Silt. Wet. Seam of fine Sand and Silt at 75.6 to 75.8 feet. Seam of black Sand at 75.8 to 76 feet..	Repeat S-23 Pen/Rec = 24"/15".	
76	S-24	76 - 78	3 5 7 7	24/17	PID: NM		S-24 (76 to 78'): Medium dense, gray/brown, fine to coarse SAND, trace Gravel, trace Silt. Wet. Layer of fine to coarse Sand, some Gravel from 77.5 to 78 feet.		
78									



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

### Log of Boring SB-1806

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/22/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/22/18

Date Finished: 06/22/18

Logged By: L. Corenthal

Checked By: A. Ashton

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
78							-----78'-----	Boring terminated at 78 feet. No refusal encountered.	
80								NOTES: 1. Approximately 675 gallons of potable water was introduced during drilling. 2. Continuous sampling started approximately 5 ft above the water table based on a water level measurement collected by Sanborn Head on 6/22/2018 at 14:20 at MW-1606S of 43.77 ft below Top of PVC Riser. 3. Upon completion, the borehole was backfilled by piping a bentonite mix (consisting of 200 gallons of potable water and 150 pounds of bentonite) using a hose through augers to approximately 40 ft bgs. From 40 ft bgs to ground surface the borehole was backfilled with bentonite chips.	
82									
84									
86									
88									
90									
92									
94									
96									
98									
100									
102									
104									



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

# Log of Boring SB-1808

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.
06/27/18	---	Not Measured	

Depth of Casing	Depth of Hole	Stab. Time

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/27/18

Date Finished: 06/27/18

Logged By: L. Corenthal

Checked By: A. Ashton

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
0							----0'----		No samples collected 0 to 9 ft.
2									
4									
6									
8									
9 - 11	S-01	9 - 11	1 2 2 3	24/9	PID: NM		----9'----	S-01 (9 to 11'): Soft, brown, Silty CLAY, trace fine Sand. Moist. Slightly stratified.	No samples collected from 11 to 37 feet. Stratum descriptions based on auger returns.
10							SILTY CLAY		
11							----11'----		
12									
14									
16									
18									
20									
22									
24									
26									
28									
								FINE TO COARSE SAND	





Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

### Log of Boring SB-1808

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/27/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/27/18

Date Finished: 06/27/18

Logged By: L. Coenthal

Checked By: A. Ashton

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/Rec (in)	Field Testing Data	Log	Description		
30									
32									
34									
36									
38	S-02	37 - 39	5 7 5 8	24/15	PID: NM			S-02 (37 to 39'): Medium dense, brown, fine to coarse SAND, little Gravel, trace Silt. Moist.	
40	S-03	39 - 41	4 8 6 7	24/16	PID: NM			S-03 (39 to 41'): Medium dense, brown, fine to coarse SAND, some Gravel, trace Silt. Moist.	
42	S-04	41 - 43	1 2 4 5	24/18	PID: NM			S-04 (41 to 43'): Loose, brown, fine to coarse SAND, trace Gravel, trace Silt. Wet.	
44	S-05	43 - 45	1 2 4 5	24/24	PID: NM		FINE TO COARSE SAND	S-05 (43 to 45'): Loose, brown, fine to coarse SAND, little Gravel, trace Silt. Wet. Seam of black fine to medium Sand at 44.8 feet.	Start introducing water to augers due to heaving sand.
46	S-06	45 - 47	1 3 3 5	24/20	PID: NM			S-06 (45 to 47'): Loose, brown, fine to coarse SAND, little Silt. Wet. Lens of black fine sand at 46.7 feet.	Repeat S-06 Pen/Rec = 24"/14".
48	S-07	47 - 49	2 2 2 3	24/16	PID: NM			S-07 (47 to 49'): Very loose, brown, fine to coarse SAND, trace Gravel, trace Silt. Wet. Sandstone Gravel at 48.5 feet.	Repeat S-07 Pen/Rec = 24"/12"
50	S-08	49 - 51	2 3 5 4	24/12	PID: NM			S-08 (49 to 51'): Loose, dark brown/black, fine to coarse SAND, trace Gravel, trace Silt. Wet.	Repeat S-08 Pen/Rec = 24"/16"
52	S-09	51 - 53	3 6 5 5	24/20	PID: NM			S-09 (51 to 53'): Medium dense, brown, fine to coarse SAND, little Silt. Wet. Seam of dark brown fine to medium Sand at 51.6 to 51.8 feet.	Repeat S-09 Pen/Rec = 24"/12" and 24"/17".
54	S-10	53 - 55	1 3 7 14	24/17	PID: NM			S-10 (53 to 55'): Loose, brown, fine to coarse SAND, little Silt, trace Gravel. Wet.	Repeat S-10 Pen/Rec = 24"/12" and 24"/15".
56	S-11	55 - 57	3 7 14 15	24/22	PID: NM			S-11 (55 to 57'): Medium dense, brown, fine to coarse SAND, little Silt, trace Gravel. Wet. Seam fine Sand and Silt at 56.8 to 57 feet.	



Project: AEP Mountaineer  
 Location: New Haven, WV  
 Project No.: 4345.00

### Log of Boring SB-1808

Ground Elevation: Not Available

Sanborn, Head & Associates, Inc.

Drilling Method: 3/4" ID Hollow Stem Auger

Sampling Method: 2" O.D. Split Spoon, Automatic Hammer

**Groundwater Readings**

Date	Time	Depth to Water	Ref. Pt.	Depth of Casing	Depth of Hole	Stab. Time
06/27/18	---	Not Measured				

Drilling Company: Terracon Consultants, Inc.

Foreman: N. Francis

Date Started: 06/27/18

Date Finished: 06/27/18

Logged By: L. Corenthal

Checked By: A. Ashton

Depth (ft)	Sample Information					Stratum		Geologic Description	Remarks
	Sample No.	Depth (ft)	Spoon Blows per 6 in	Pen/ Rec (in)	Field Testing Data	Log	Description		
58	S-12	57 - 59	7 3 4 7	24/16	PID: NM		FINE TO MEDIUM SAND	S-12 (57 to 59'): Loose, brown/black, fine to medium SAND, little Silt. Wet.	
60							-----59'-----	Boring terminated at 59 feet. No refusal encountered.	
62								NOTES: 1. Approximately 200 gallons of potable water was introduced to the augers during drilling. 2. Continuous sampling started approximately 5 ft above the water table based on a water level measurement collected by Sanborn Head on 6/27/2018 at 8:55 AM at MW-1608 of 44.79 ft below Top of PVC Riser. 3. Upon completion, the borehole was backfilled by piping a bentonite mix (consisting of 200 gallons of potable water and 150 pounds of bentonite) using a hose through augers to approximately 2 ft bgs and placing bentonite chips from 0 to 2 ft bgs.	

BORING LOG P:\4300S\4345.00\WORK\LOGS\4345.00 LOGS.GPJ 2017 SANBORN HEAD V1.GLB 2017 SANBORN HEAD V1.GDT 12/7/18

**APPENDIX C**

**AVERAGE GROUNDWATER  
CONCENTRATION PLANS**





Figure C.1

# Average Groundwater Concentration (Cobalt)

Bottom Ash Pond Geochemical Assessment

AEP Mountaineer Plant  
New Haven, West Virginia

Drawn By: L. Corenthal  
Designed By: A. Ashton  
Reviewed By: C. Crocetti  
Project No: 4345.00  
Date: December 2018

## Figure Narrative

This figure shows the average concentration in groundwater of Appendix IV parameters in the vicinity of the Bottom Ash Pond Coal Combustion Residual (CCR) Unit. Average concentrations are based on samples collected between September 2016 and October 2017 and reported in units of micrograms per liter (µg/l).

## Notes

1. Sample locations are referenced from the Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation Report, prepared by Arcadis U.S., Inc., on behalf of American Electric Power, dated October 27, 2016.

2. Analytical results are referenced from Appendix I of the Annual Groundwater Monitoring Report, prepared by American Electric Power Service Corporation on behalf of Appalachian Power Company, dated January 2018.

## Legend

- MW-1602 Upgradient Well ID
- 0.11 Average Concentration
- MW-1604S Downgradient Shallow Well ID
- 0.35 Average Concentration
- MW-1606D Downgradient Deep Well ID
- 1.91 Average Concentration

### Average Concentration (µg/l)

- 0.00 - 1.00
- 1.01 - 2.00
- 2.01 - 3.00
- 3.01 - 4.00
- 4.01 - 5.00
- 5.01 - 6.00







Figure C.2

# Average Groundwater Concentration (Lithium)

## Bottom Ash Pond Geochemical Assessment

AEP Mountaineer Plant  
New Haven, West Virginia

Drawn By: L. Corenthal  
 Designed By: A. Ashton  
 Reviewed By: C. Crocetti  
 Project No: 4345.00  
 Date: December 2018

### Figure Narrative

This figure shows the average concentration in groundwater of Appendix IV parameters in the vicinity of the Bottom Ash Pond Coal Combustion Residual (CCR) Unit. Average concentrations are based on samples collected between September 2016 and October 2017 and reported in units of micrograms per liter (µg/l).

### Notes

1. Sample locations are referenced from the Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation Report, prepared by Arcadis U.S., Inc., on behalf of American Electric Power, dated October 27, 2016.
2. Analytical results are referenced from Appendix I of the Annual Groundwater Monitoring Report, prepared by American Electric Power Service Corporation on behalf of Appalachian Power Company, dated January 2018.

### Legend

- MW-1602 Upgradient Well ID  
13.9 Average Concentration
- MW-1604S Downgradient Shallow Well ID  
34.9 Average Concentration
- MW-1606D Downgradient Deep Well ID  
122 Average Concentration

### Average Concentration (µg/l)

- 0.0 - 40.0
- 40.1 - 80.0
- 80.1 - 120.0
- 120.1 - 160.0

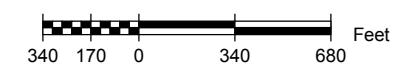






Figure C.3

# Average Groundwater Concentration (Molybdenum)

## Bottom Ash Pond Geochemical Assessment

AEP Mountaineer Plant  
New Haven, West Virginia

Drawn By: L. Corenthal  
Designed By: A. Ashton  
Reviewed By: C. Crocetti  
Project No: 4345.00  
Date: December 2018

### Figure Narrative

This figure shows the average concentration in groundwater of Appendix IV parameters in the vicinity of the Bottom Ash Pond Coal Combustion Residual (CCR) Unit. Average concentrations are based on samples collected between September 2016 and October 2017 and reported in units of micrograms per liter (µg/l).

### Notes

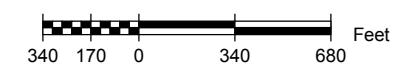
1. Sample locations are referenced from the Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation Report, prepared by Arcadis U.S., Inc., on behalf of American Electric Power, dated October 27, 2016.
2. Analytical results are referenced from Appendix I of the Annual Groundwater Monitoring Report, prepared by American Electric Power Service Corporation on behalf of Applachian Power Company, dated January 2018.

### Legend

- MW-1602 Upgradient Well ID  
0.9 Average Concentration
- MW-1604S Downgradient Shallow Well ID  
2.6 Average Concentration
- MW-1606D Downgradient Deep Well ID  
78.0 Average Concentration

### Average Concentration (µg/l)

- 0.0 - 20.0
- 20.1 - 40.0
- 40.1 - 60.0
- 60.1 - 80.0
- 80.1 - 100.0



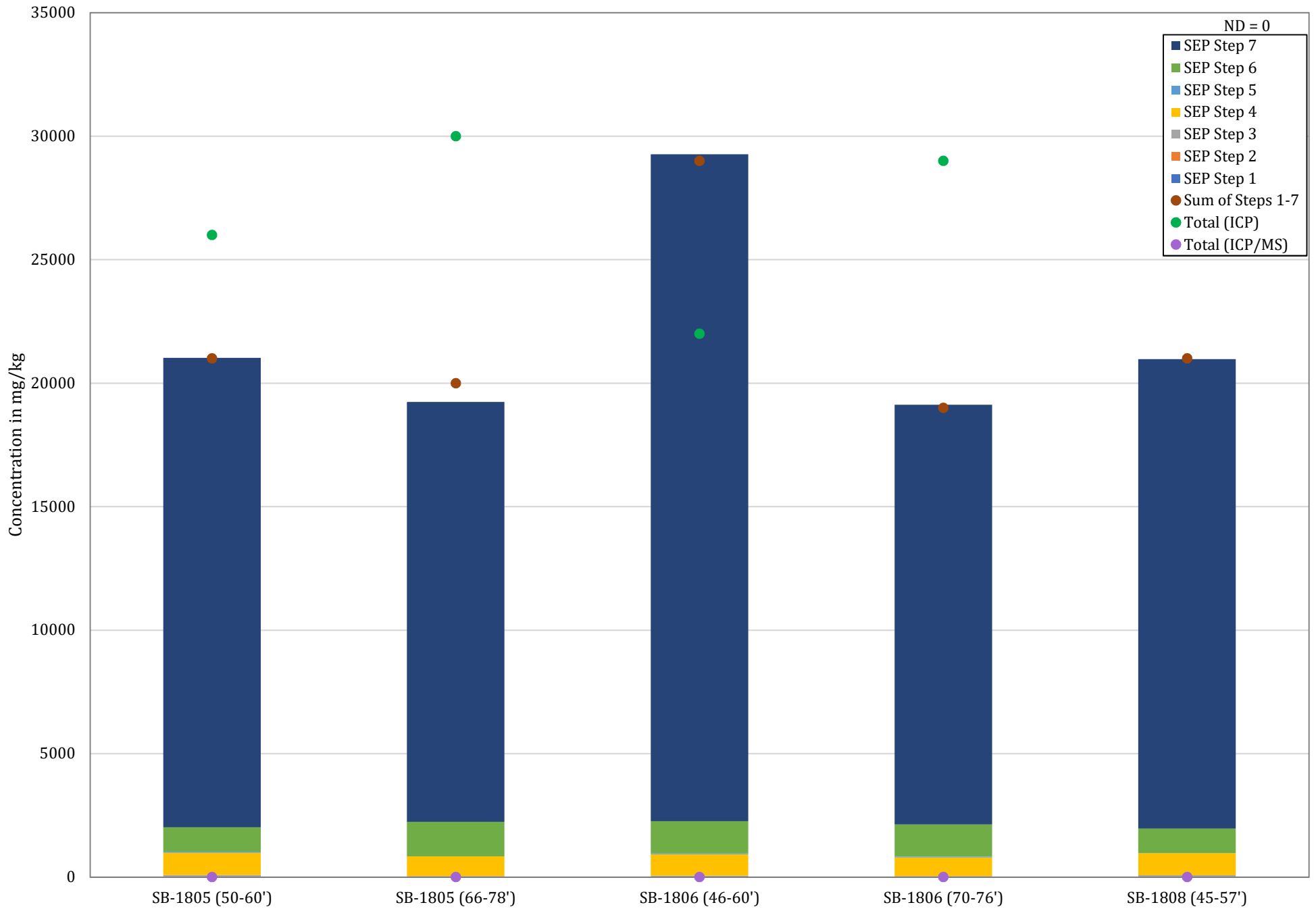


**APPENDIX D**

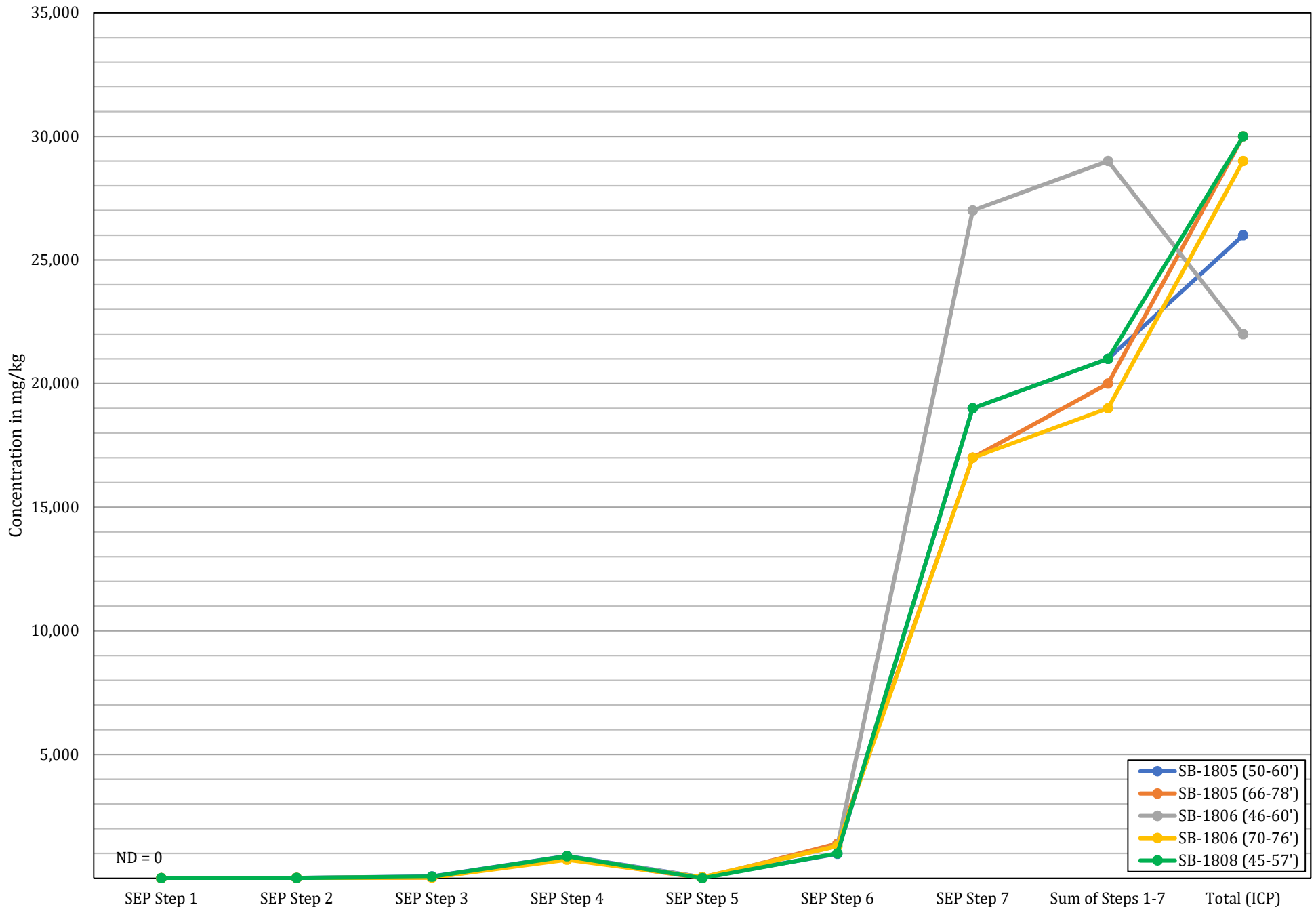
**SEQUENTIAL EXTRACTION  
PROCEDURE CHARTS**

**APPENDIX D.1**  
**SEP CHARTS BY ANALYTE**

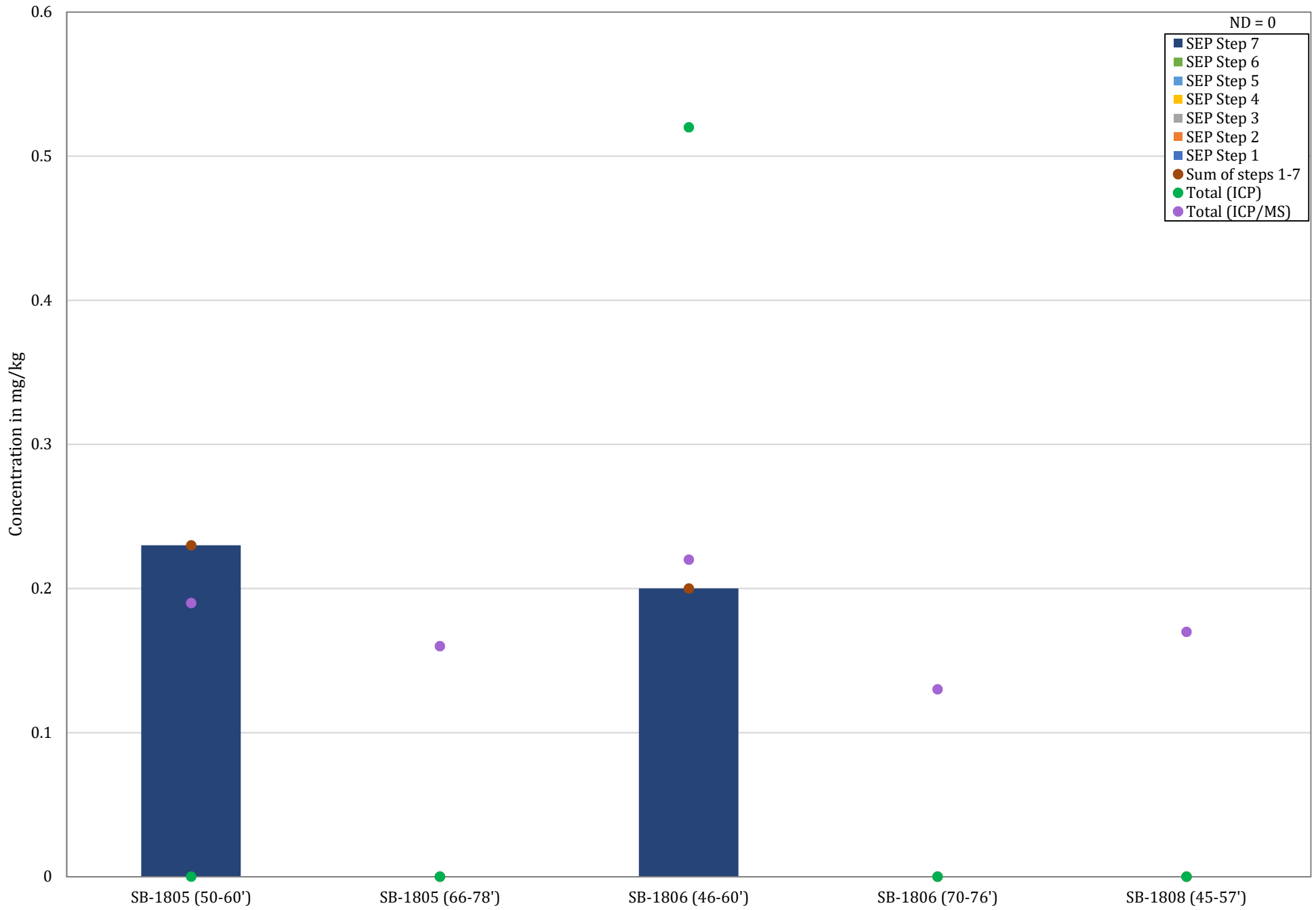
# Aluminum – SEP Analytical Data



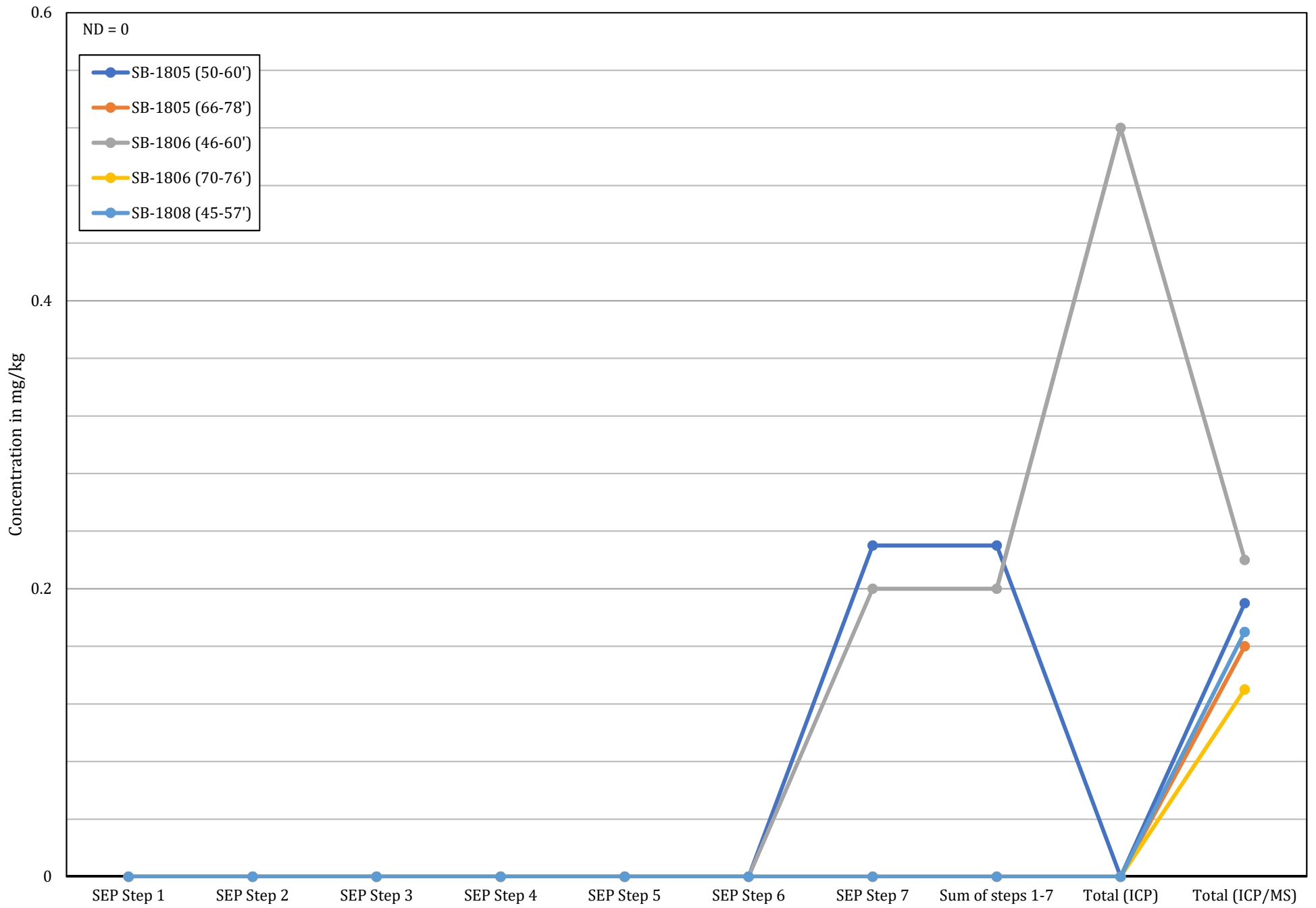
# Aluminum - SEP Analytical Data



# Antimony - SEP Analytical Data

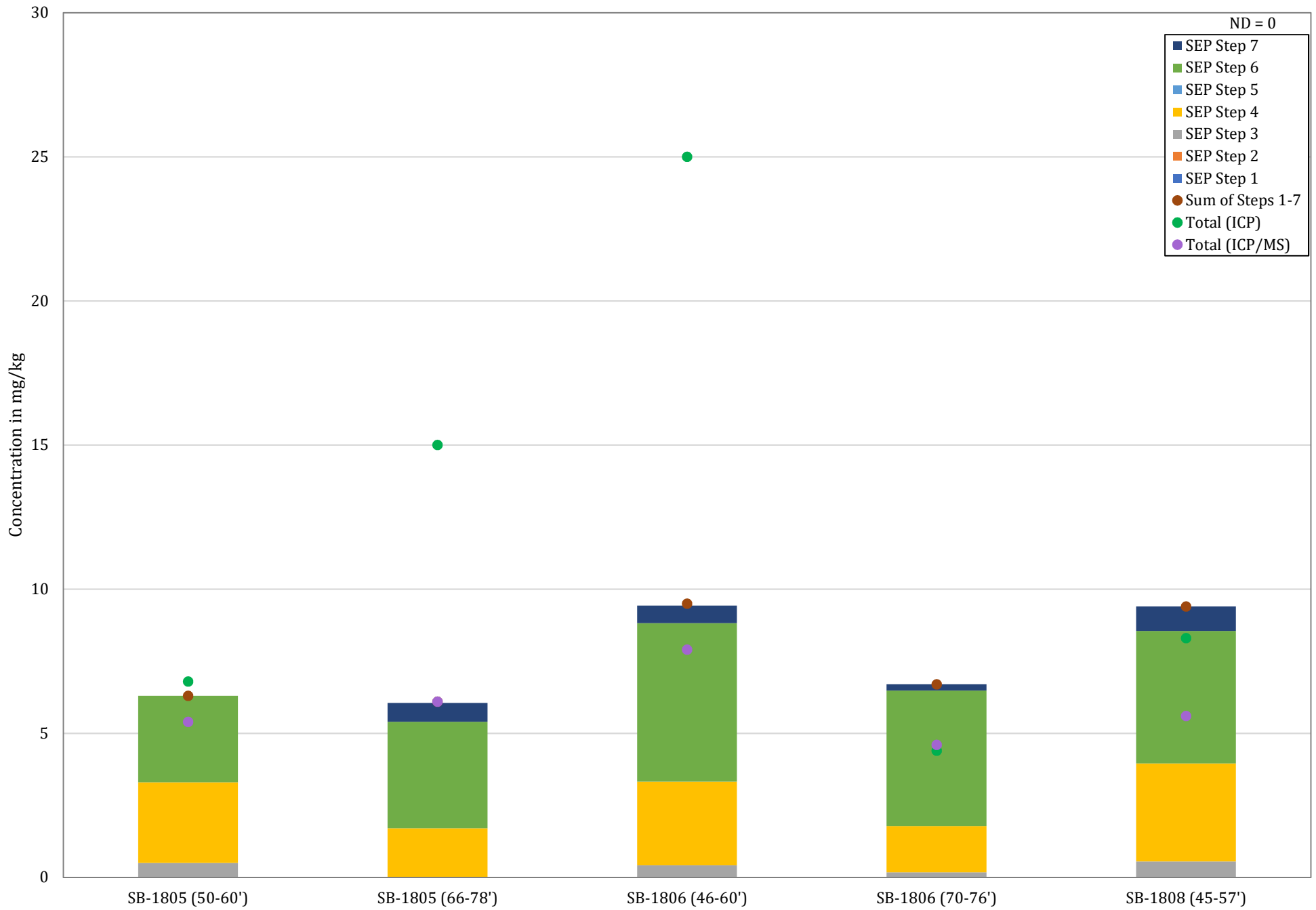


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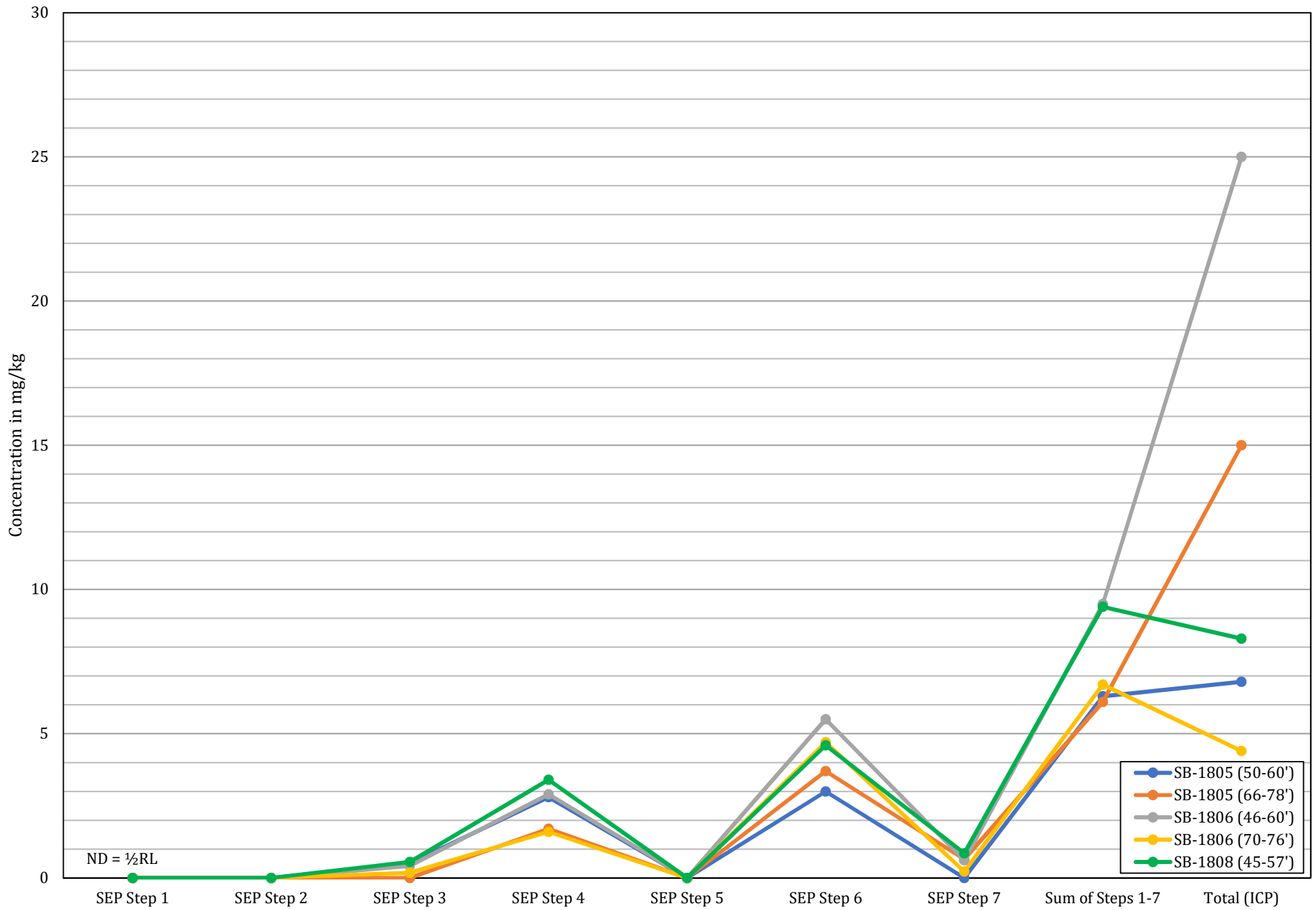




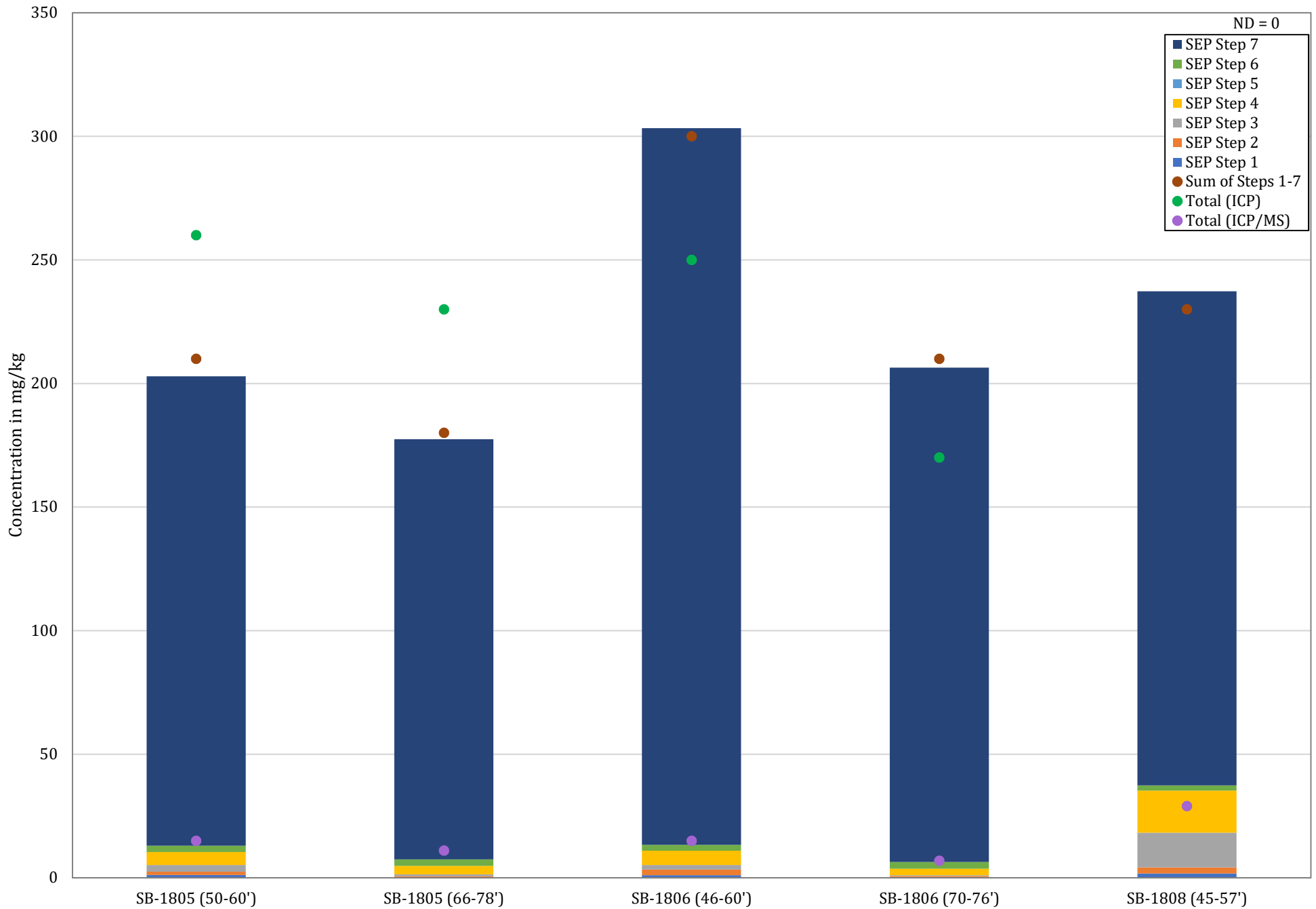
## Arsenic - SEP Analytical Data



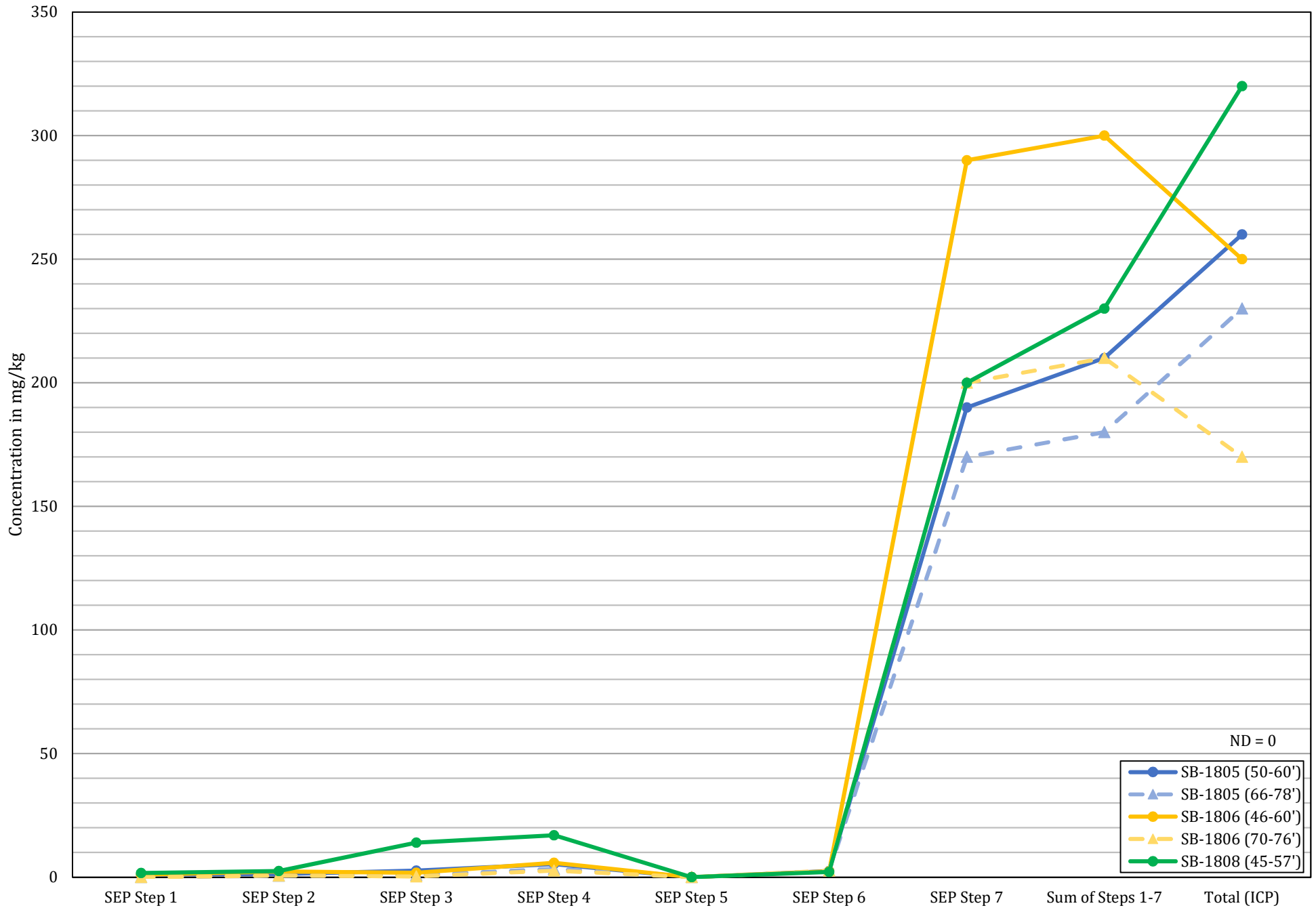
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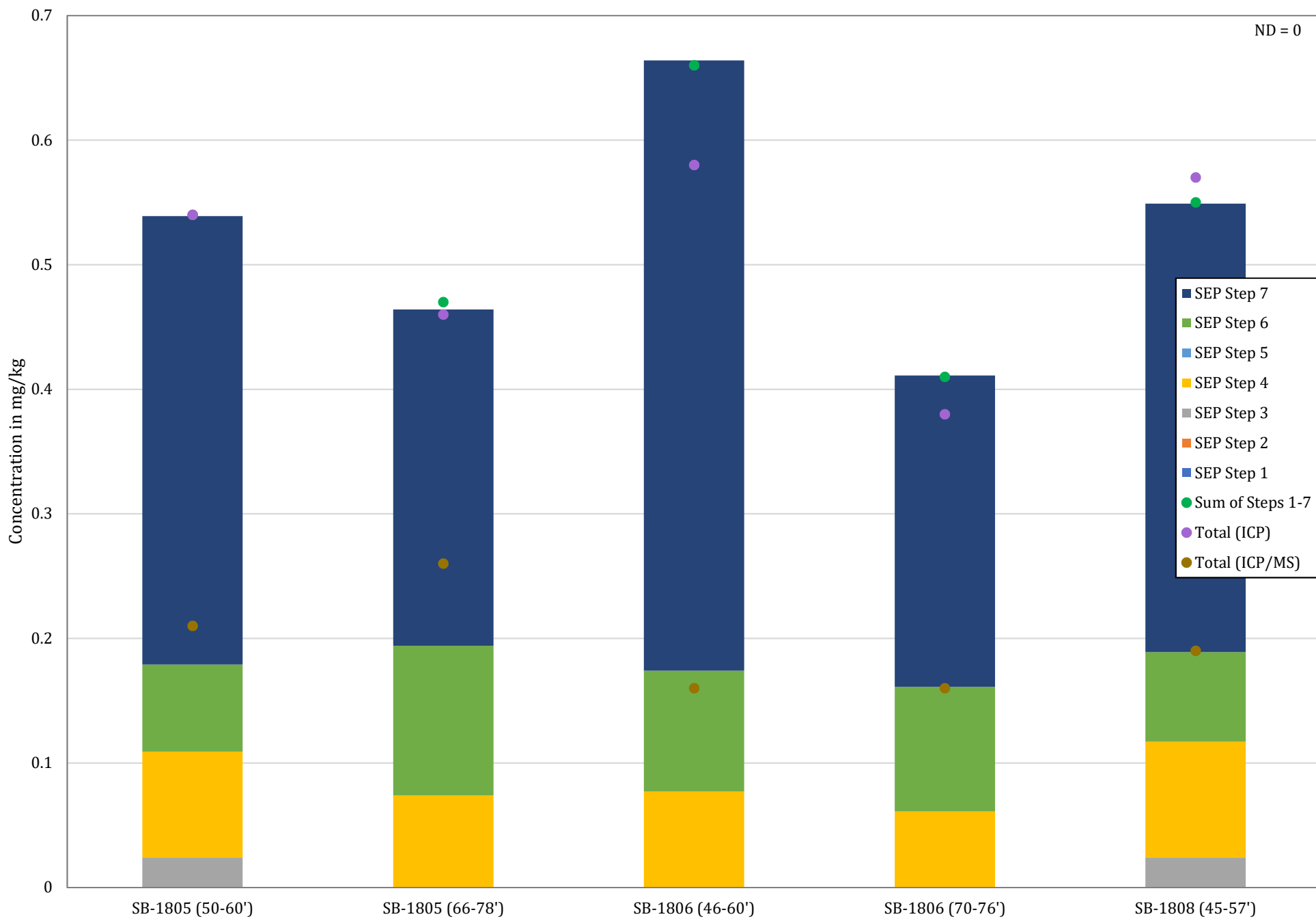
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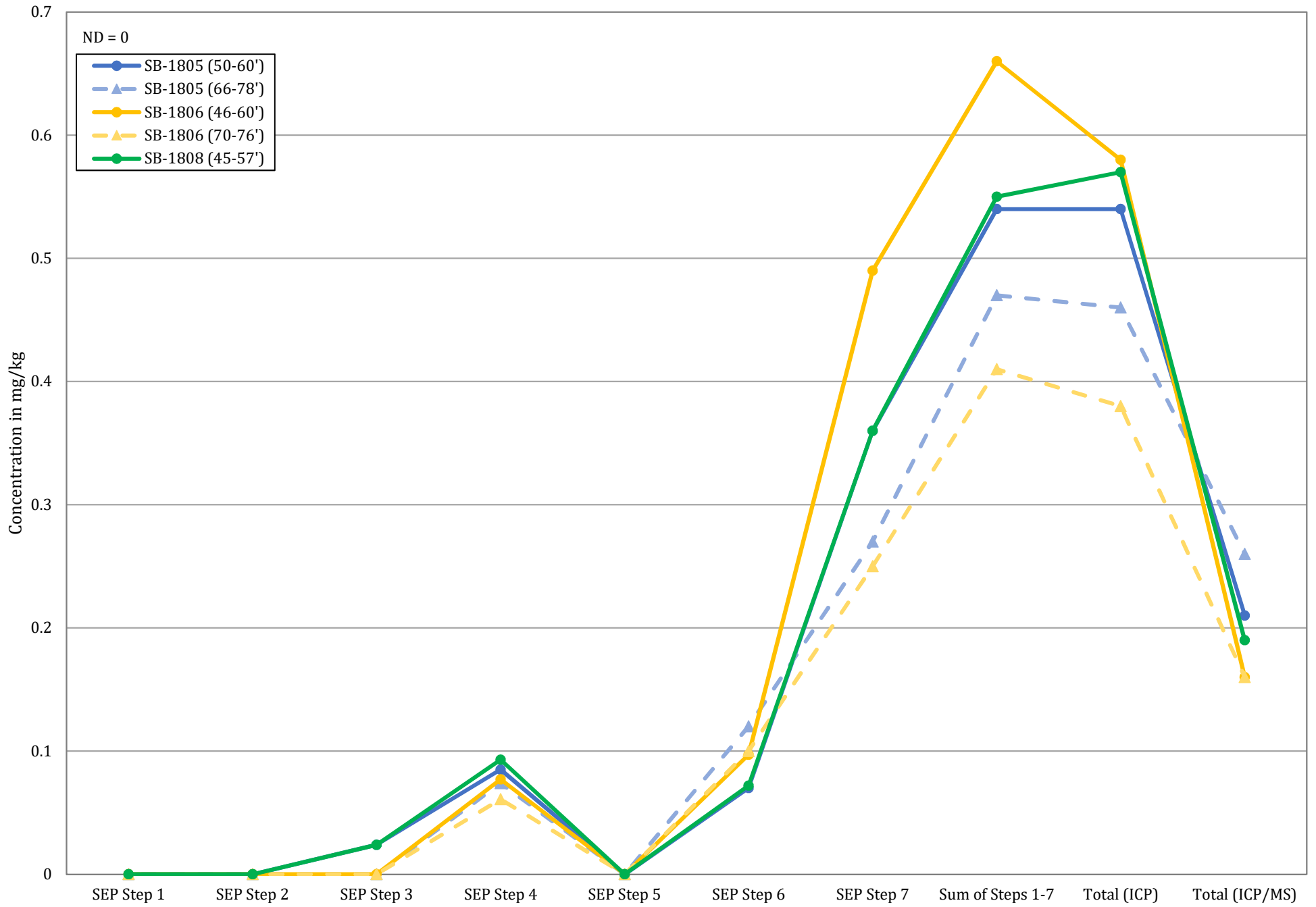
## Barium – SEP Analytical Data



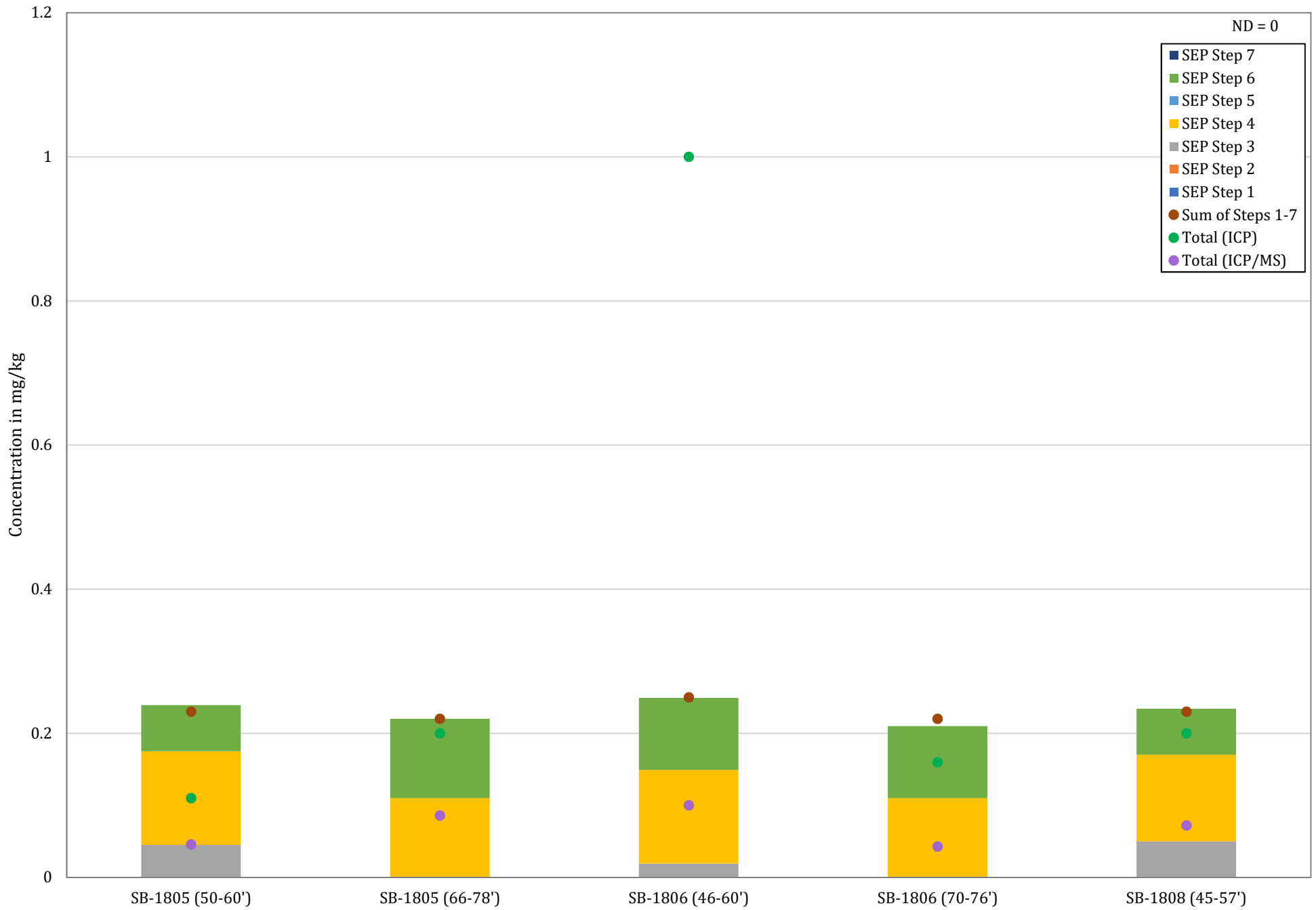
# Beryllium - SEP Analytical Data



# Beryllium - SEP Analytical Data

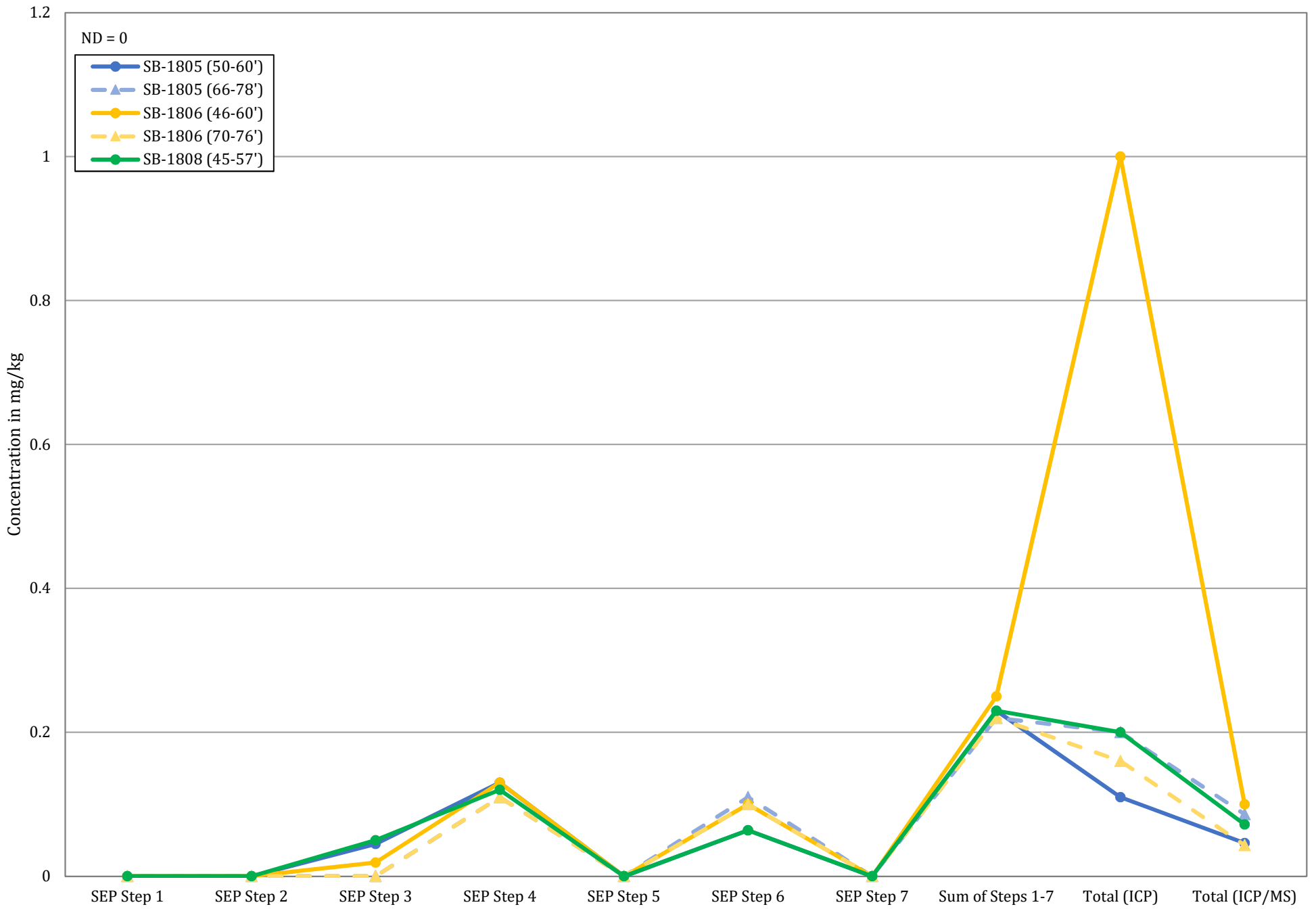


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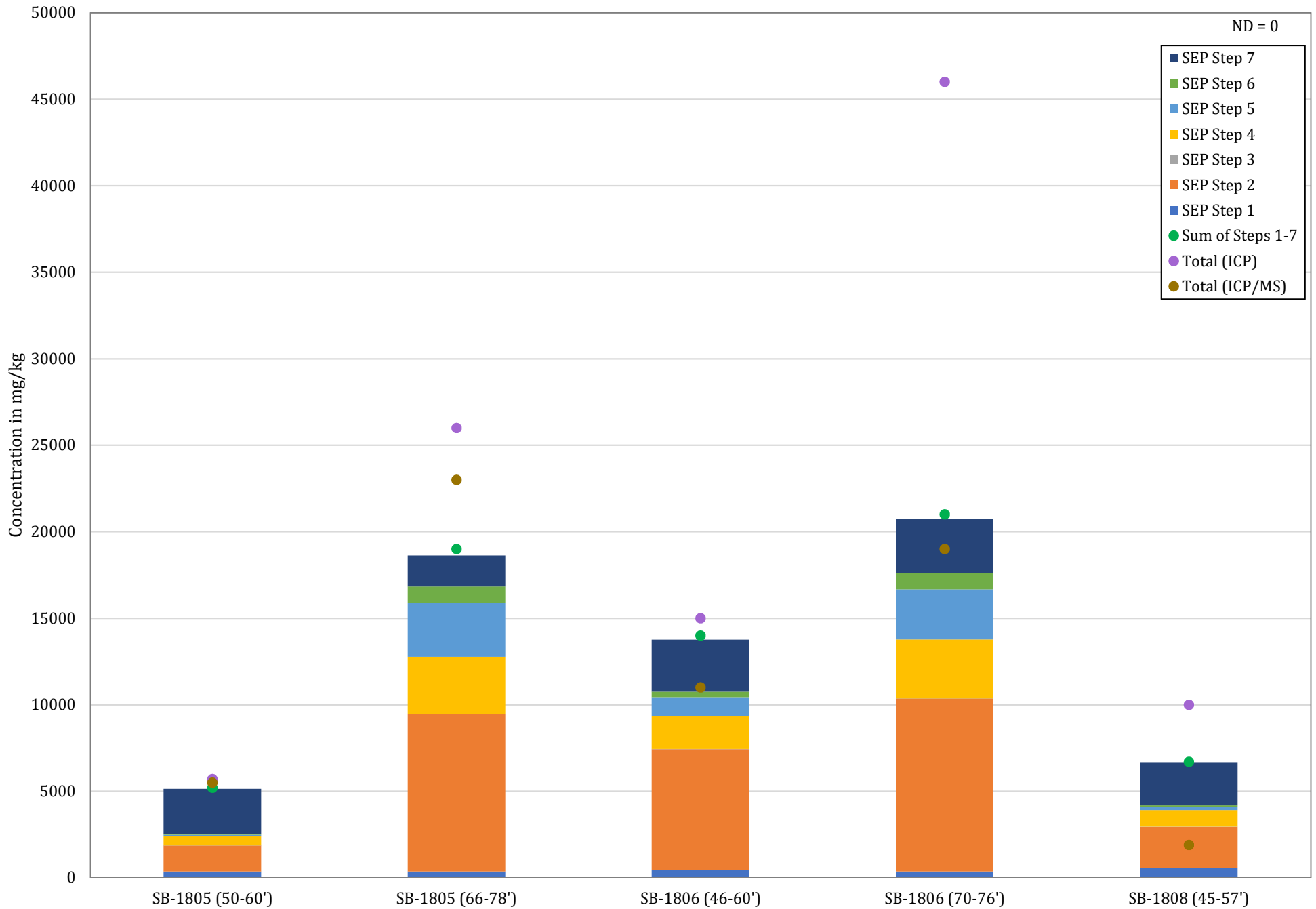




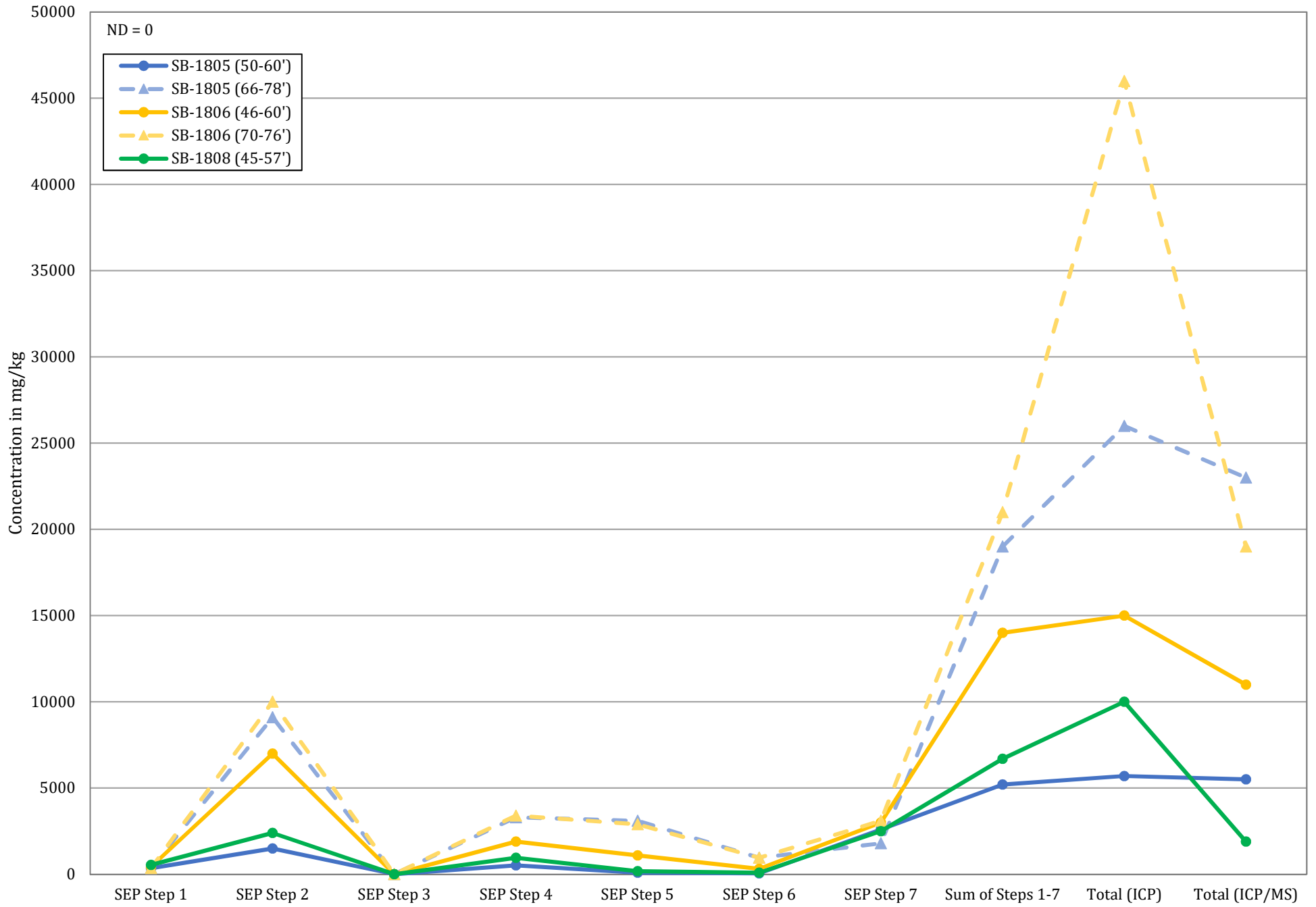
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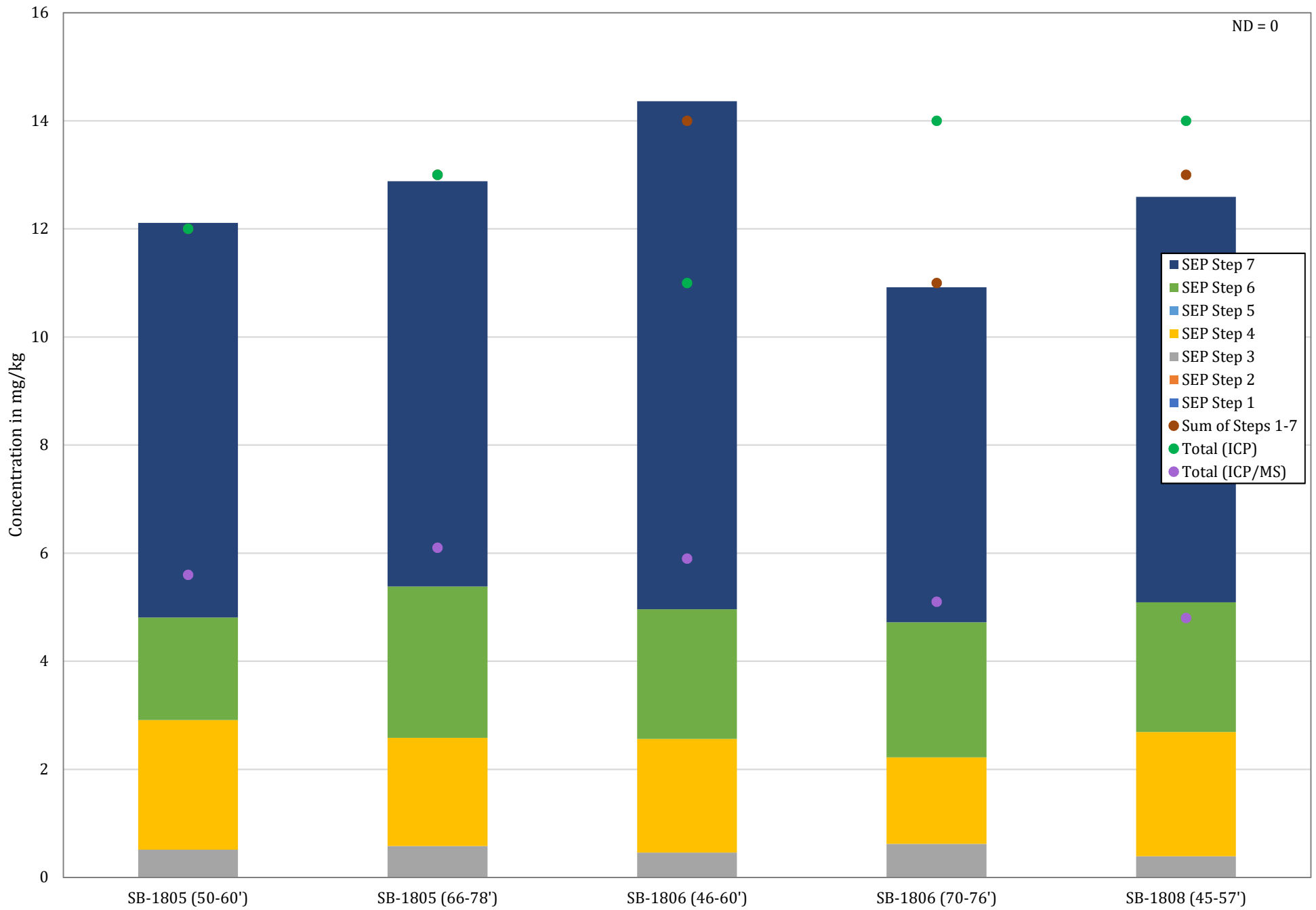
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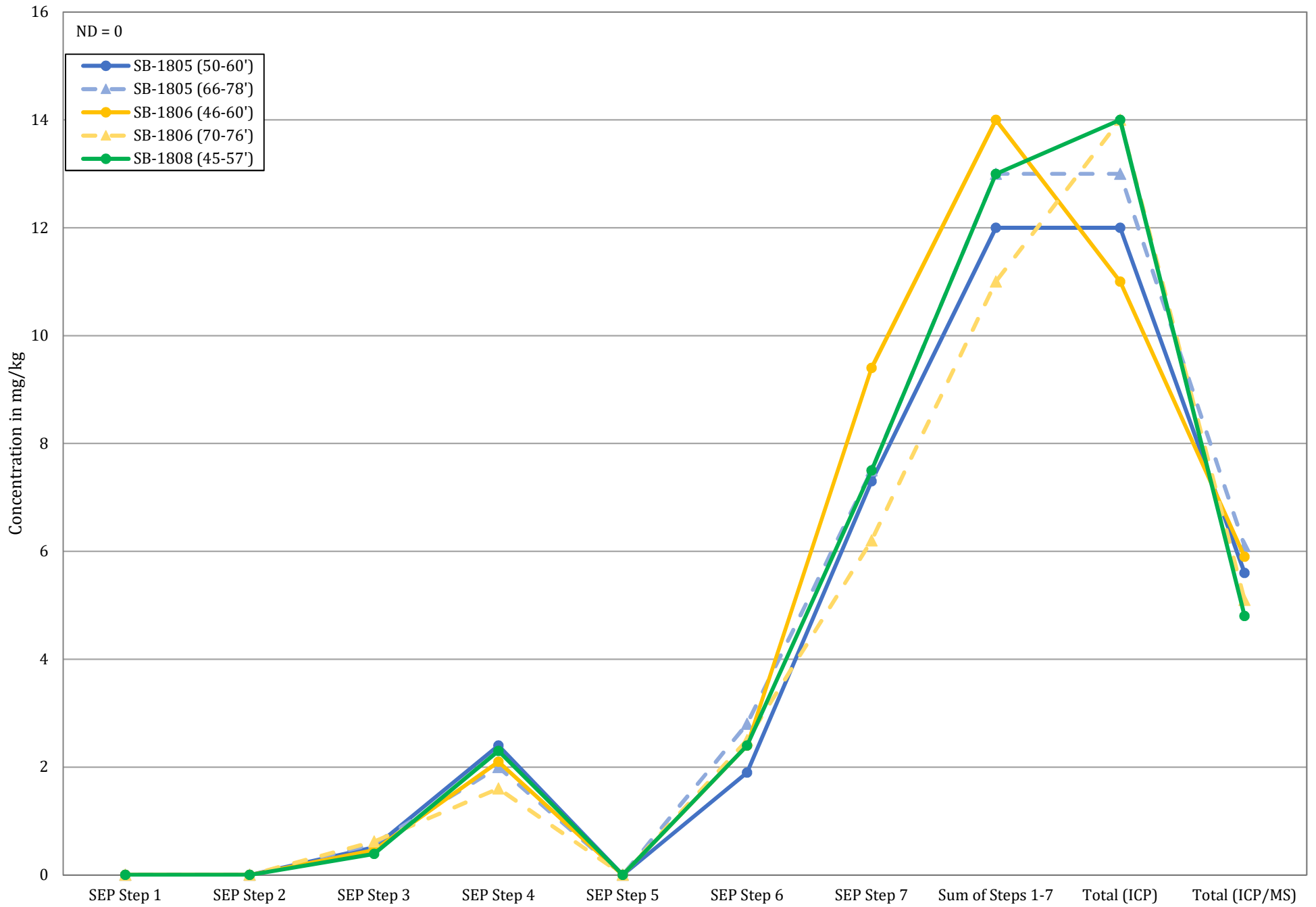
### Calcium - SEP Analytical Data



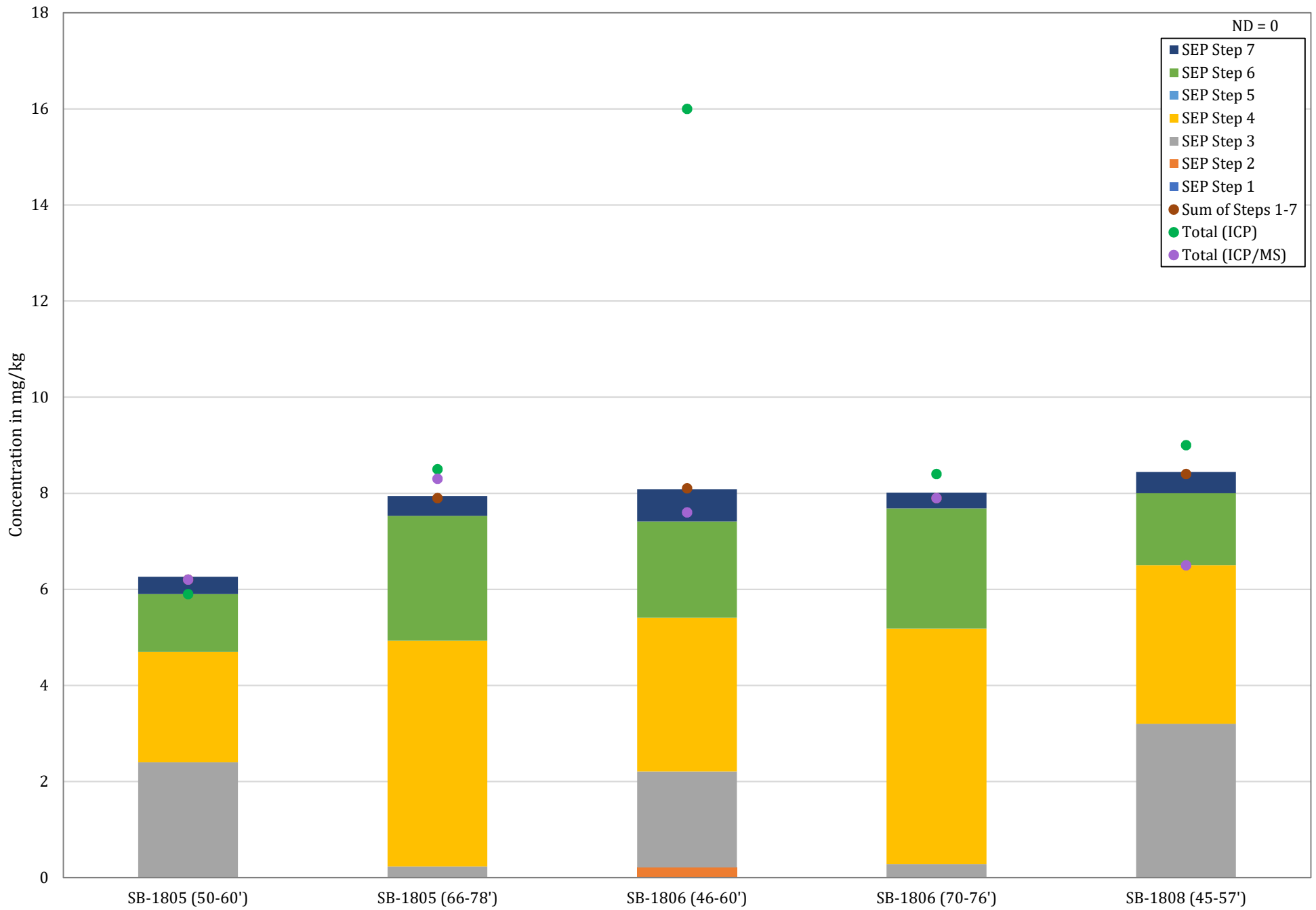
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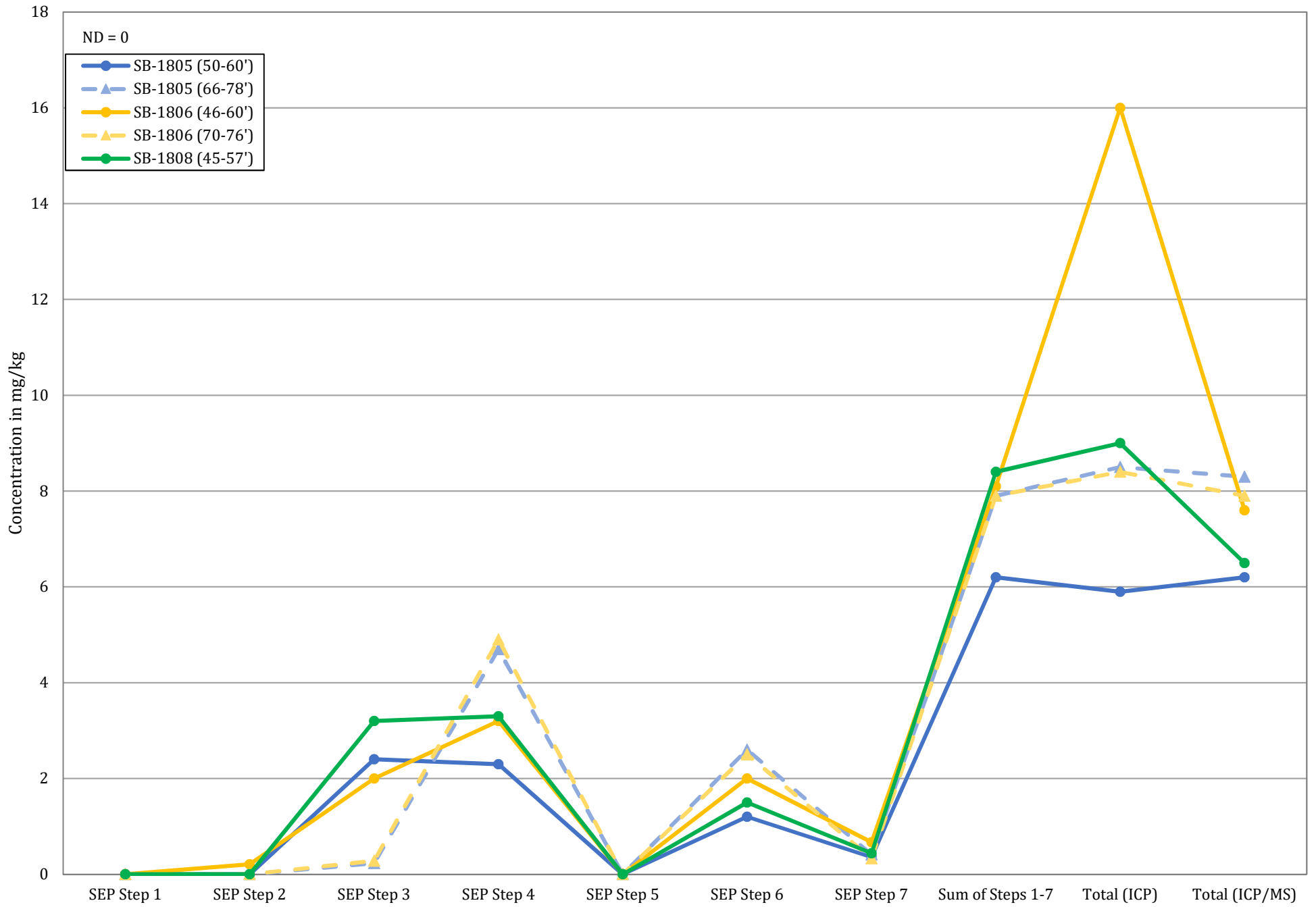
# Chromium - SEP Analytical Data



# Cobalt - SEP Analytical Data

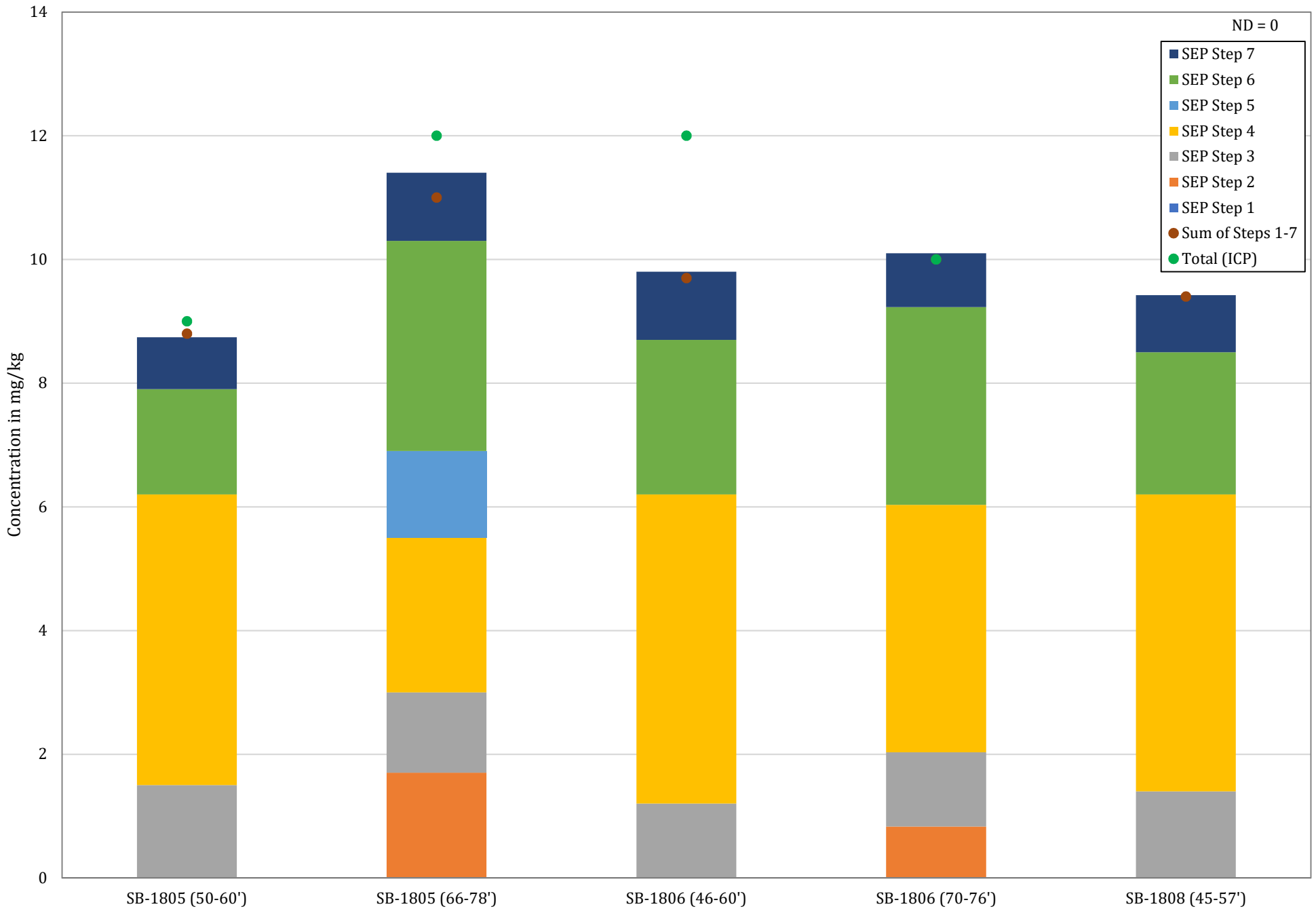


# Cobalt - SEP Analytical Data

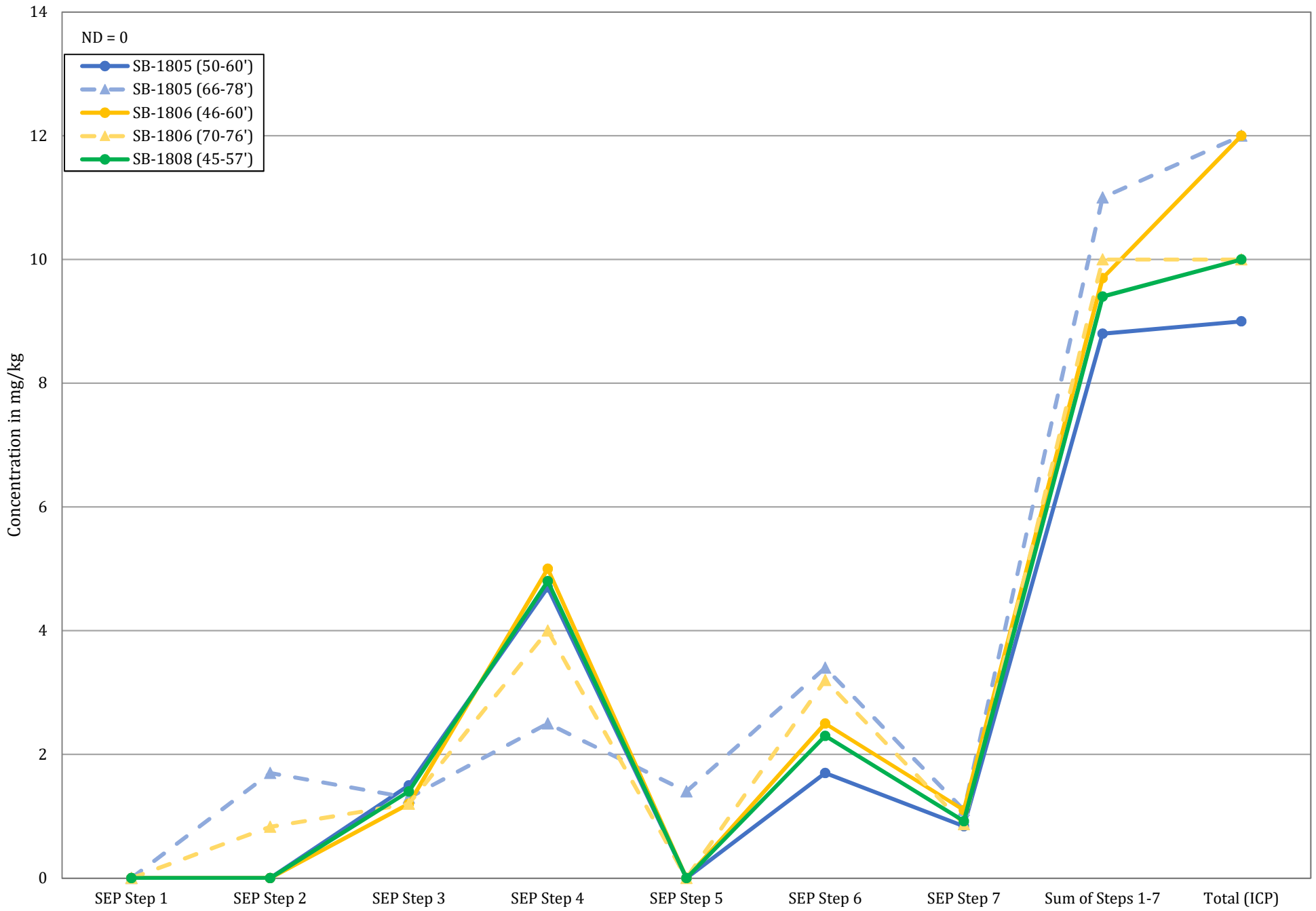




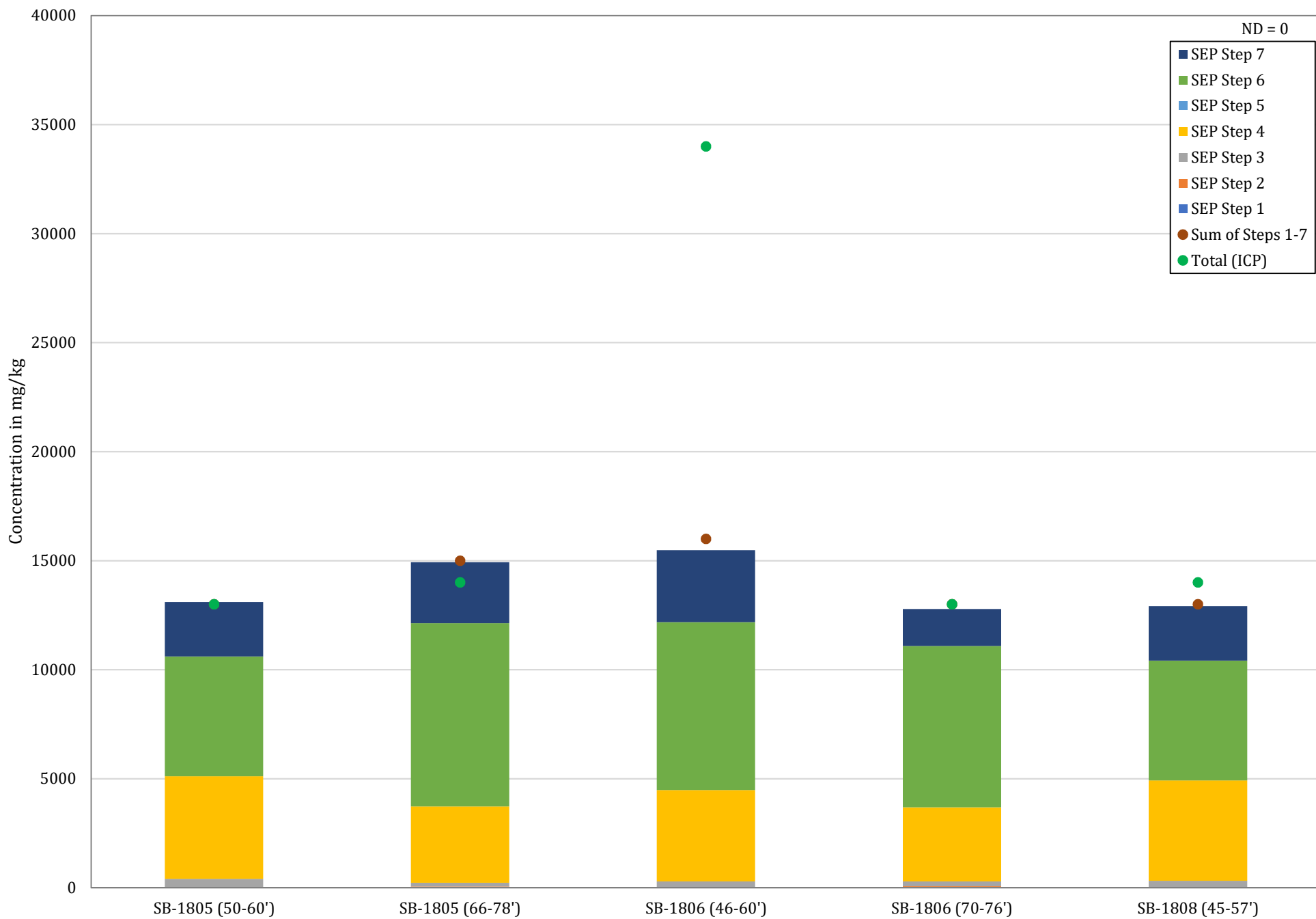
### Copper – SEP Analytical Data



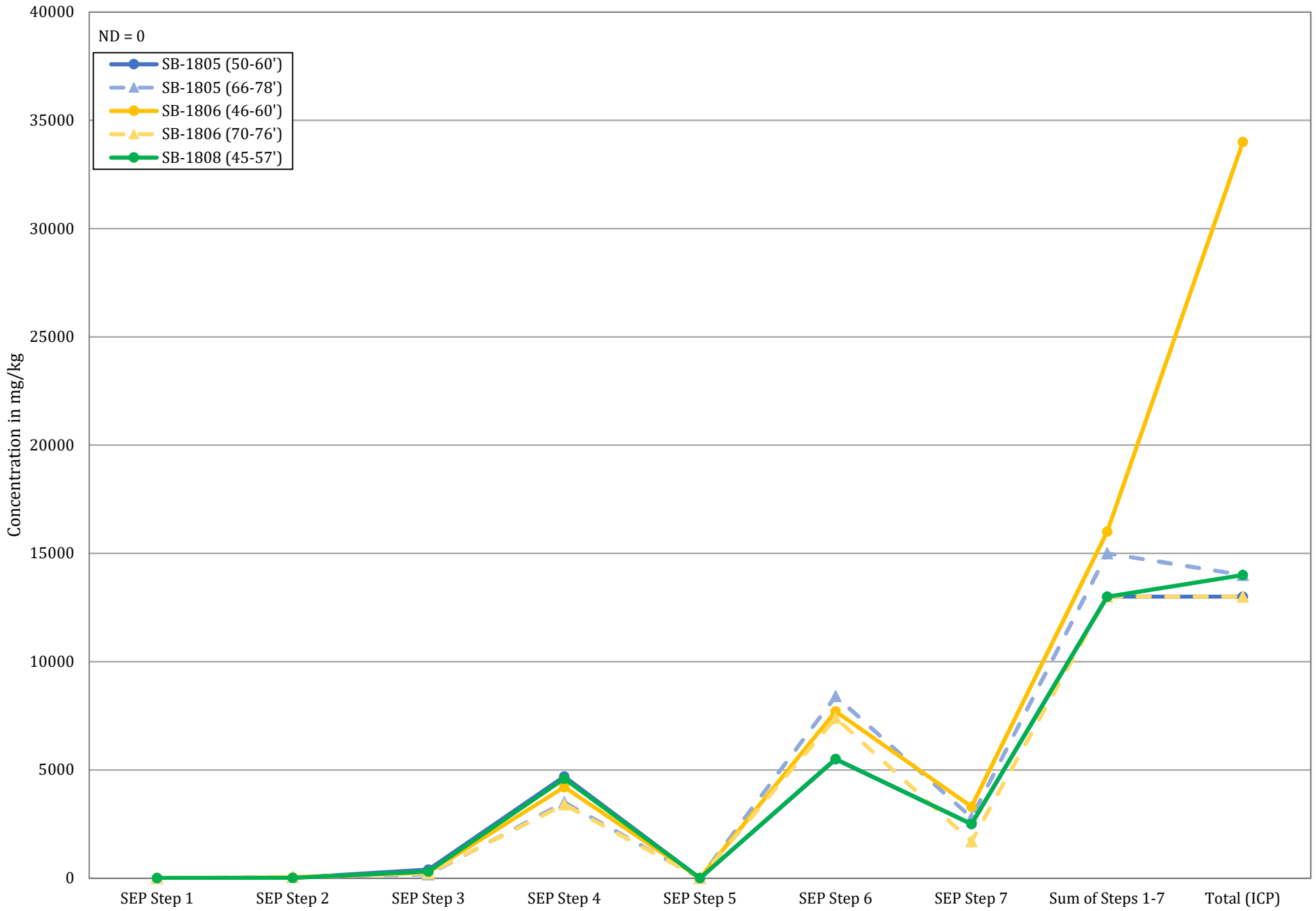
### Copper – SEP Analytical Data



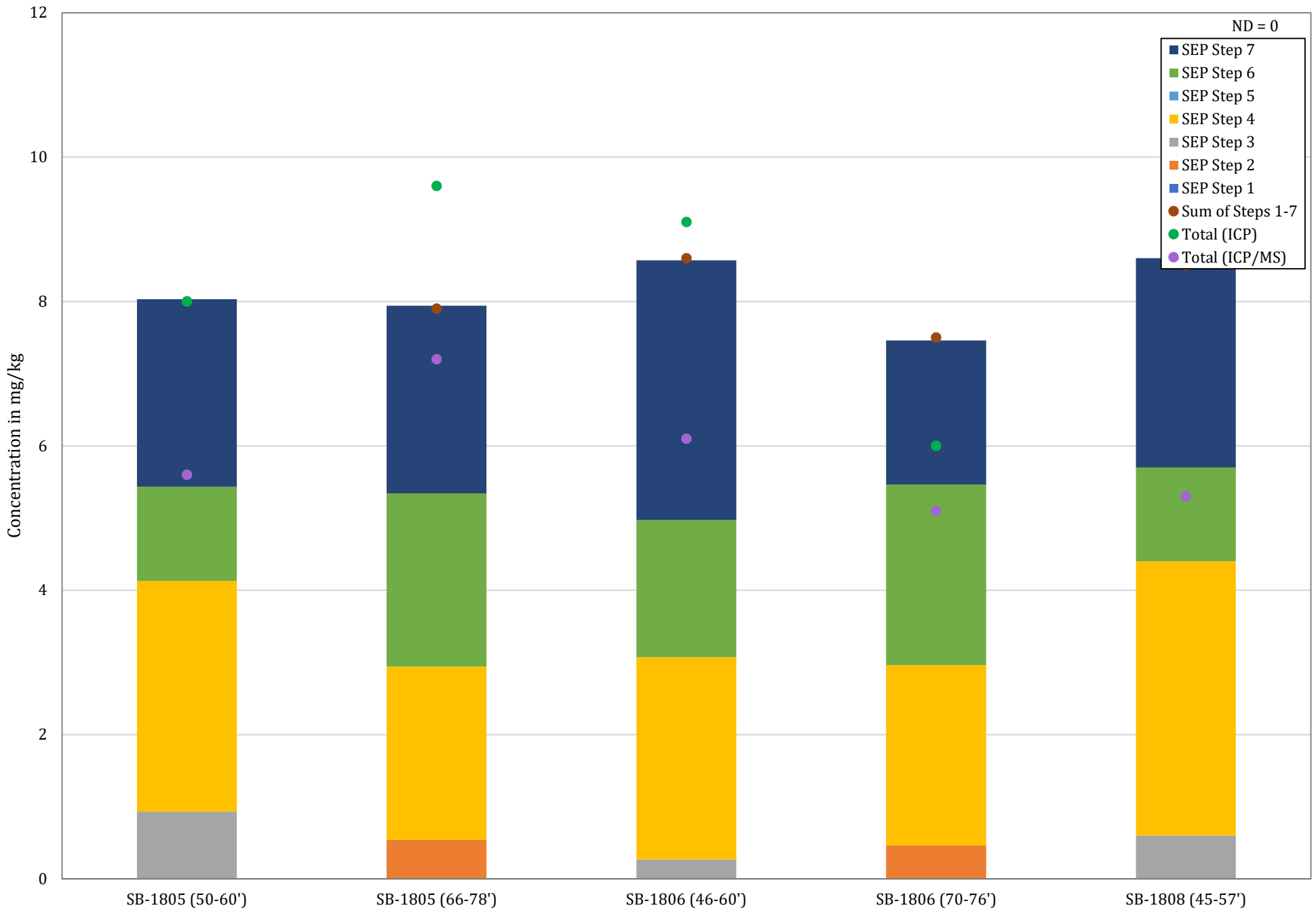
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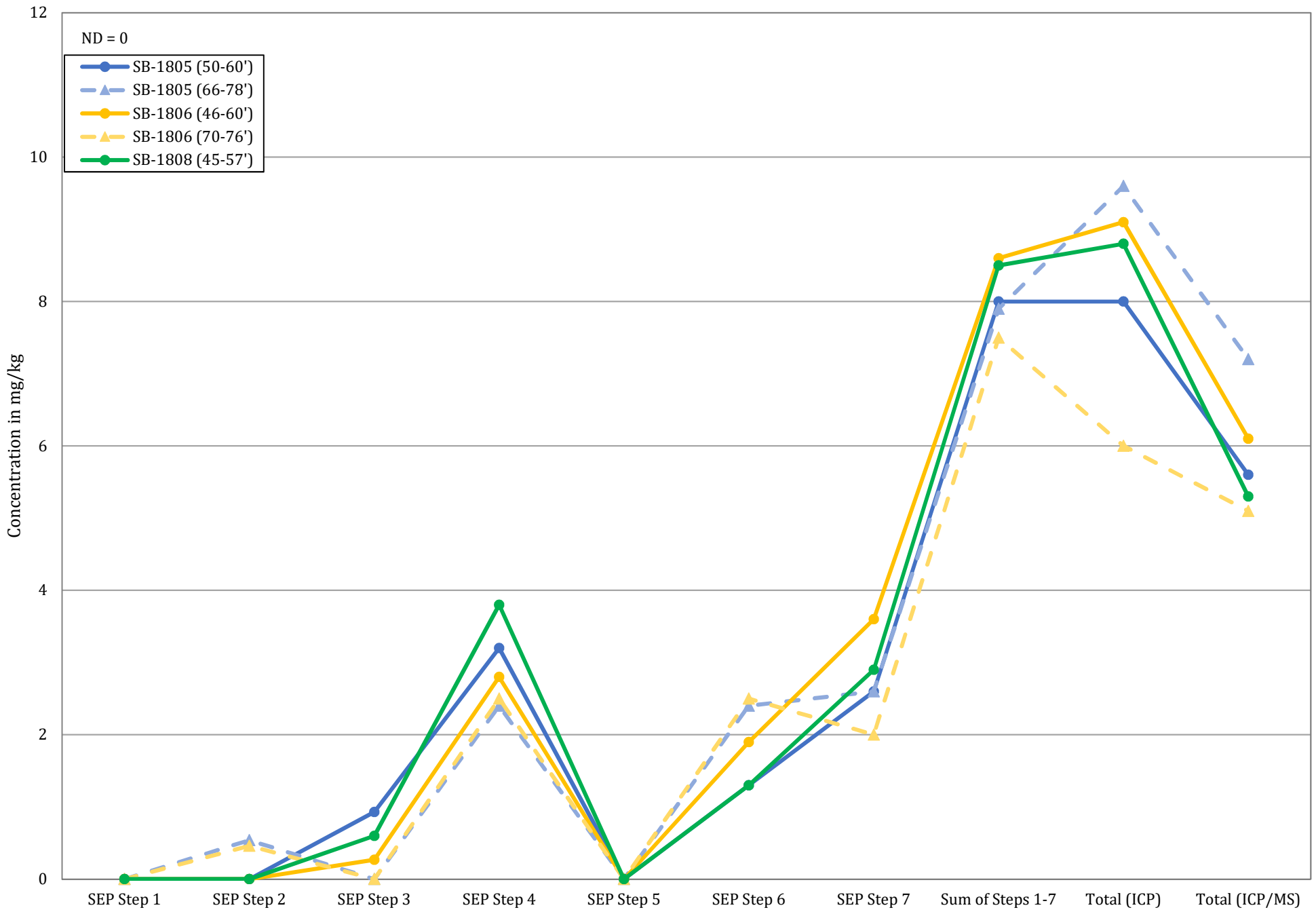
# Iron - SEP Analytical Data



# Lead - SEP Analytical Data

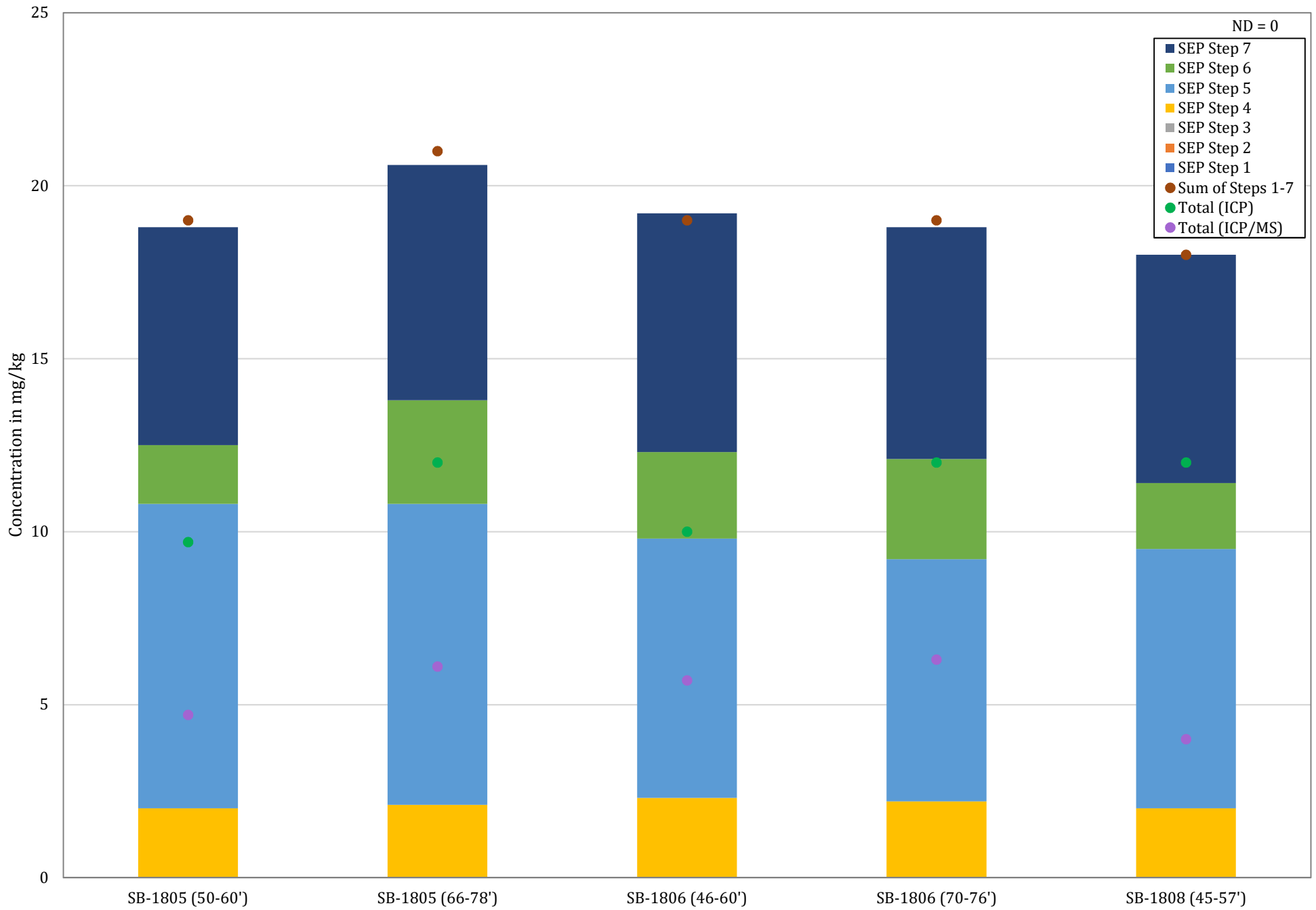


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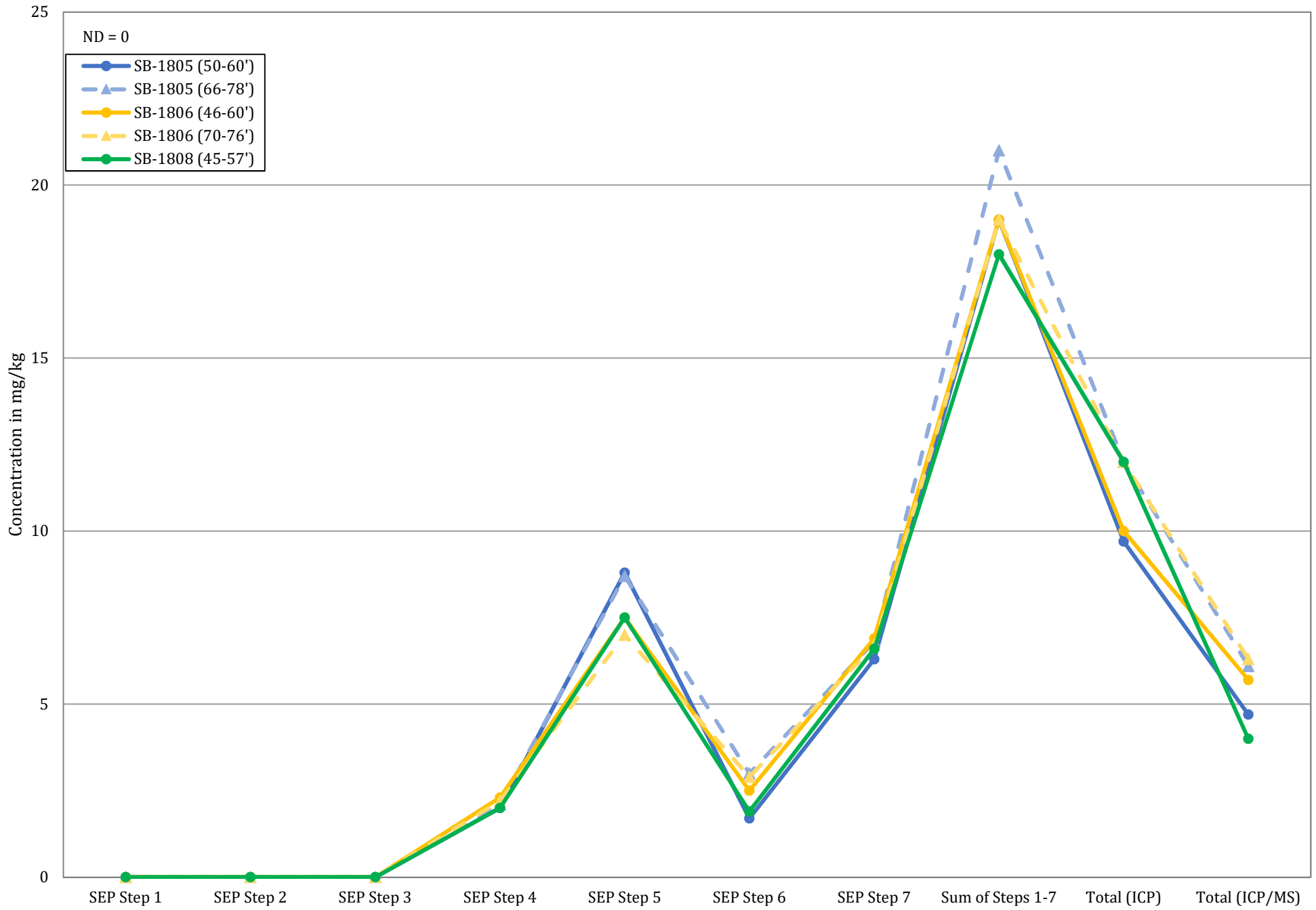




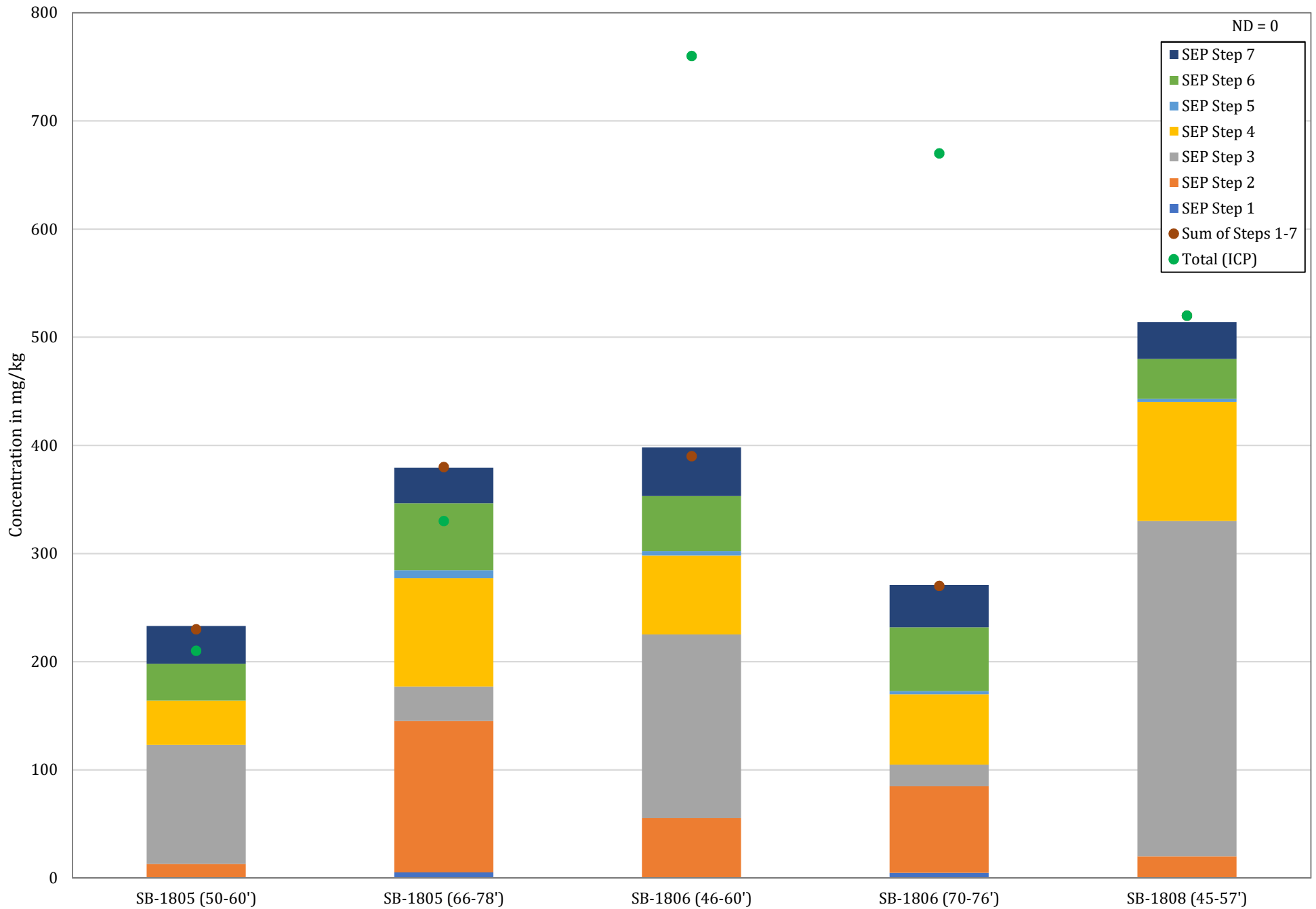
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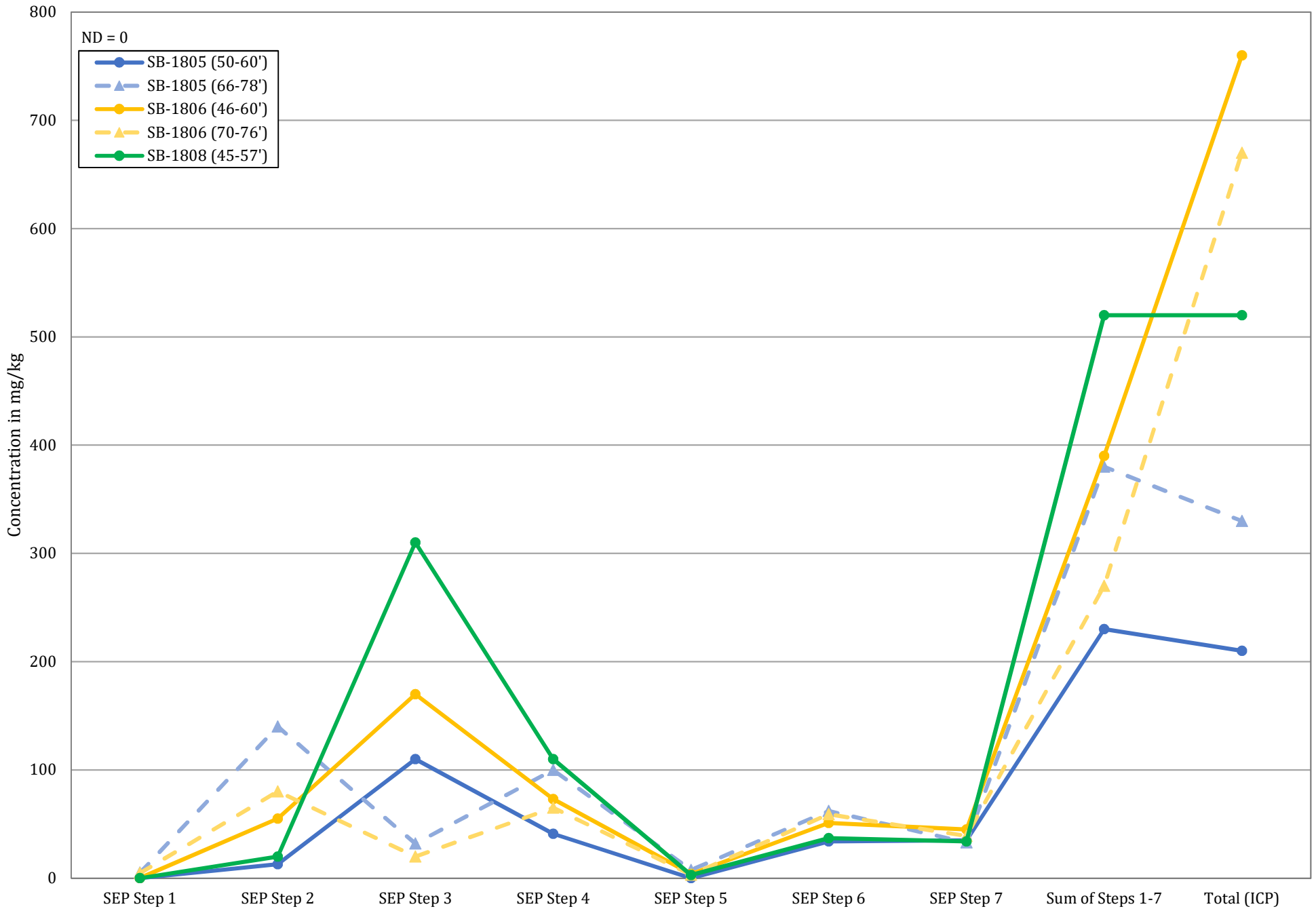
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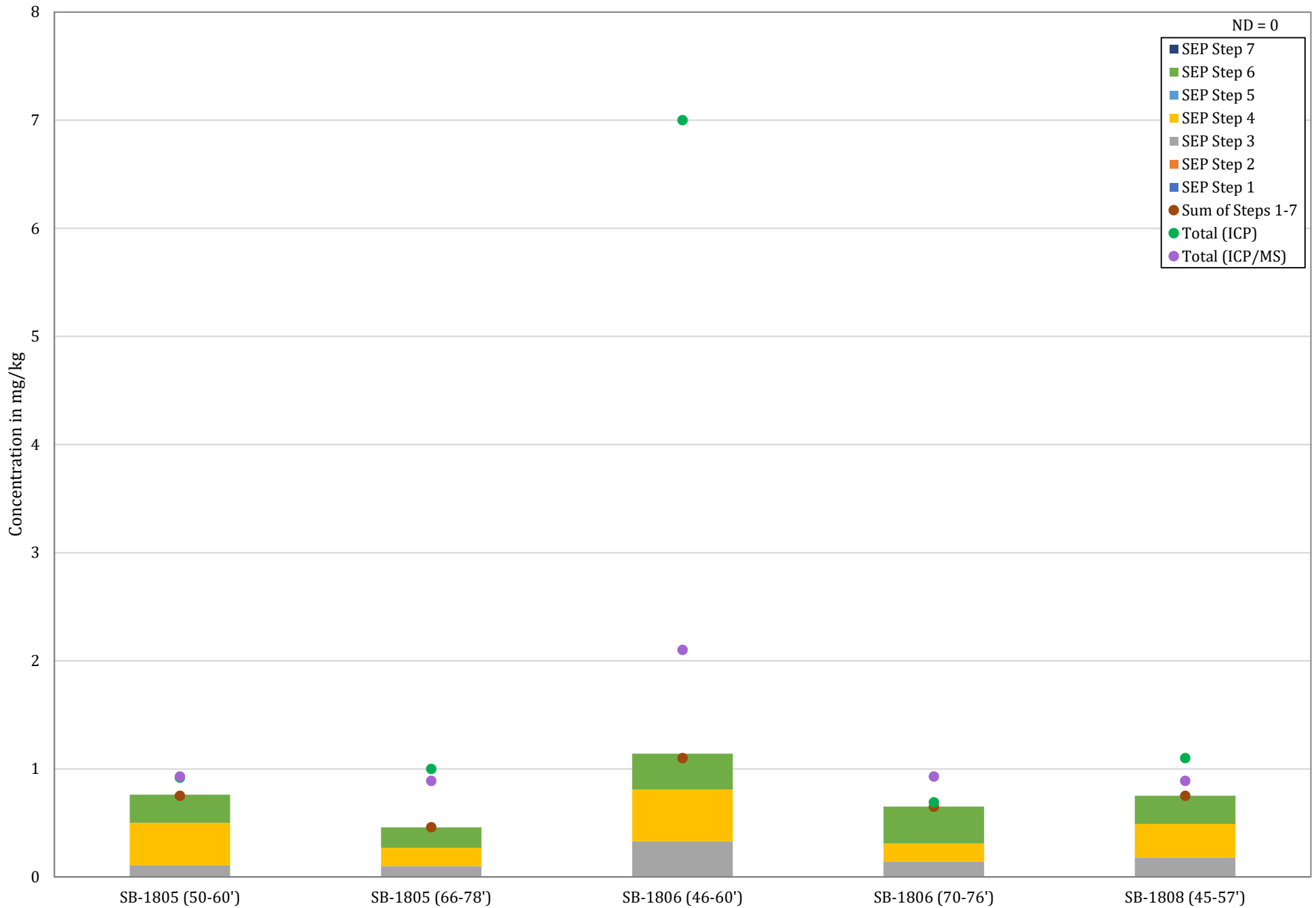
## Manganese – SEP Analytical Data



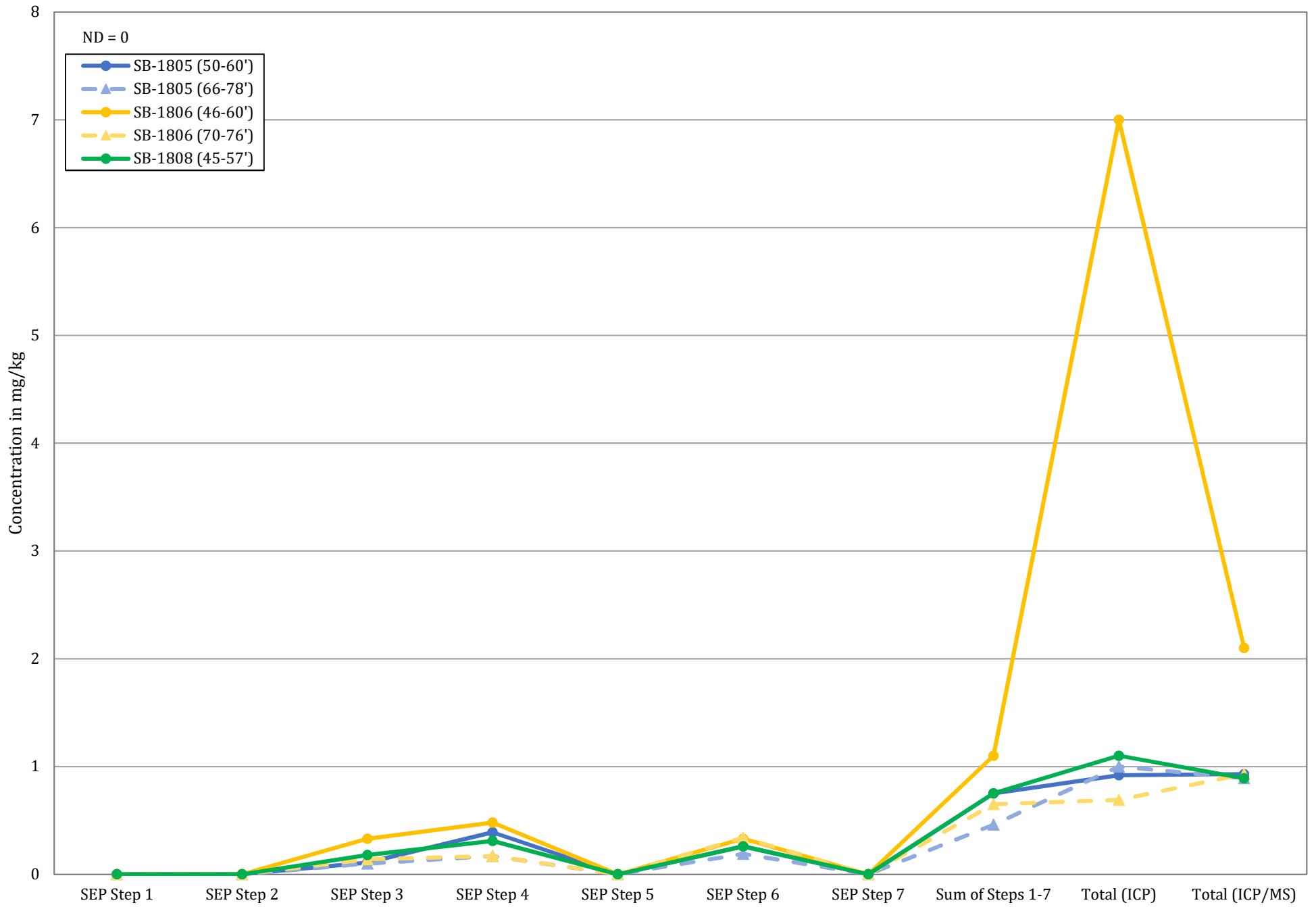
# Manganese – SEP Analytical Data



# Molybdenum – SEP Analytical Data

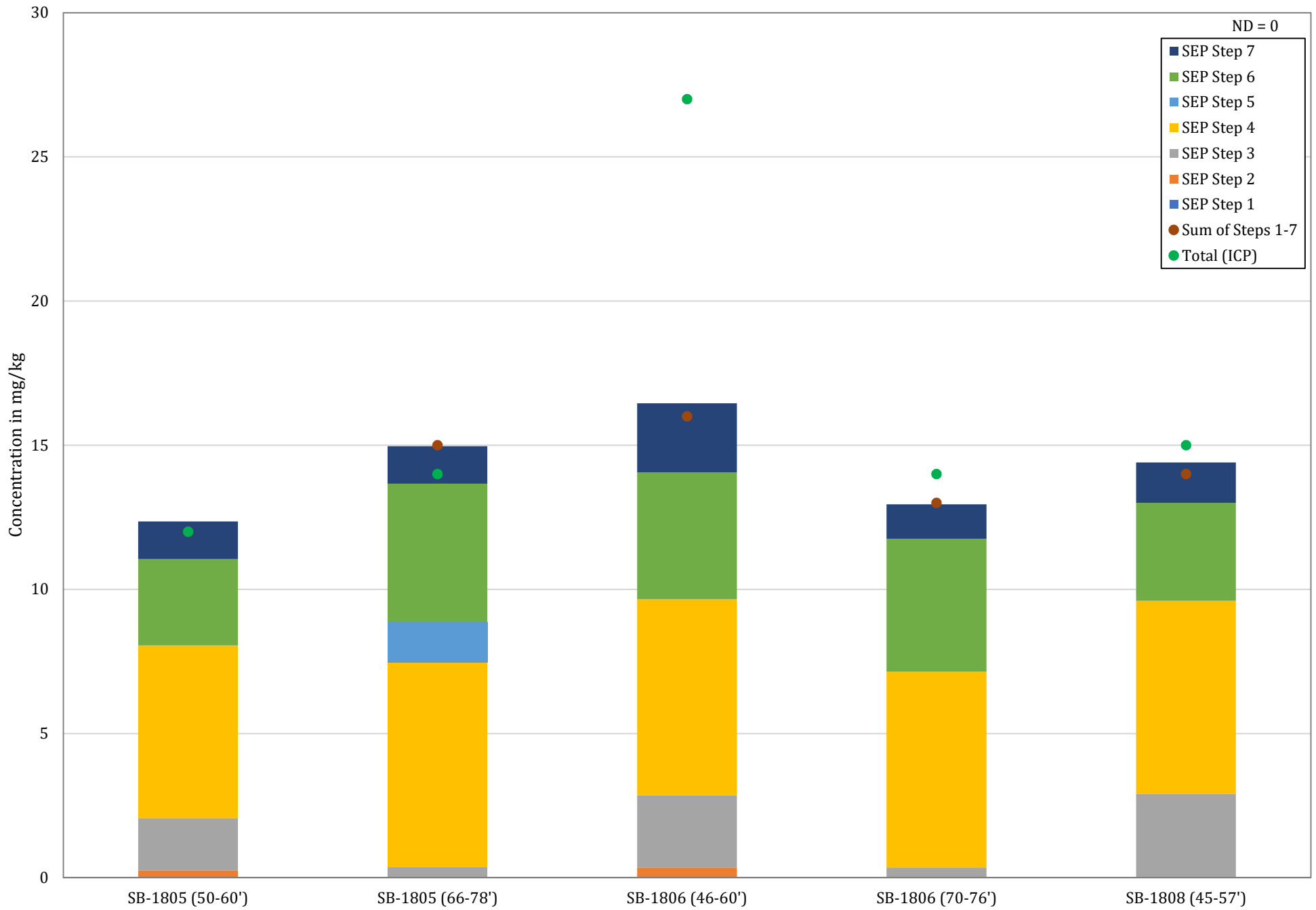


# Molybdenum - SEP Analytical Data

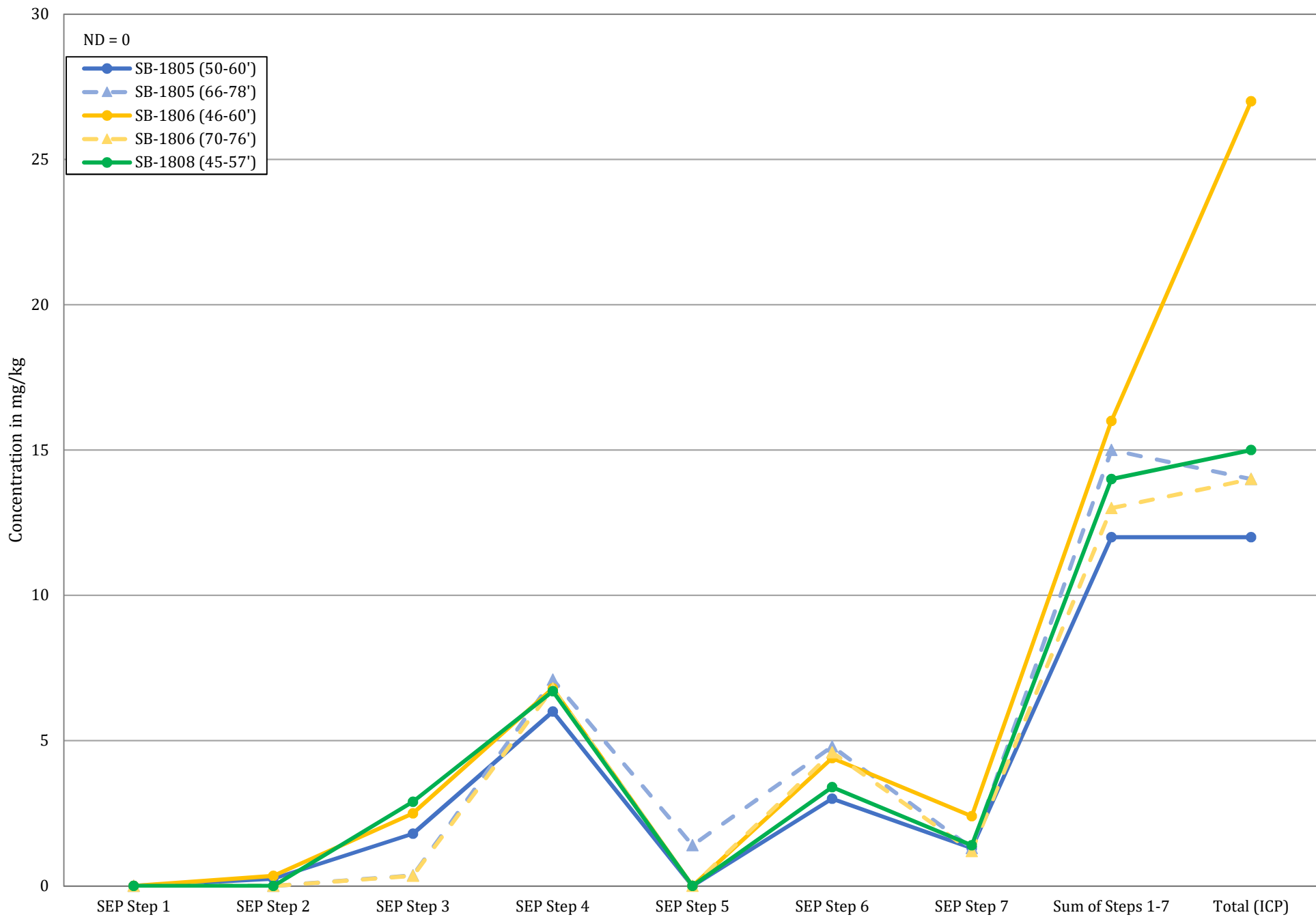




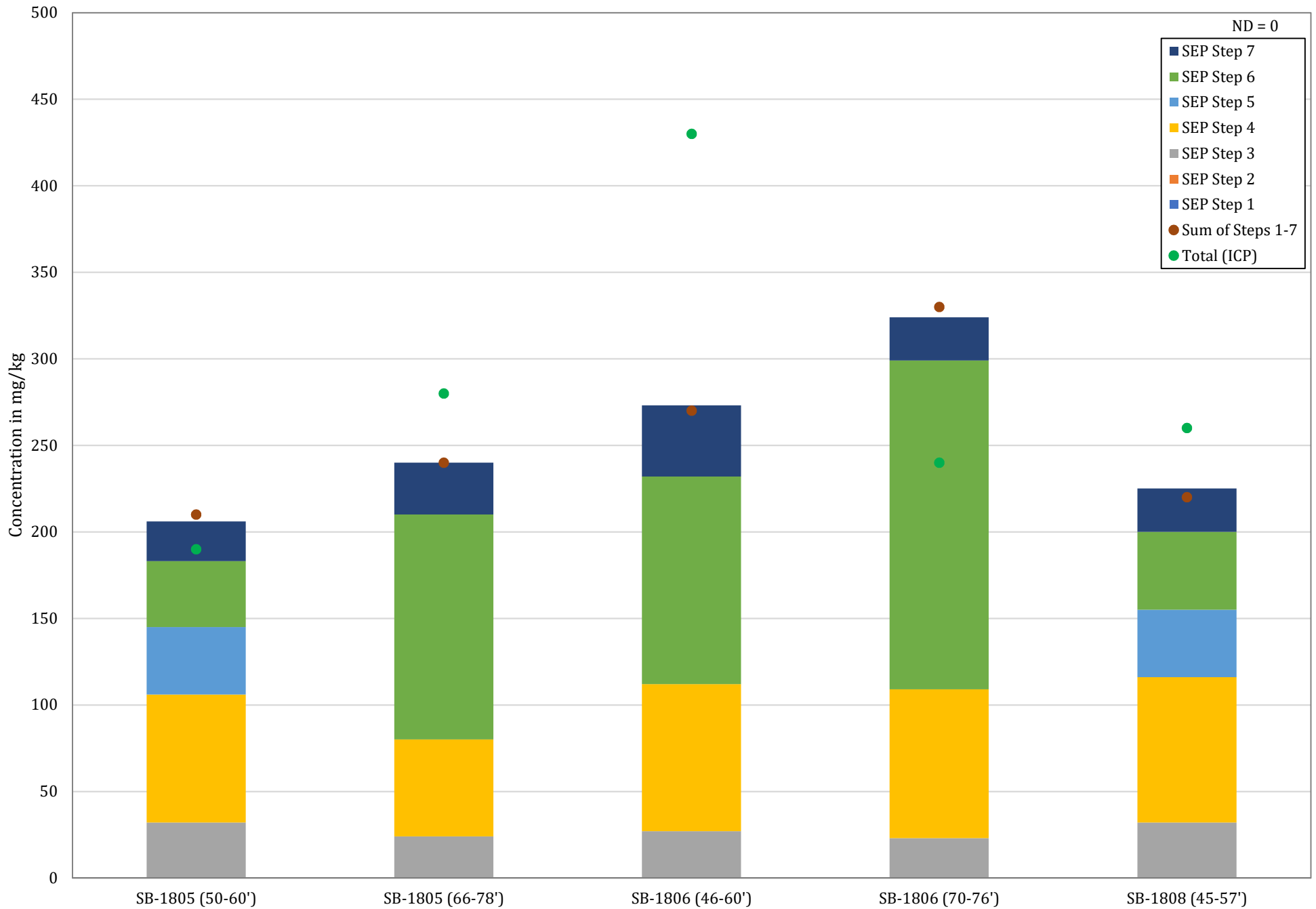
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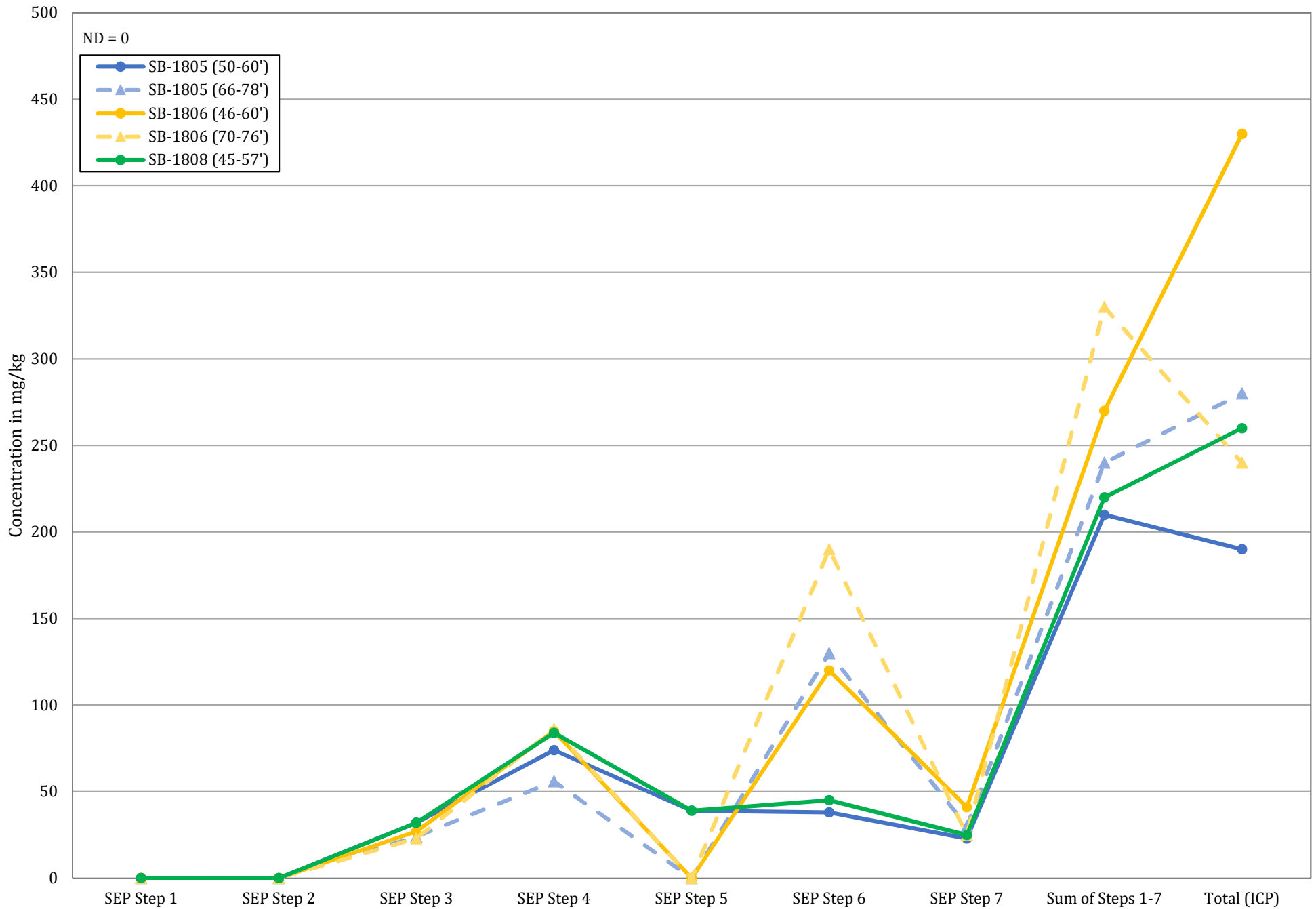
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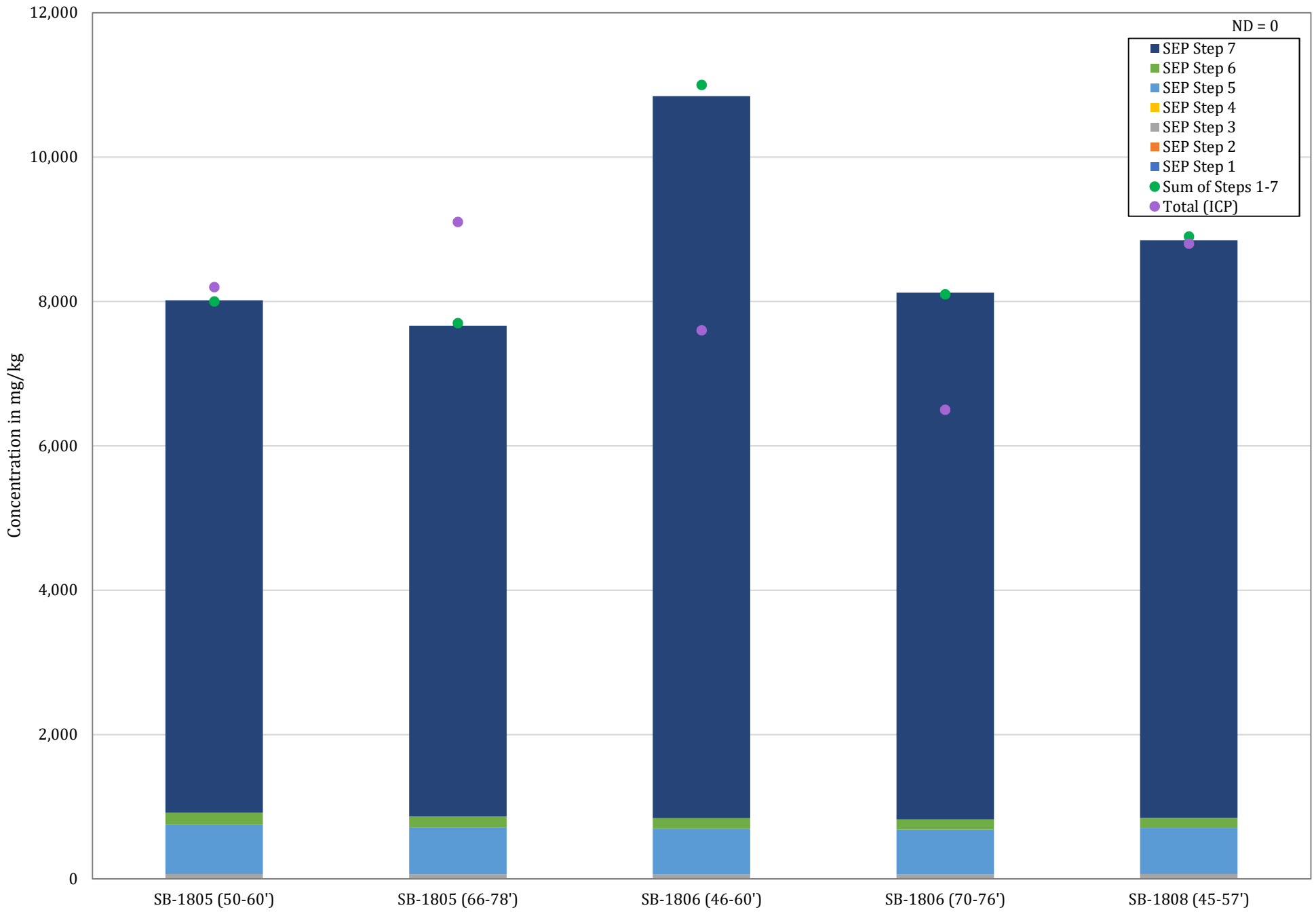
# Phosphorous – SEP Analytical Data



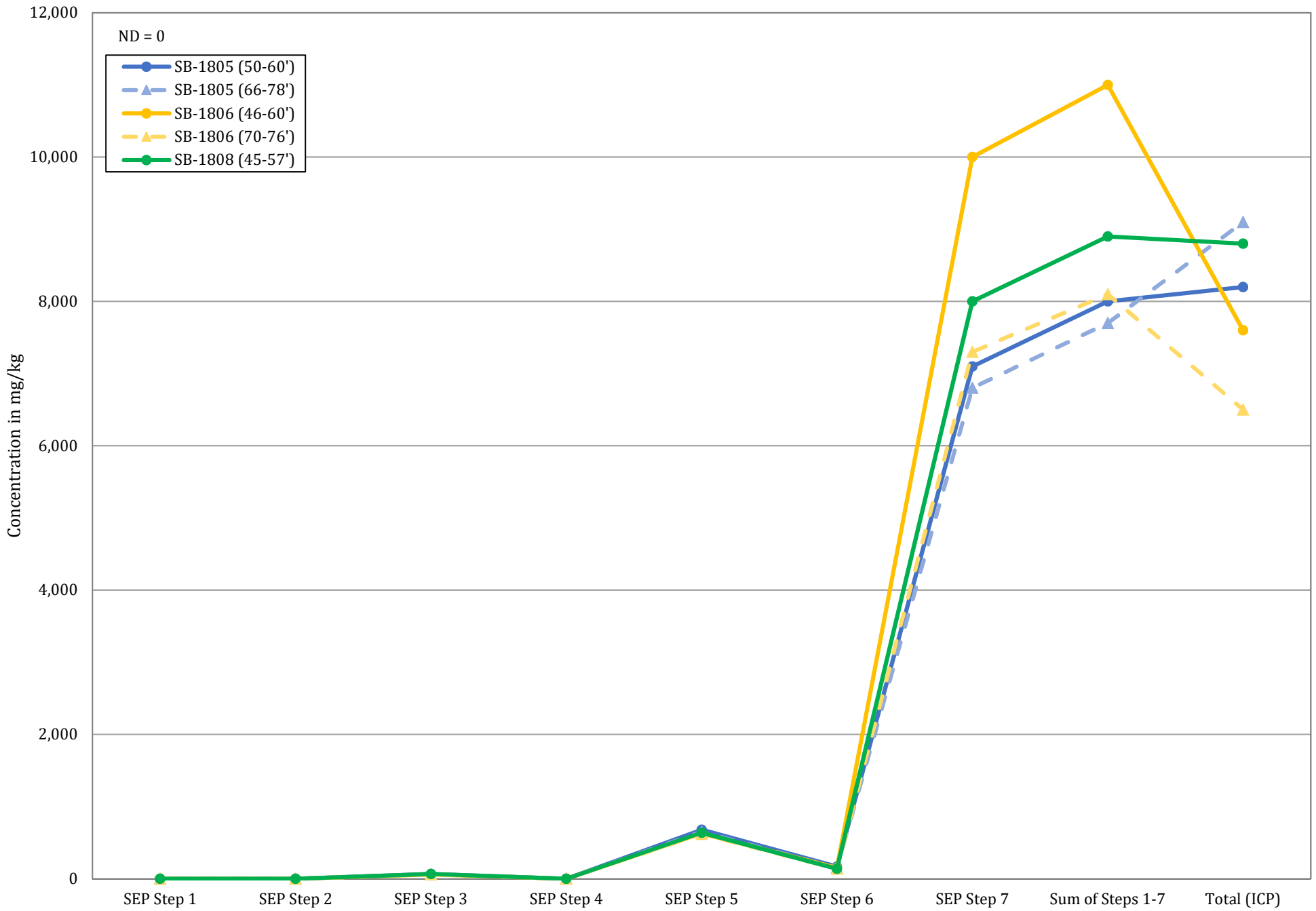
# Phosphorous - SEP Analytical Data



# Potassium – SEP Analytical Data

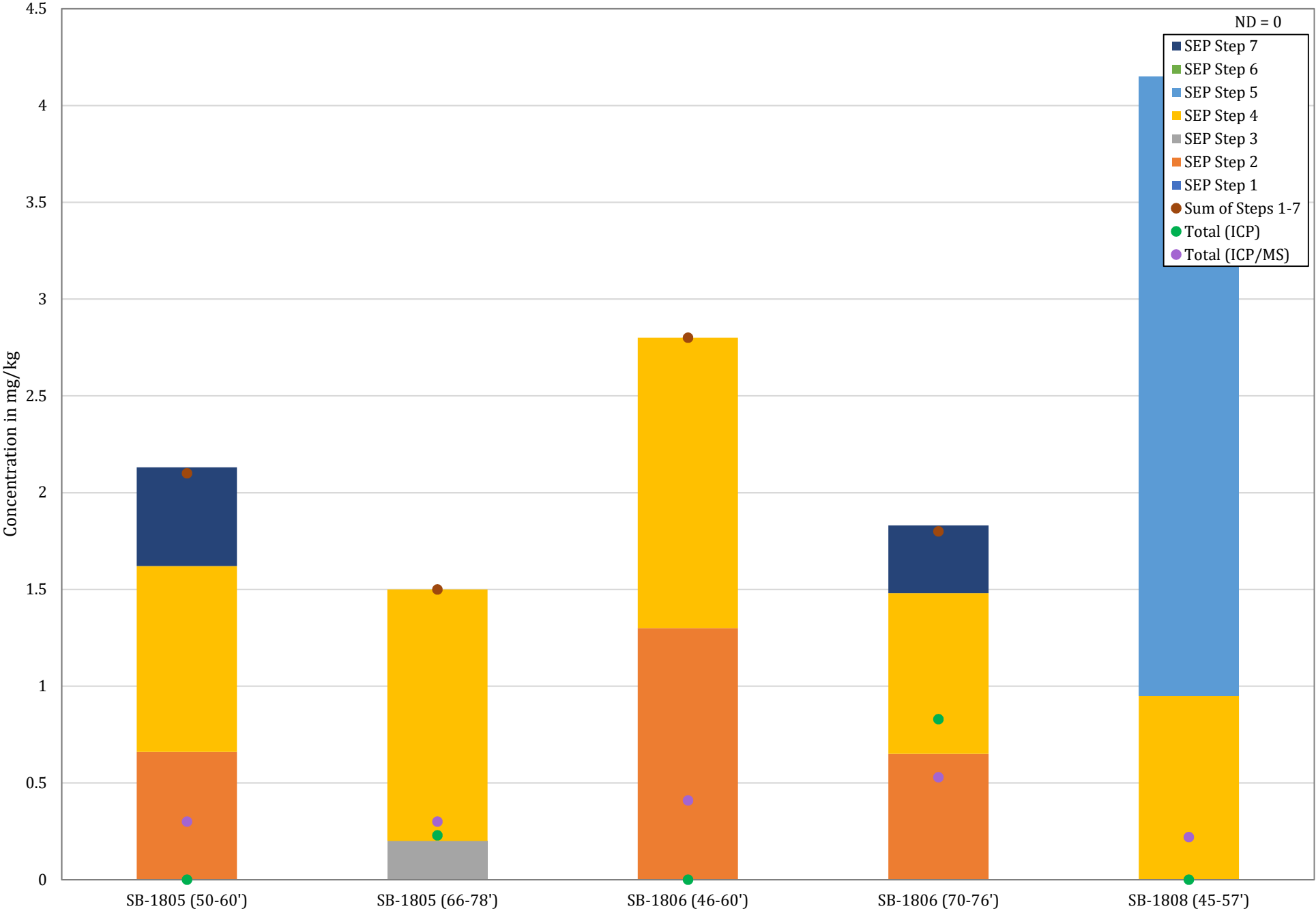


# Potassium – SEP Analytical Data

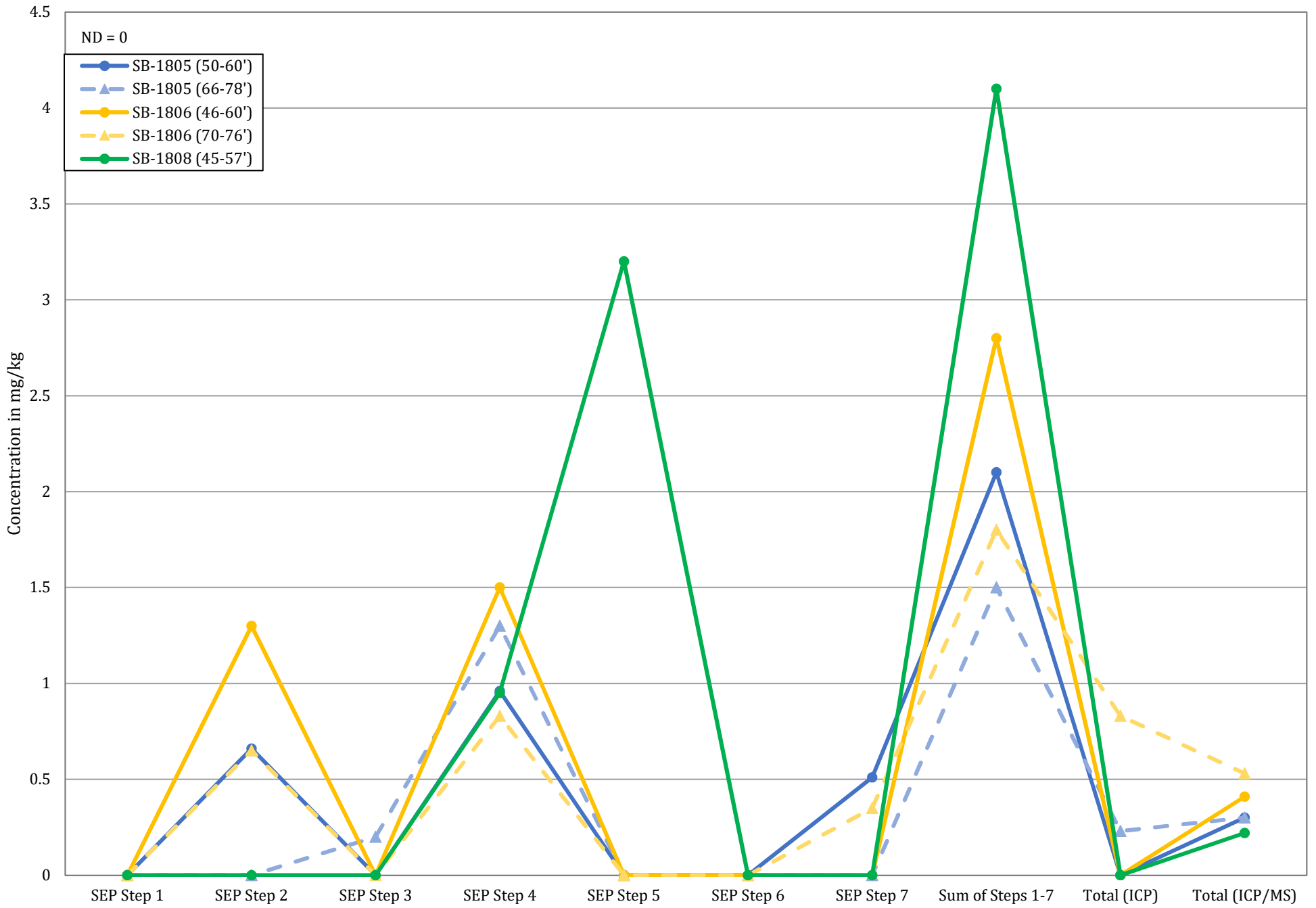




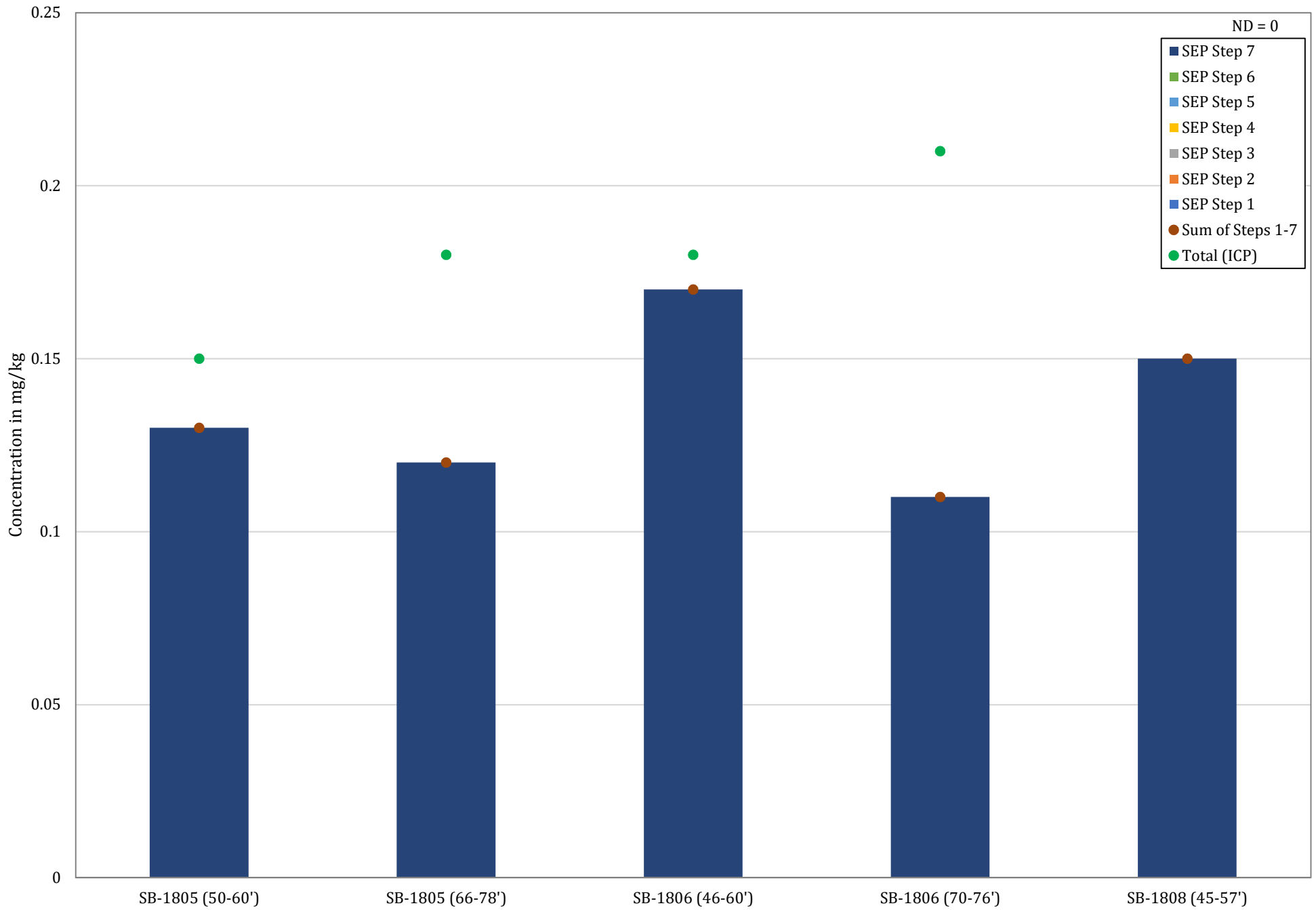
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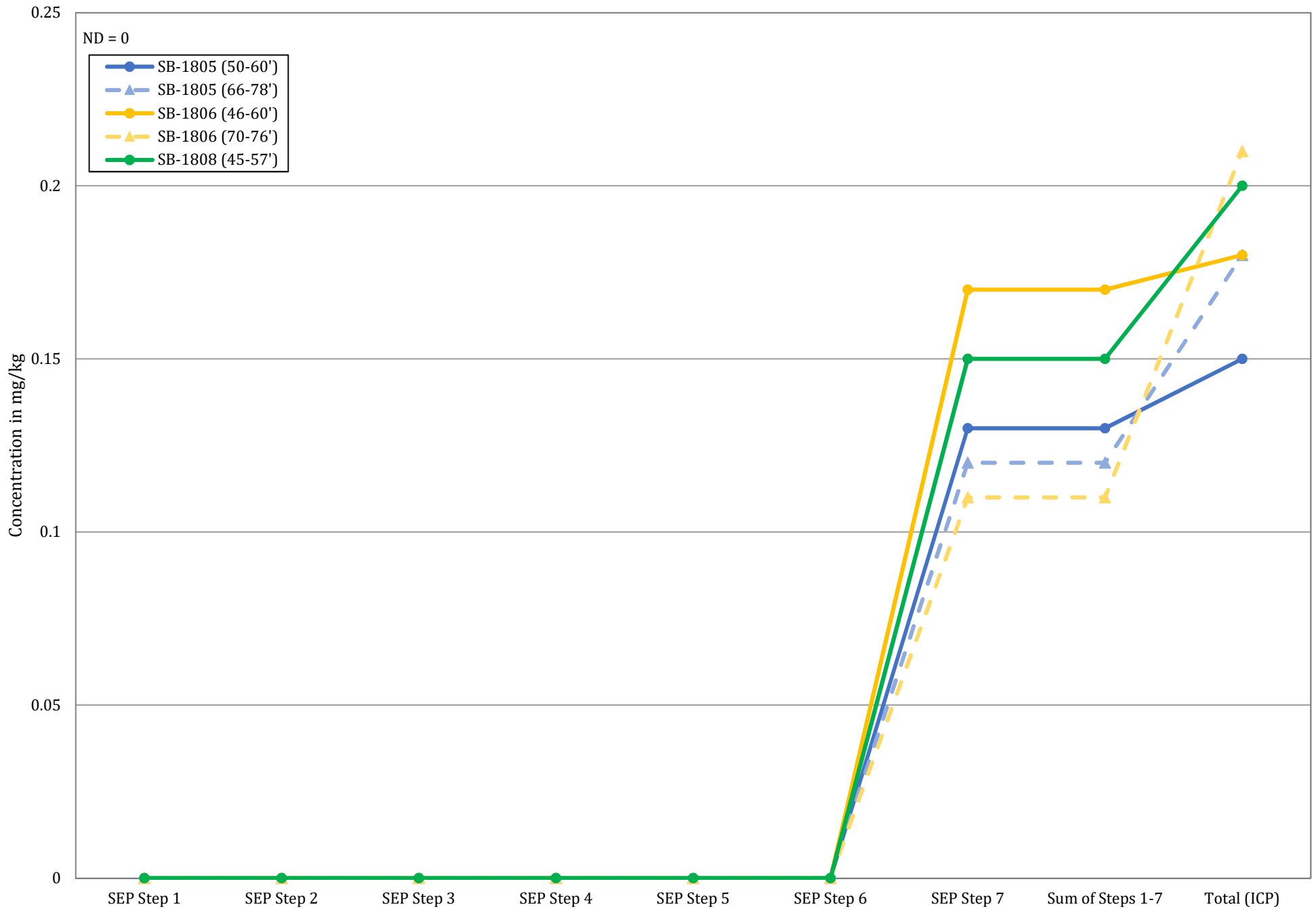
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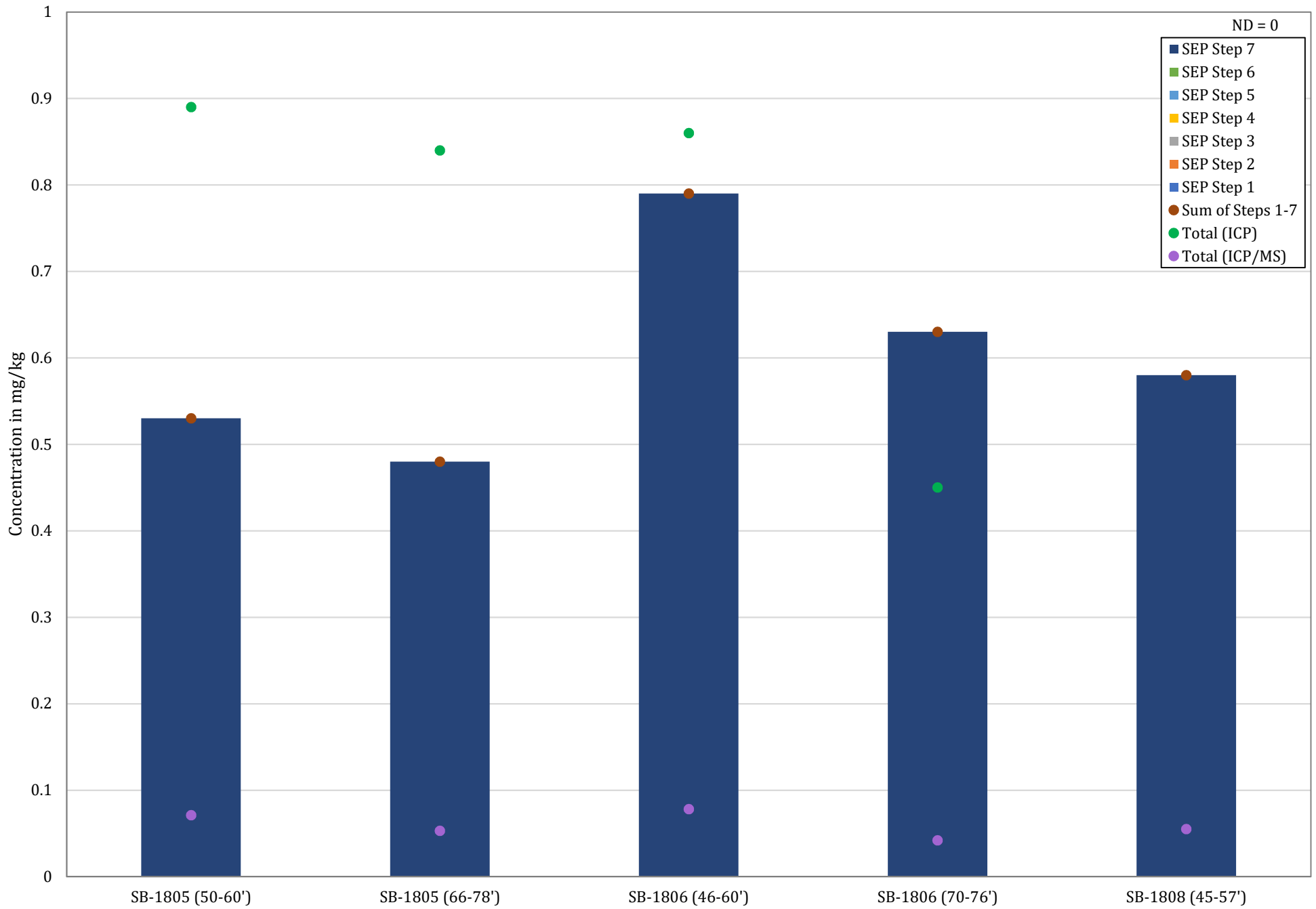
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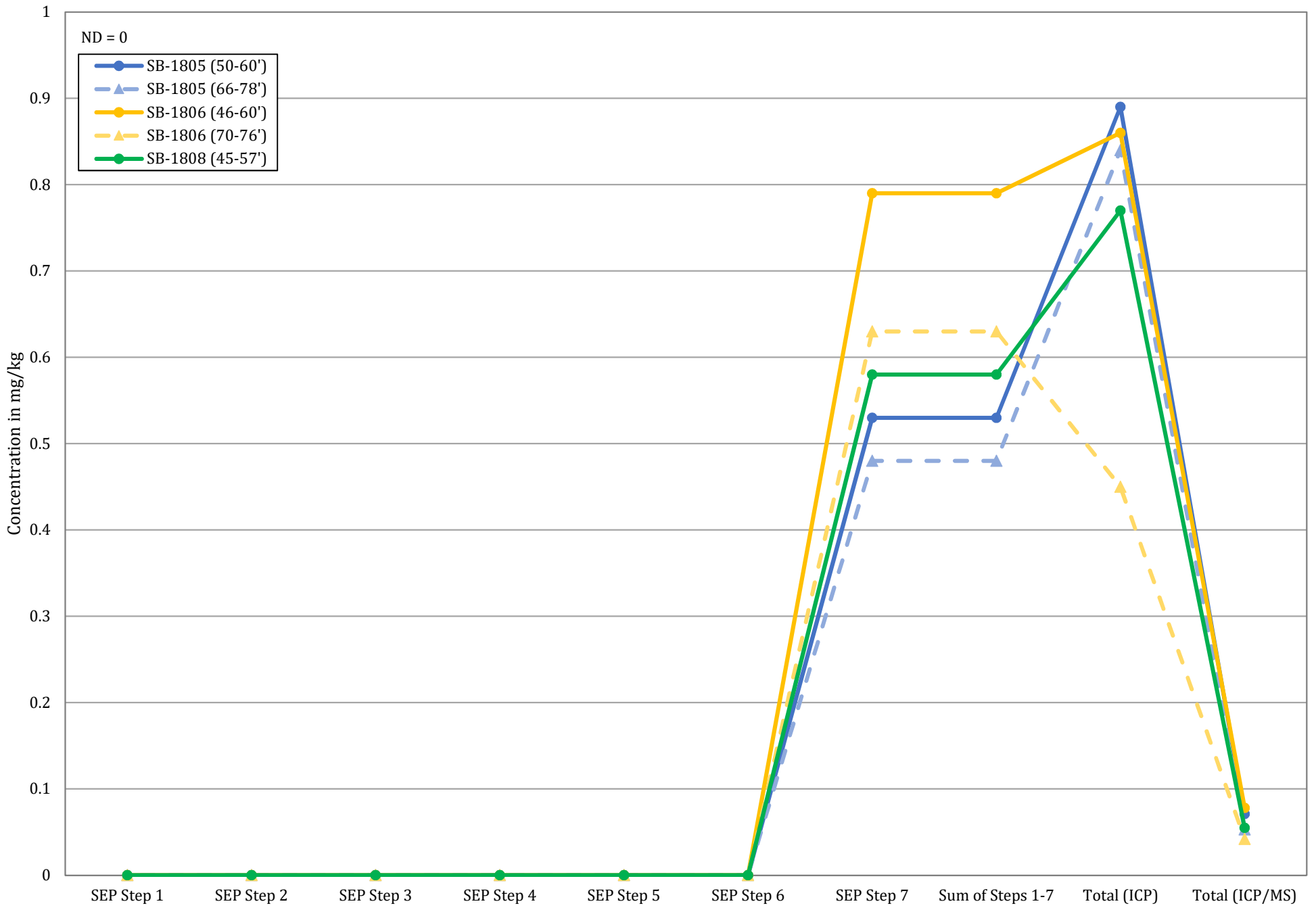
# Silver - SEP Analytical Data



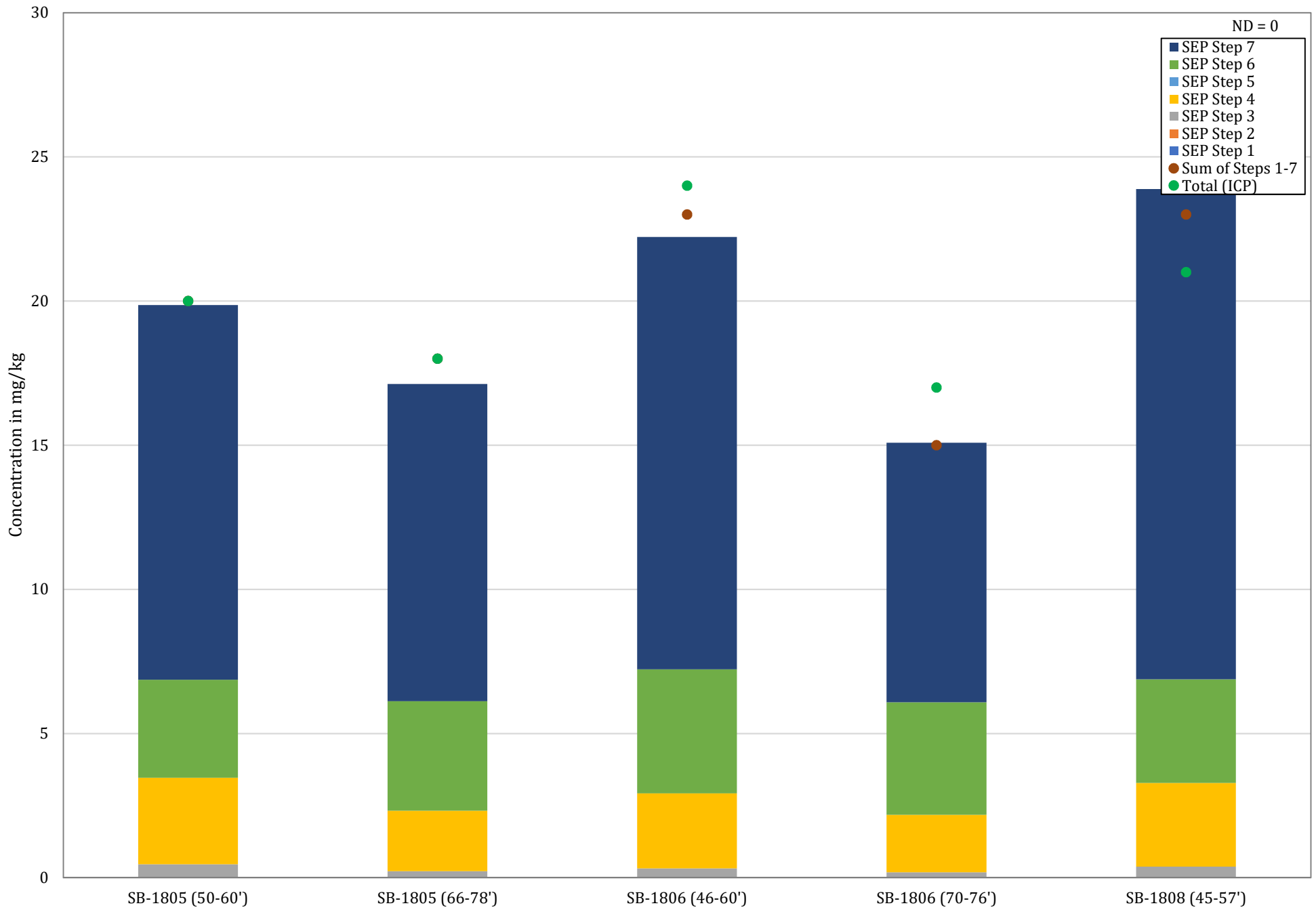
# Thallium - SEP Analytical Data



# Thallium – SEP Analytical Data

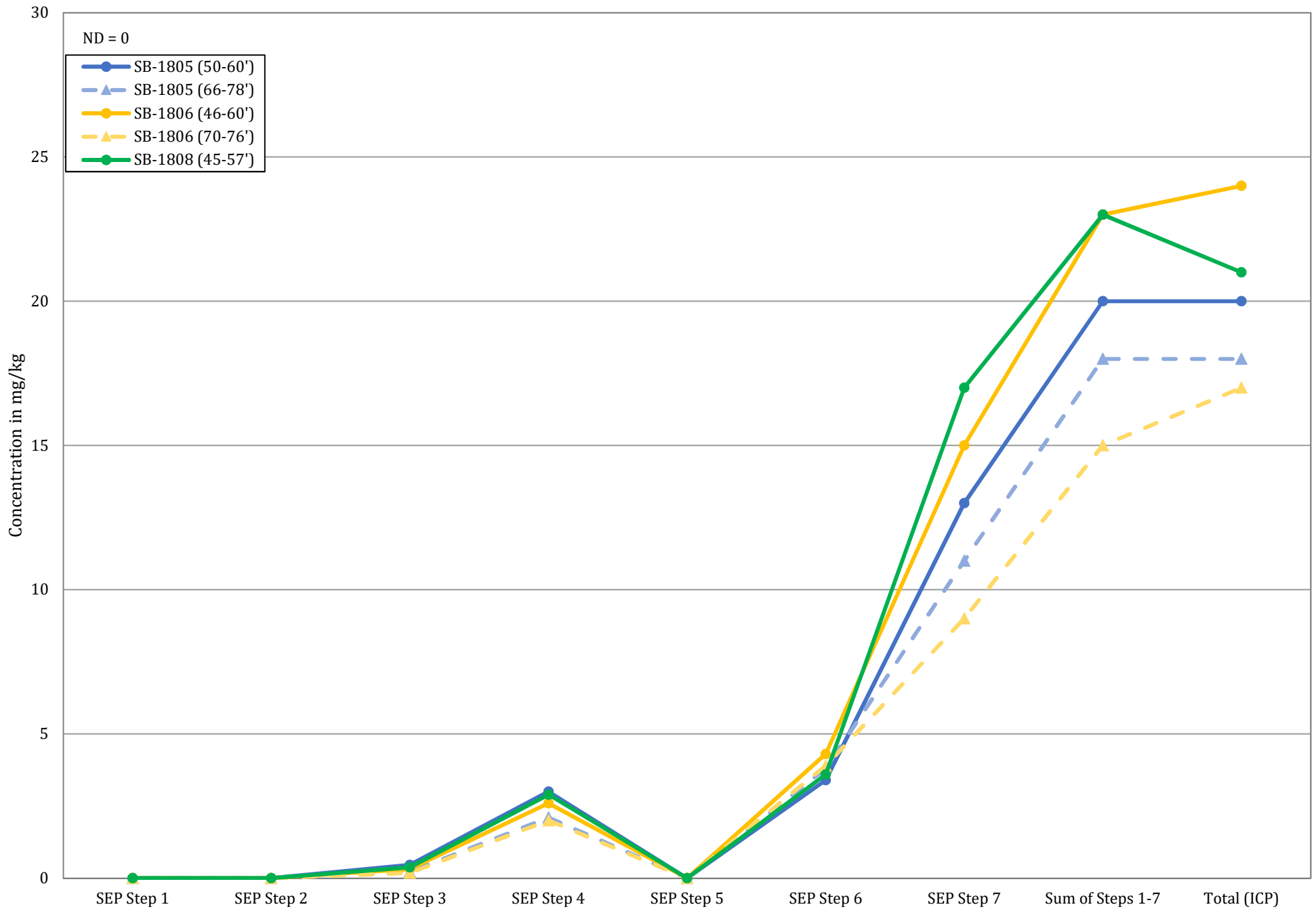


## Vanadium – SEP Analytical Data

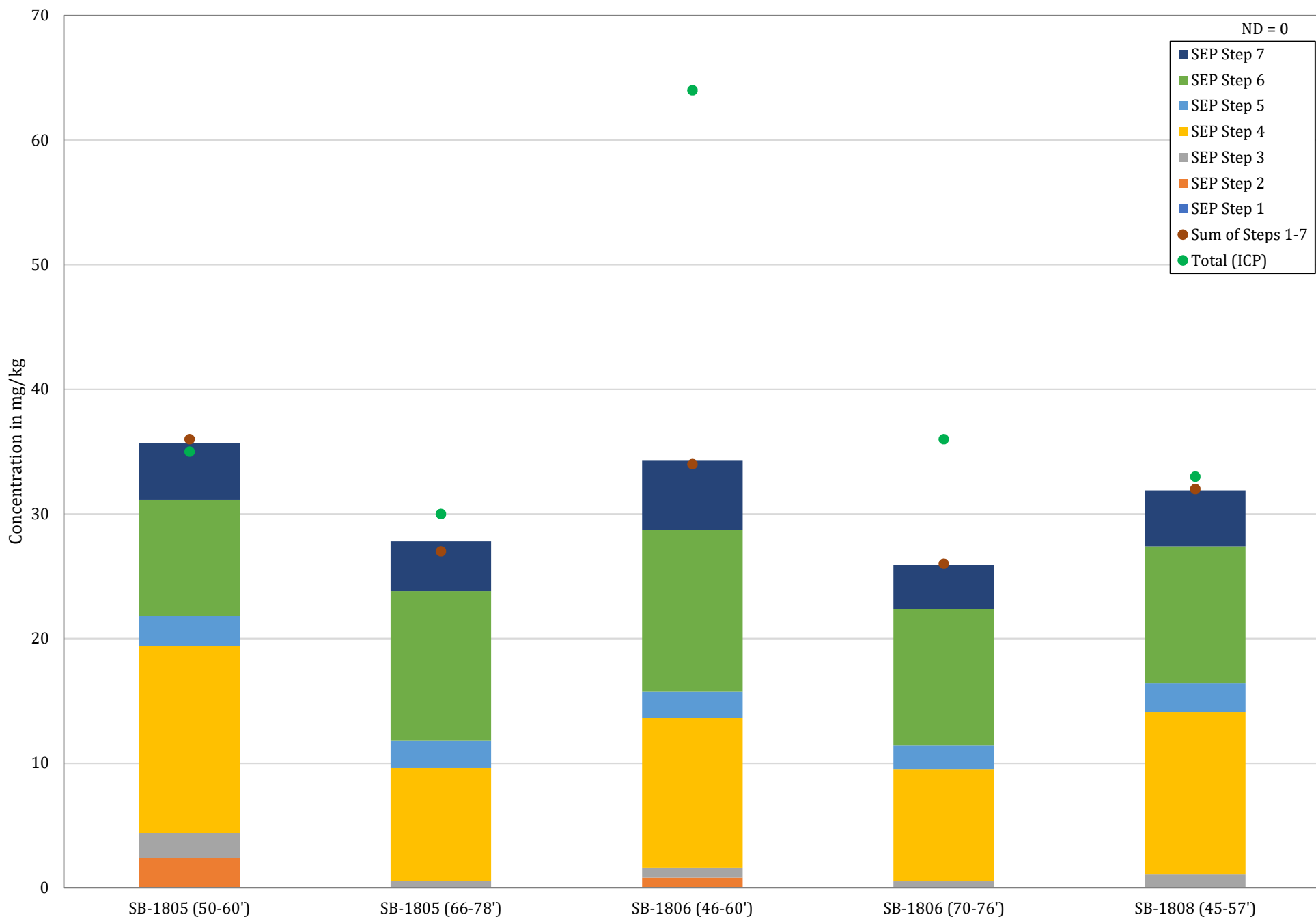




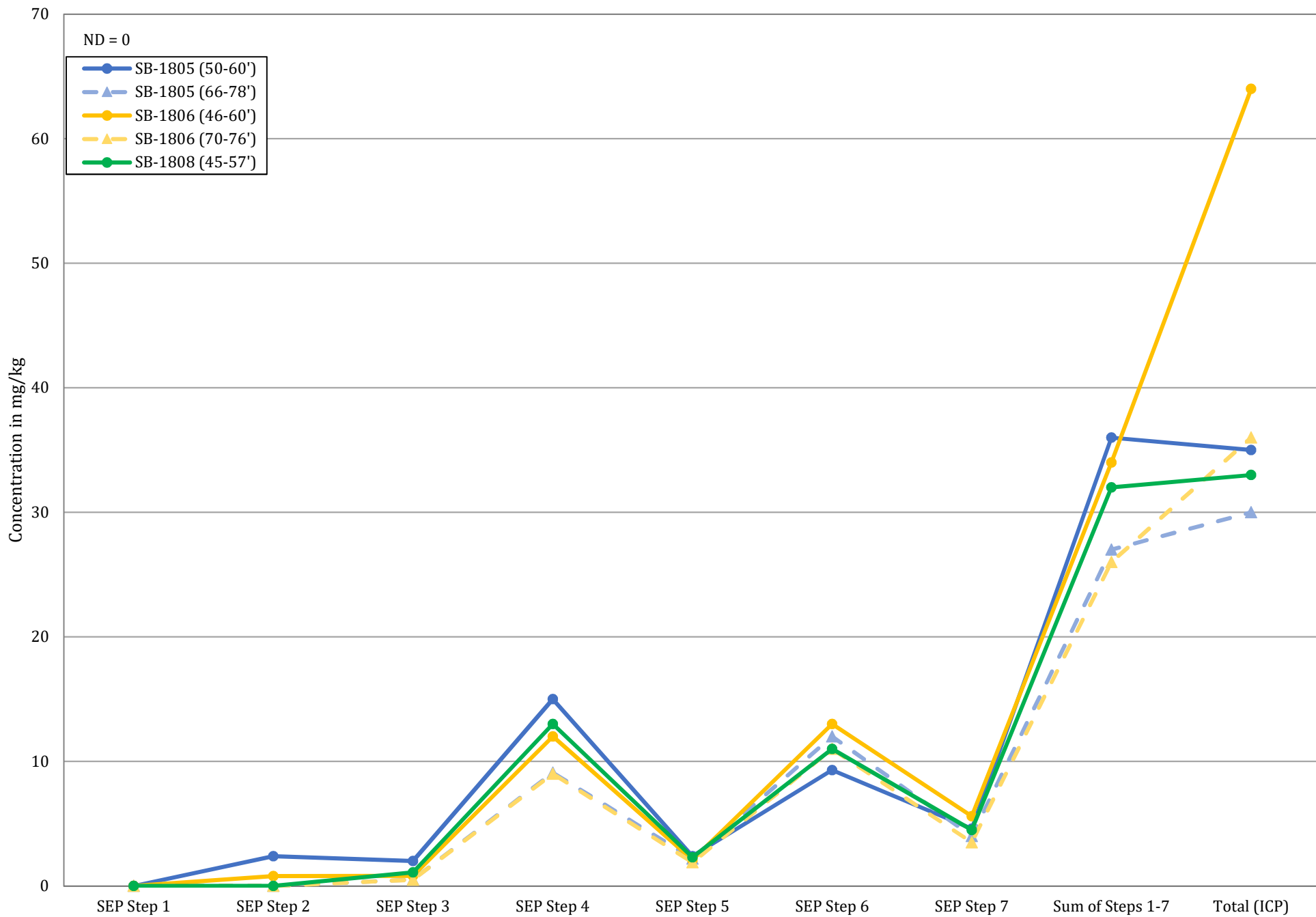
# Vanadium – SEP Analytical Data



## Zinc - SEP Analytical Data

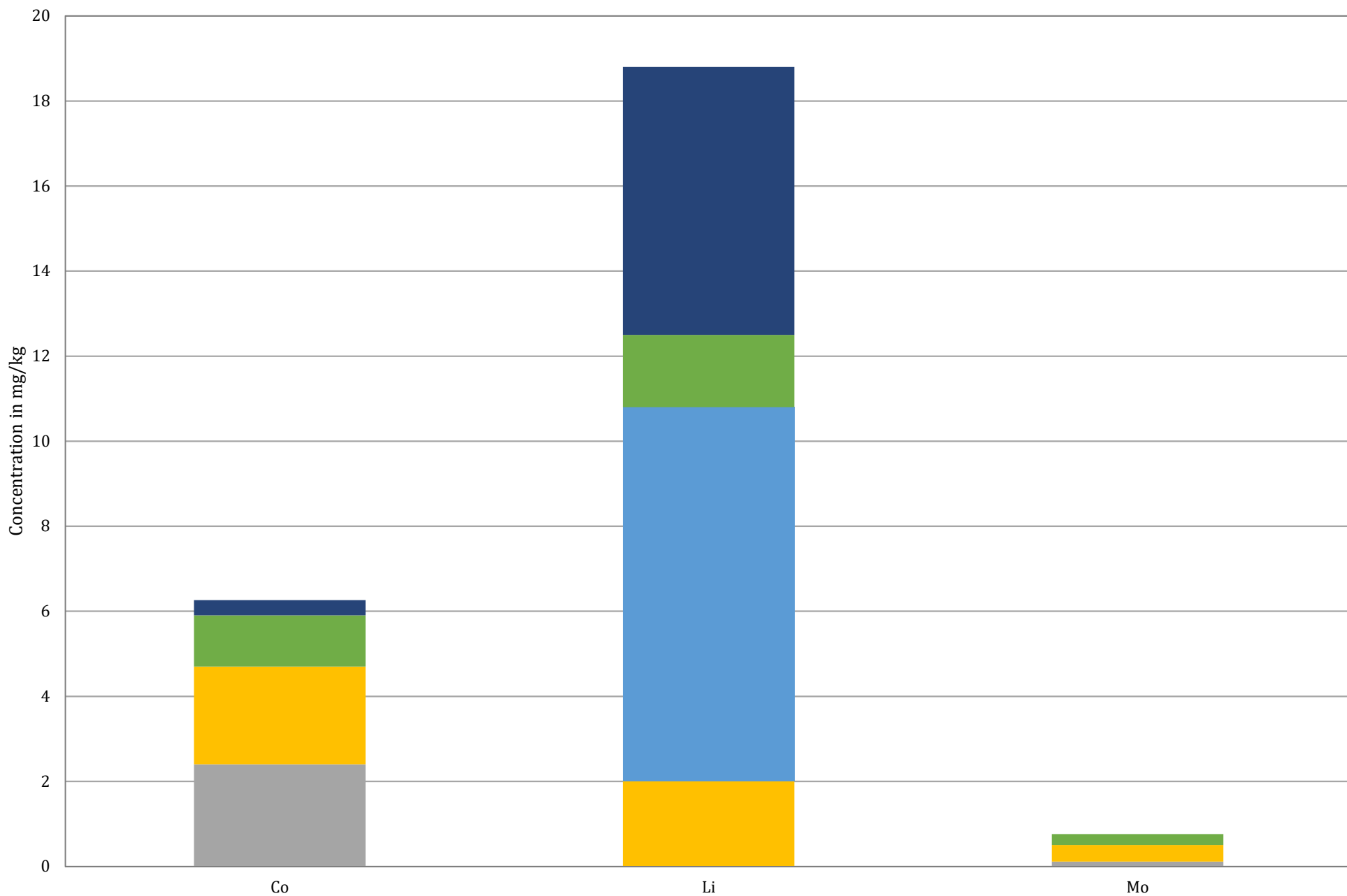


### Zinc - SEP Analytical Data



**APPENDIX D.2**  
**SEP BAR CHARTS BY LOCATION**  
**(CONCENTRATIONS)**

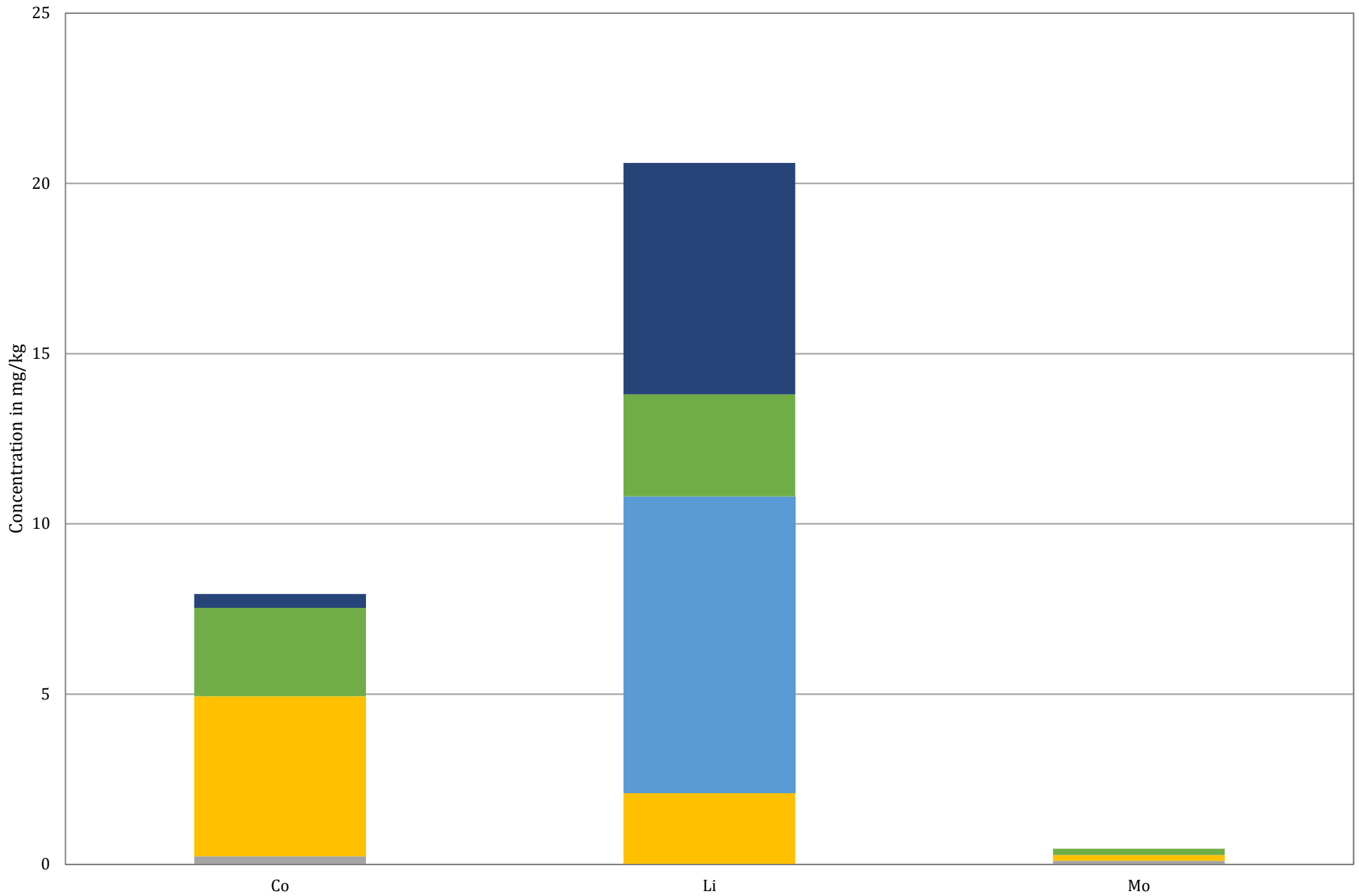
# SB-1805 (50-60')



NDs are depicted as 0.

■ SEP Step 1 ■ SEP Step 2 ■ SEP Step 3 ■ SEP Step 4 ■ SEP Step 5 ■ SEP Step 6 ■ SEP Step 7

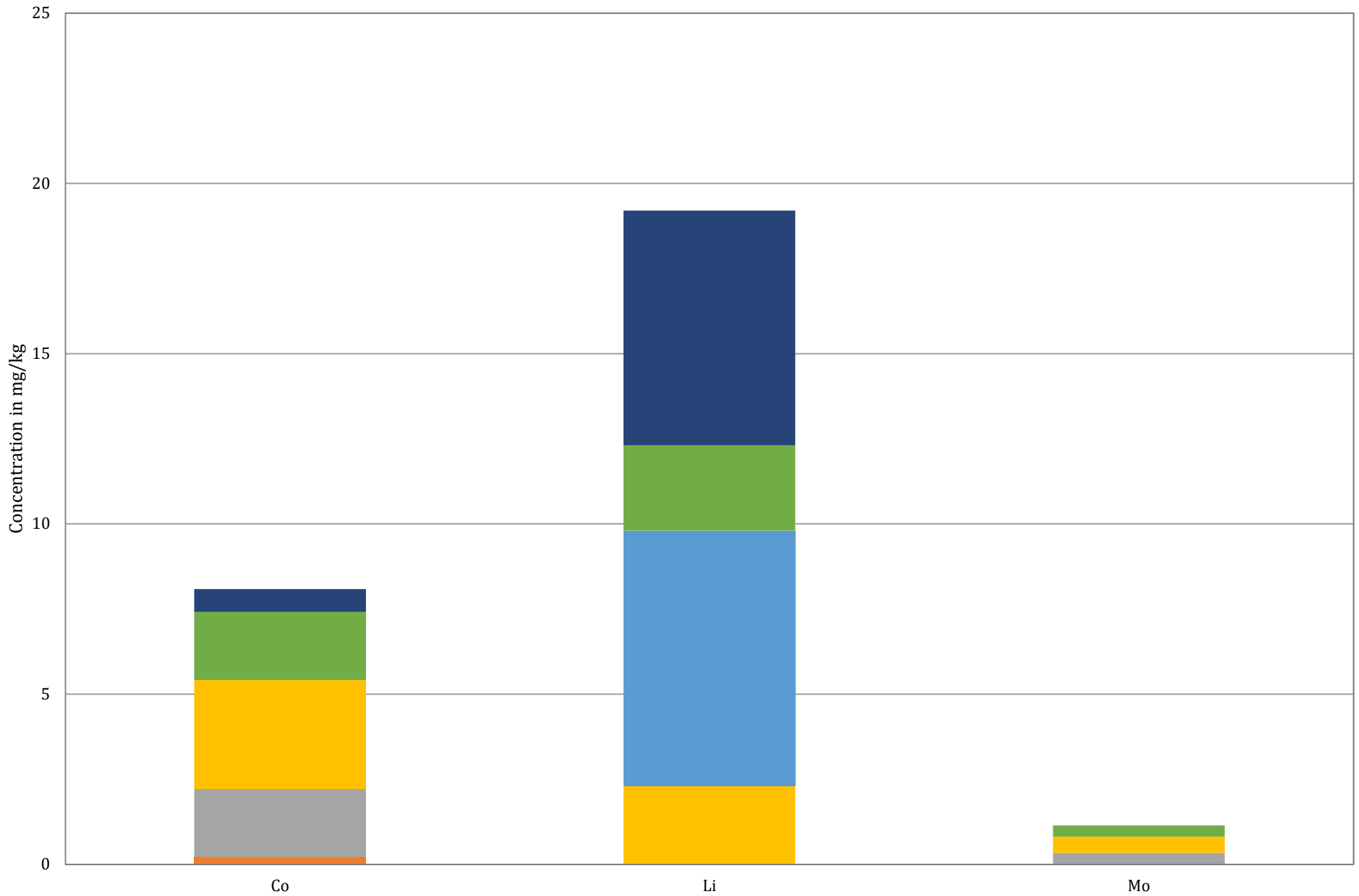
# SB-1805 (66-78')



NDs are depicted as 0.

■ SEP Step 1 ■ SEP Step 2 ■ SEP Step 3 ■ SEP Step 4 ■ SEP Step 5 ■ SEP Step 6 ■ SEP Step 7

# SB-1806 (46-60')

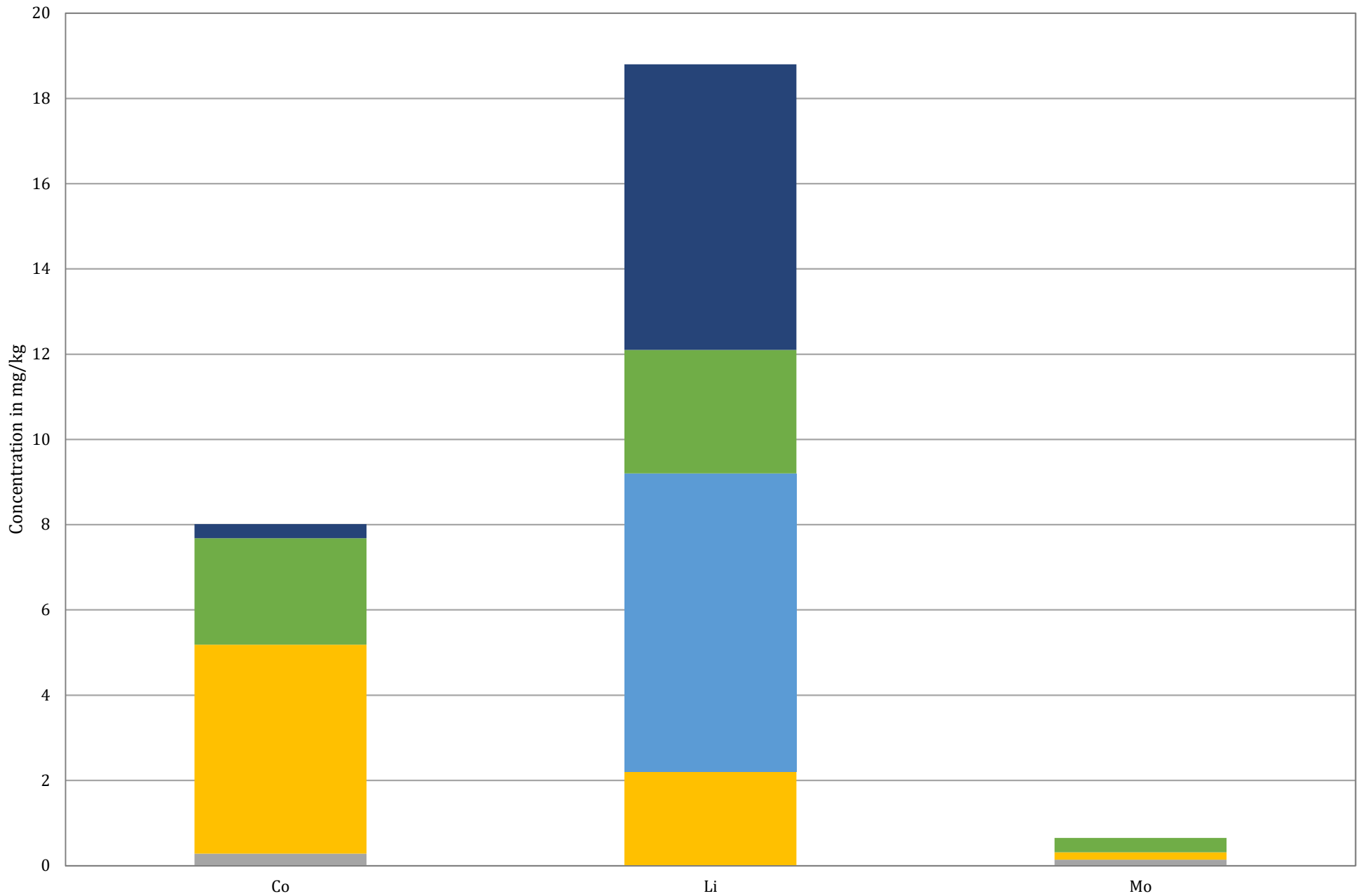


NDs are depicted as 0.

■ SEP Step 1 ■ SEP Step 2 ■ SEP Step 3 ■ SEP Step 4 ■ SEP Step 5 ■ SEP Step 6 ■ SEP Step 7



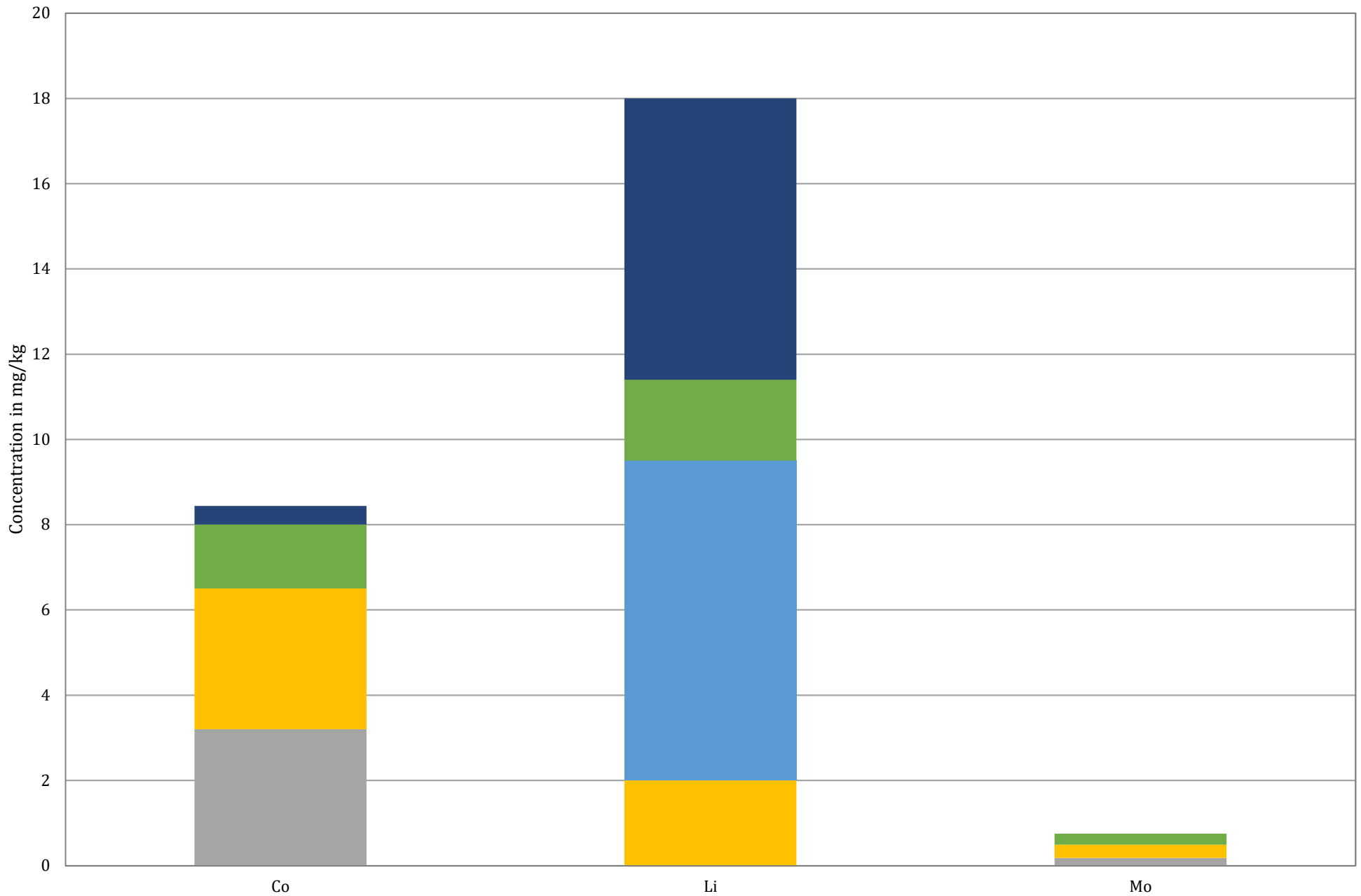
# SB-1806 (70-76')



NDs are depicted as 0.

■ SEP Step 1 ■ SEP Step 2 ■ SEP Step 3 ■ SEP Step 4 ■ SEP Step 5 ■ SEP Step 6 ■ SEP Step 7

# SB-1808 (45-57')

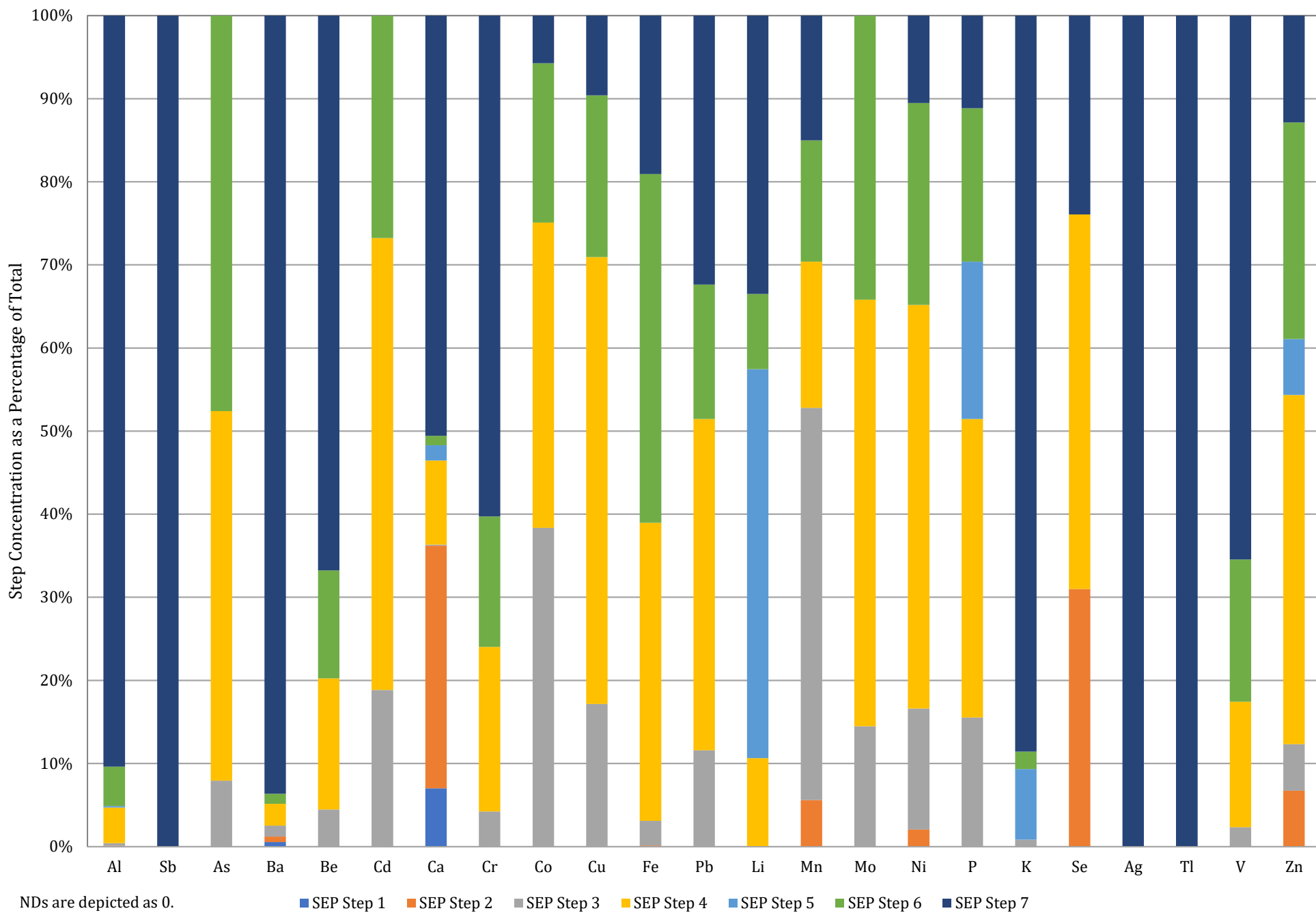


NDs are depicted as 0.

■ SEP Step 1 ■ SEP Step 2 ■ SEP Step 3 ■ SEP Step 4 ■ SEP Step 5 ■ SEP Step 6 ■ SEP Step 7

**APPENDIX D.3**  
**SEP BAR CHARTS BY LOCATION**  
**(PERCENTAGES)**

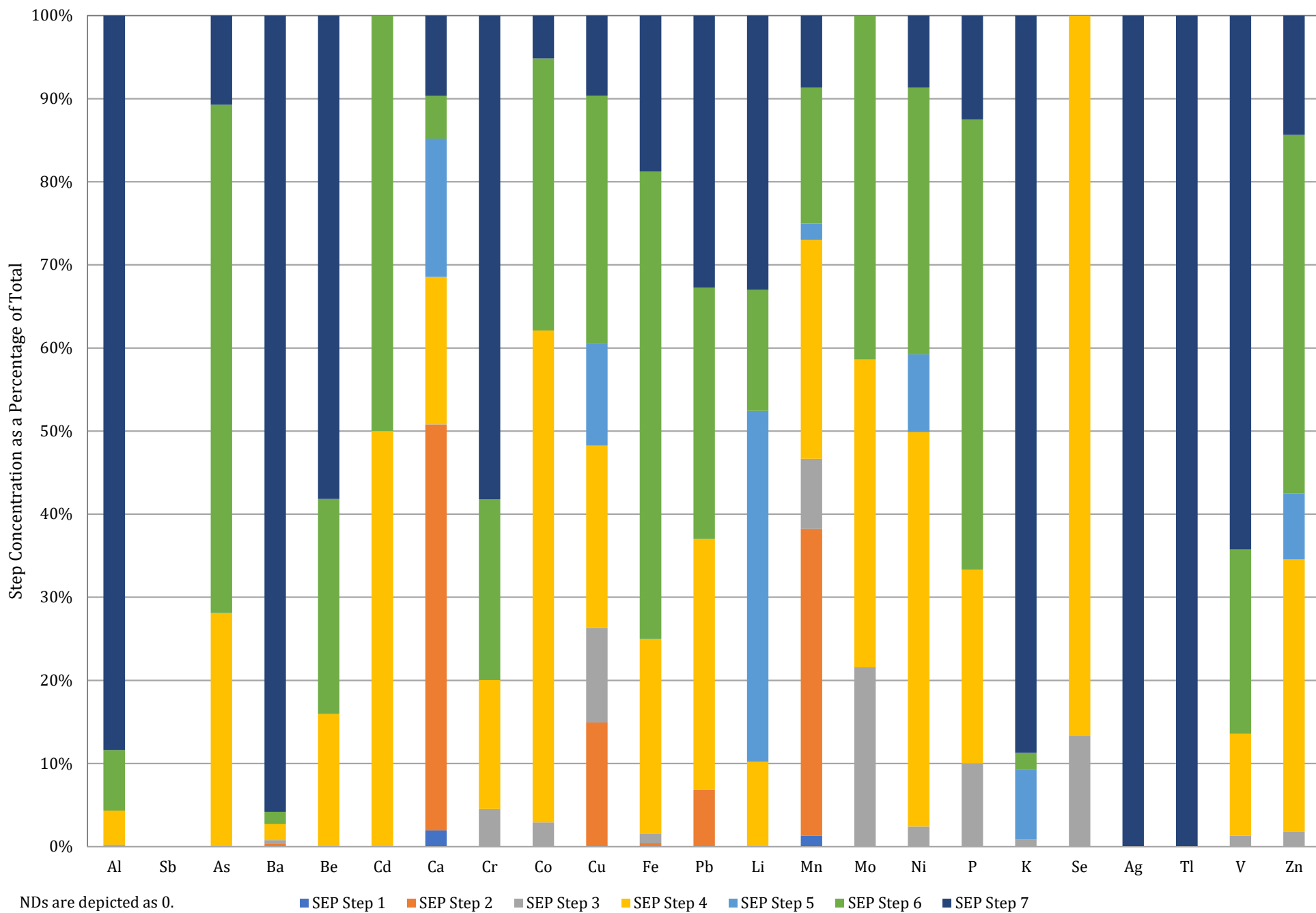
### SB-1805 (50-60')



NDs are depicted as 0.

■ SEP Step 1  
 ■ SEP Step 2  
 ■ SEP Step 3  
 ■ SEP Step 4  
 ■ SEP Step 5  
 ■ SEP Step 6  
 ■ SEP Step 7

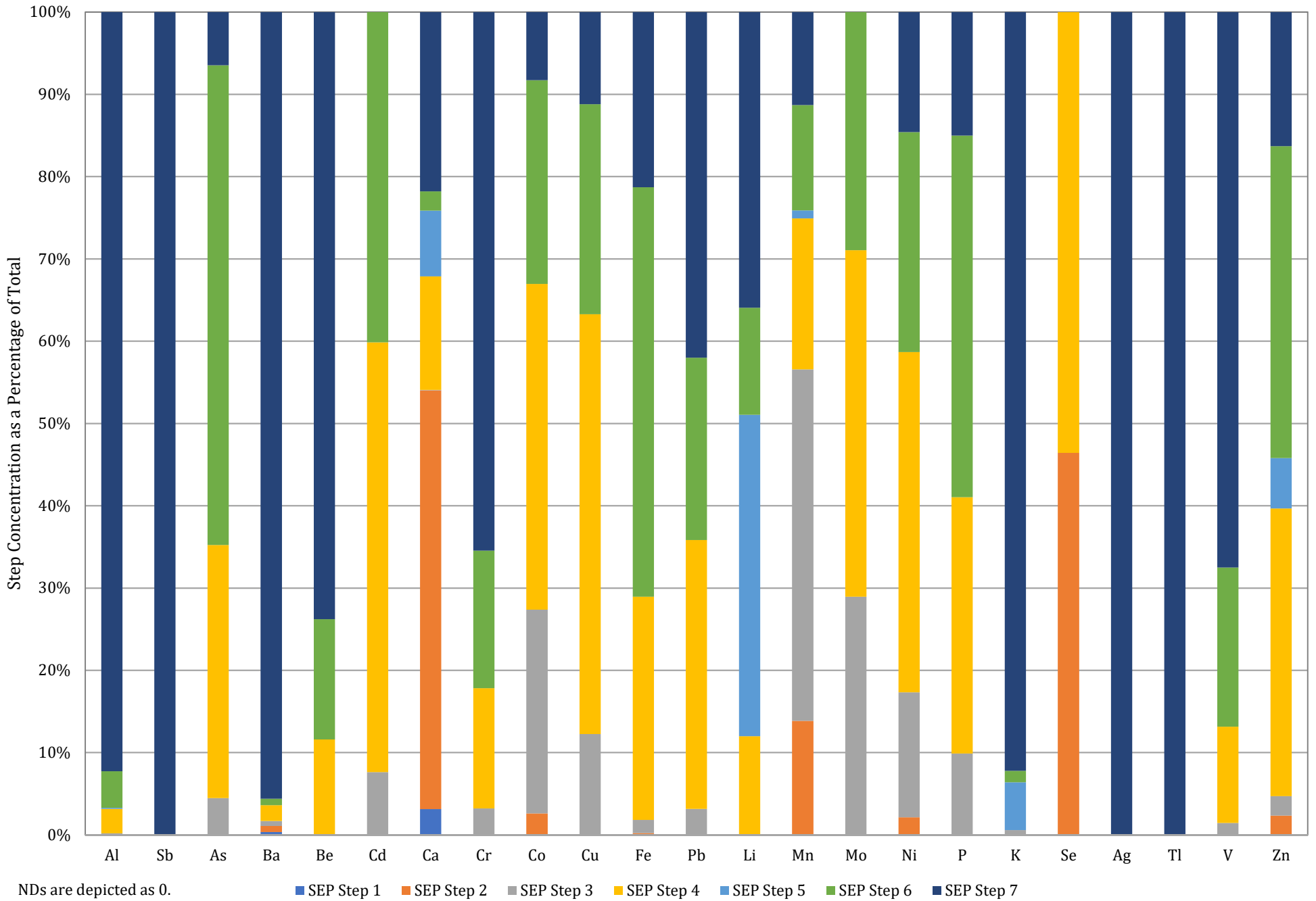
### SB-1805 (66-78')



NDs are depicted as 0.

■ SEP Step 1  
 ■ SEP Step 2  
 ■ SEP Step 3  
 ■ SEP Step 4  
 ■ SEP Step 5  
 ■ SEP Step 6  
 ■ SEP Step 7

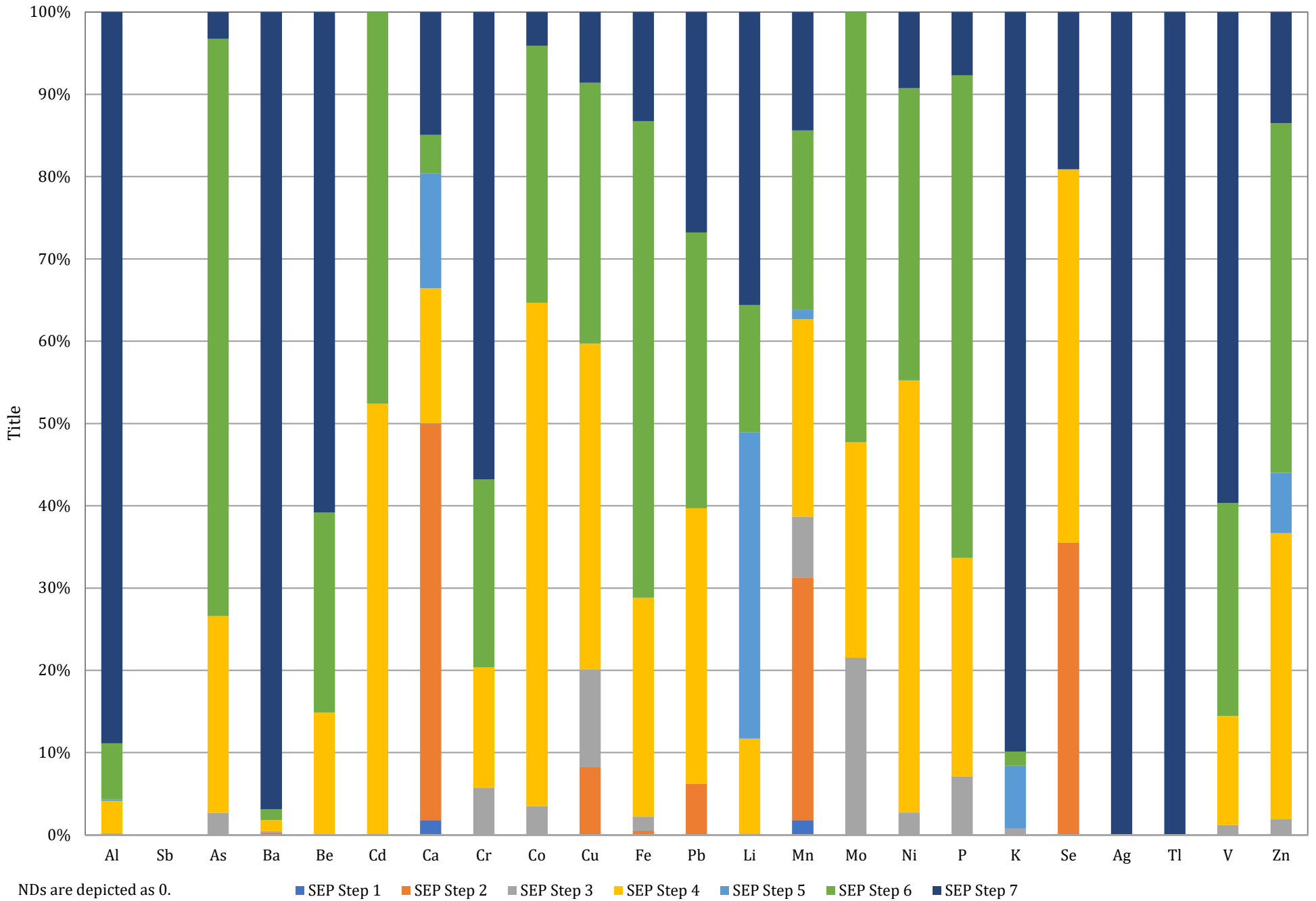
# SB-1806 (46-60')



NDs are depicted as 0.

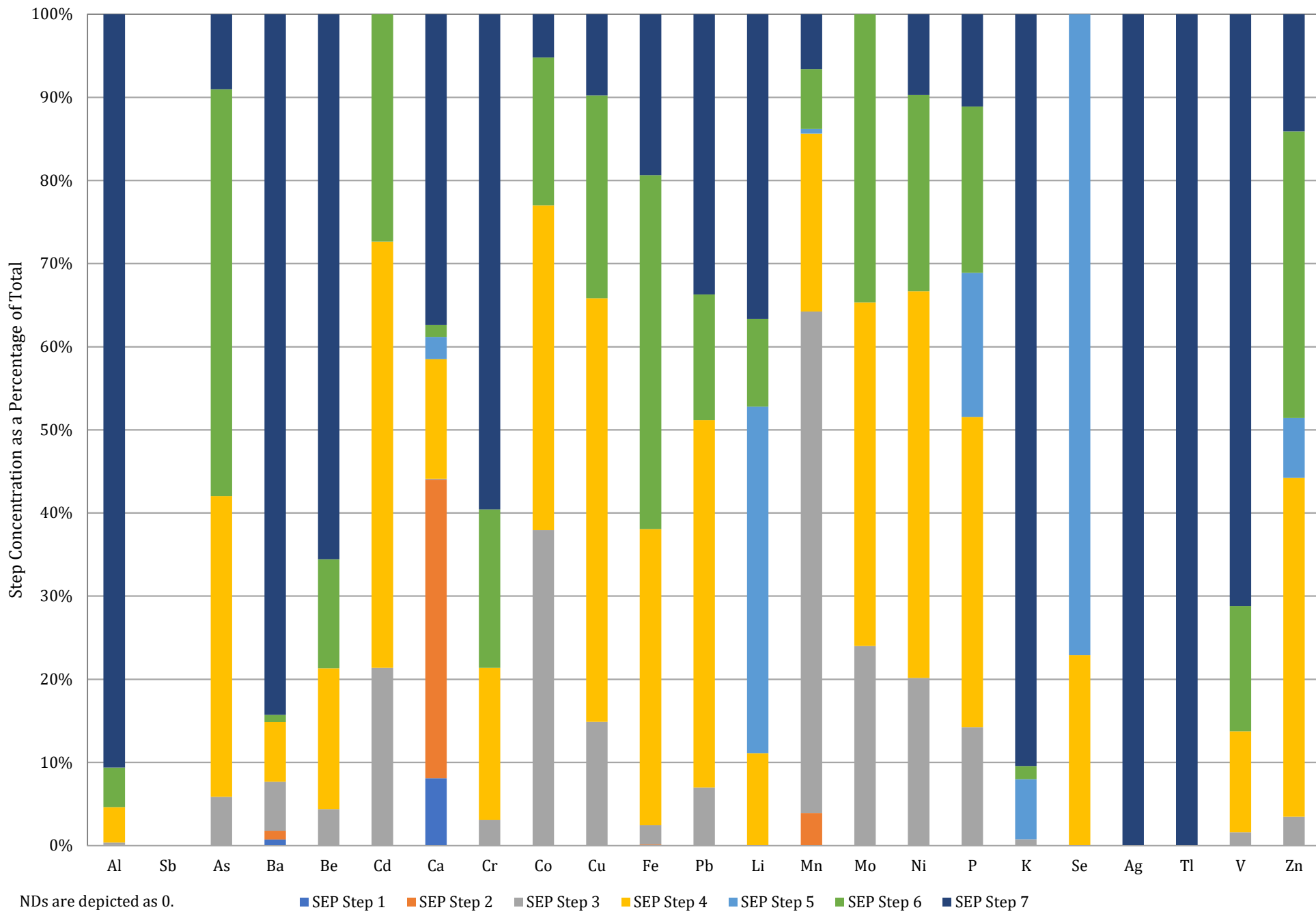
■ SEP Step 1  
 ■ SEP Step 2  
 ■ SEP Step 3  
 ■ SEP Step 4  
 ■ SEP Step 5  
 ■ SEP Step 6  
 ■ SEP Step 7

# SB-1806 (70-76')





### SB-1808 (45-57')



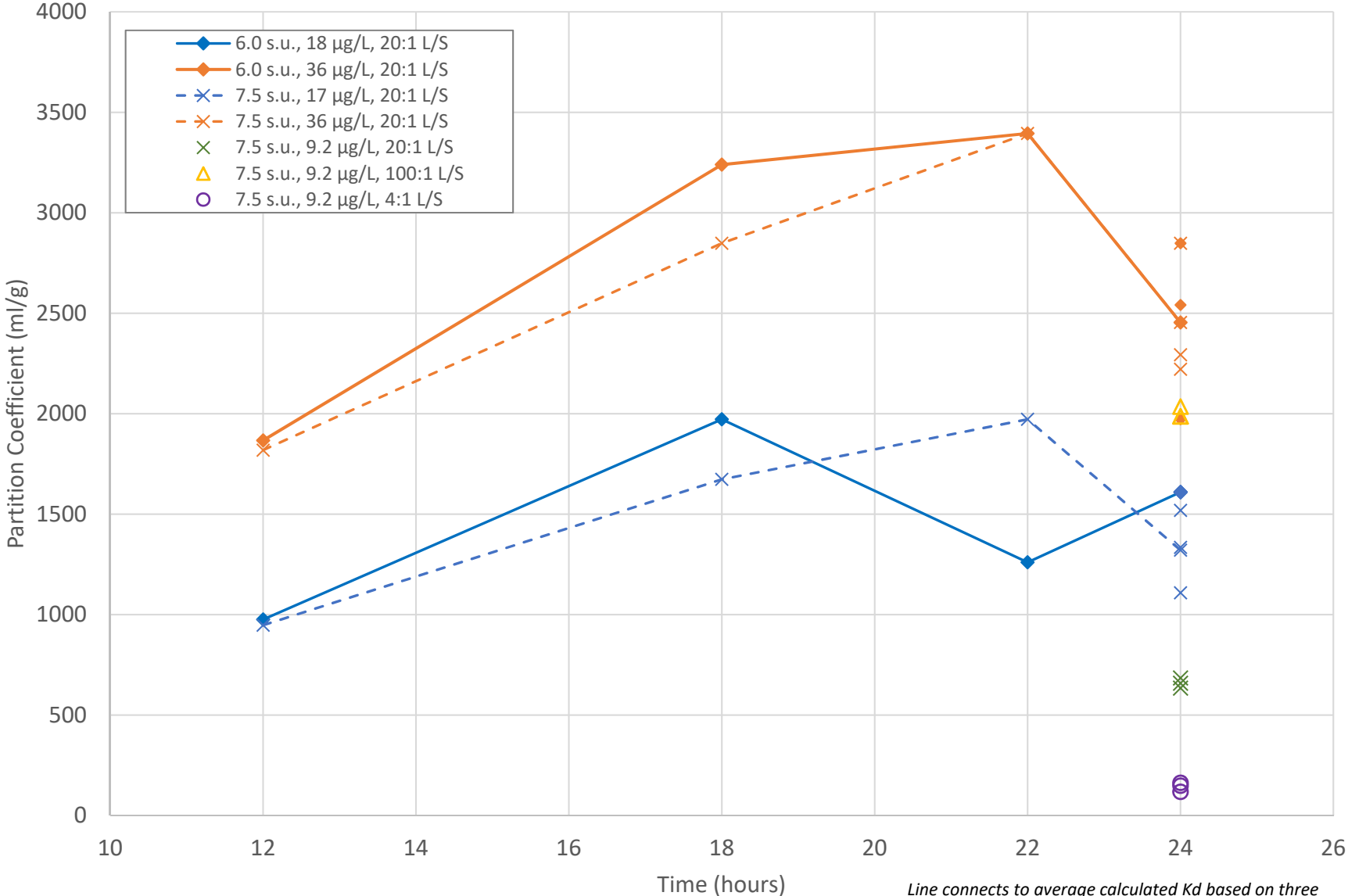
NDs are depicted as 0.

■ SEP Step 1  
 ■ SEP Step 2  
 ■ SEP Step 3  
 ■ SEP Step 4  
 ■ SEP Step 5  
 ■ SEP Step 6  
 ■ SEP Step 7

**APPENDIX E**  
**PARTITION COEFFICIENT CHARTS**

Cobalt -- SB-1806 (46-60')

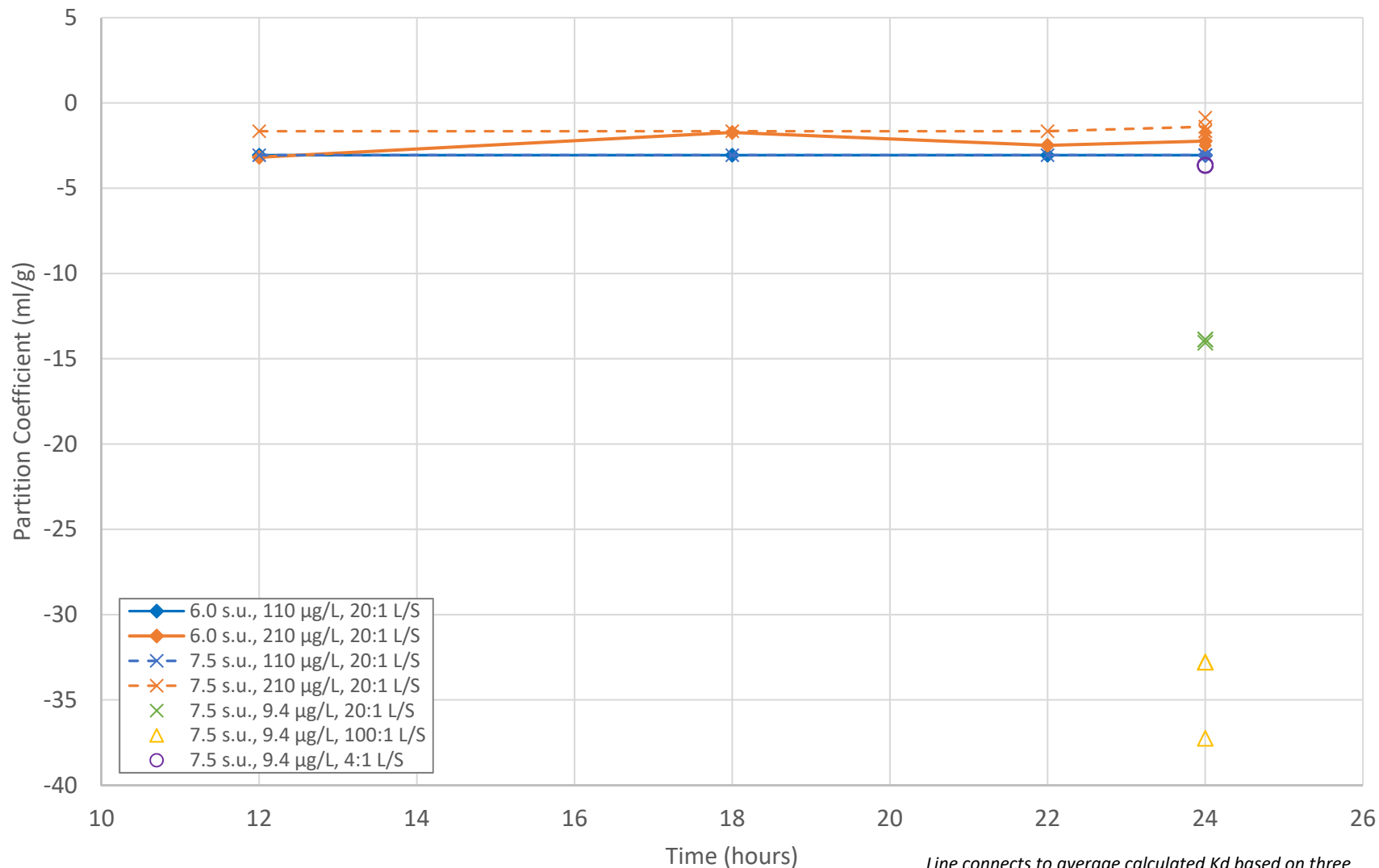
*Kd calculated as Adsorbed Concentration*



*Line connects to average calculated Kd based on three repetitions of the 24 hour leaching test (REP-1, -2 and -3).*

### Molybdenum -- SB-1806 (46-60')

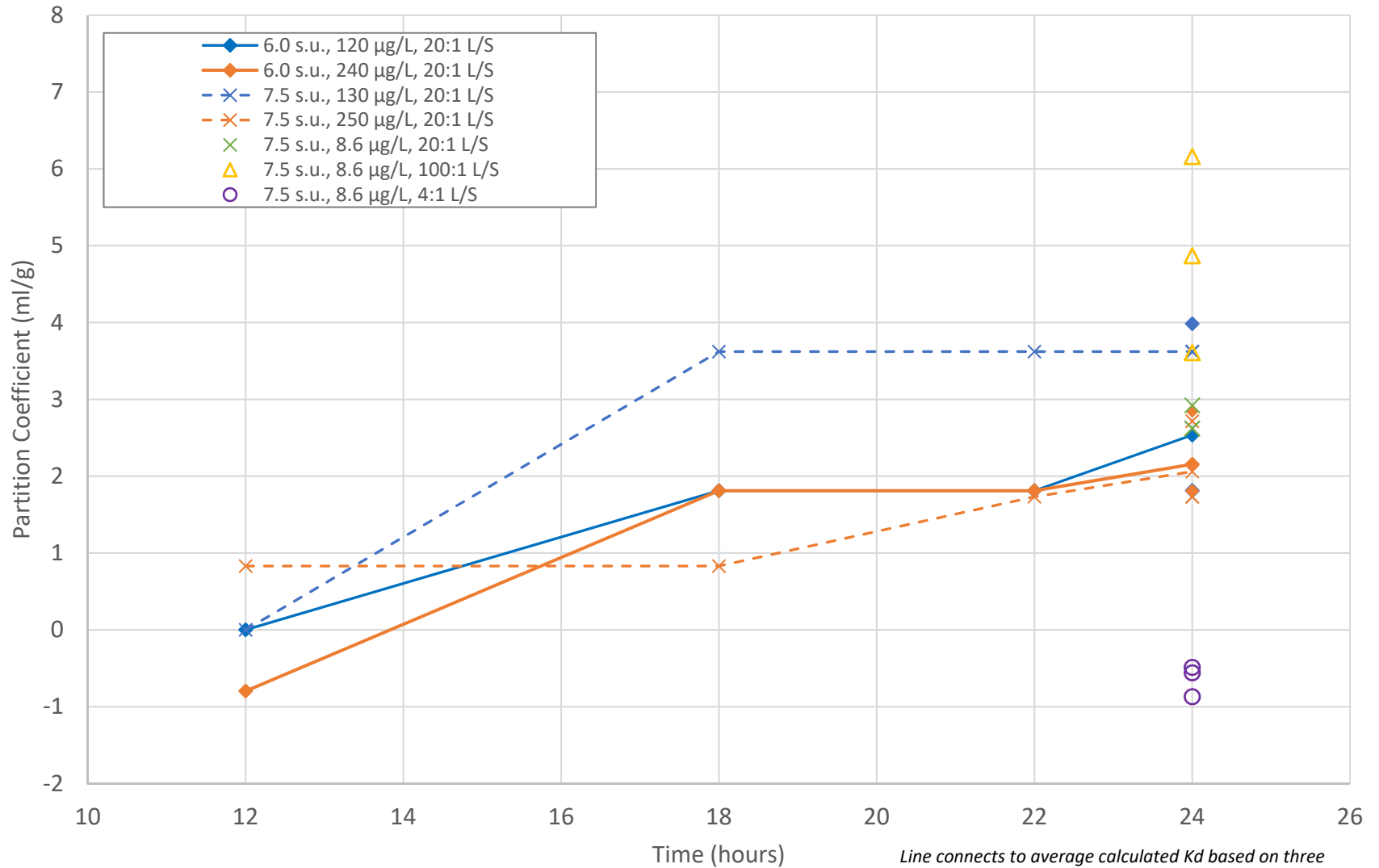
*Kd calculated as Adsorbed Concentration*



*Line connects to average calculated  $K_d$  based on three repetitions of the 24 hour leaching test (REP-1, -2 and -3)*

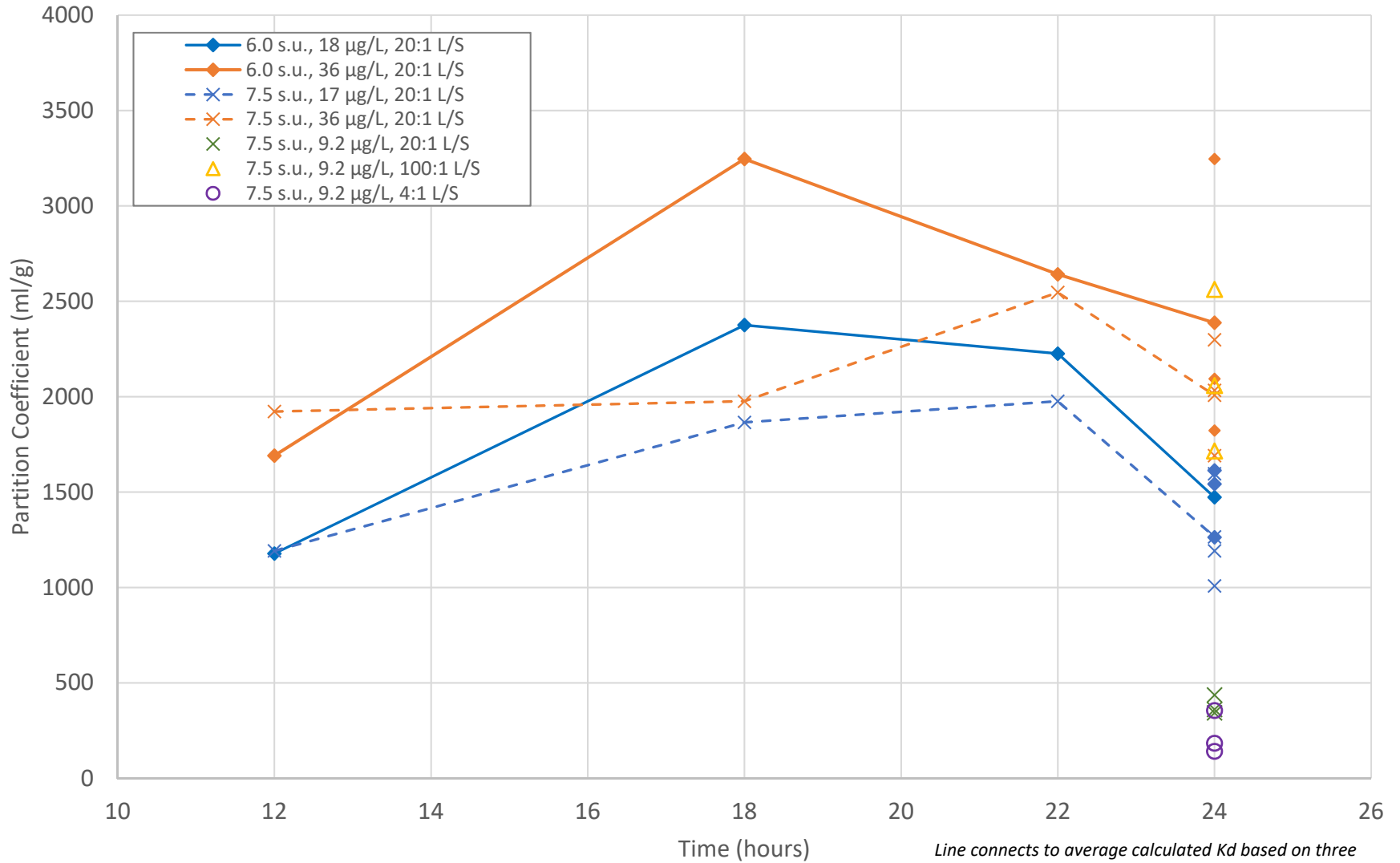
# Lithium -- SB-1806 (46-60')

*Kd calculated as Adsorbed Concentration*



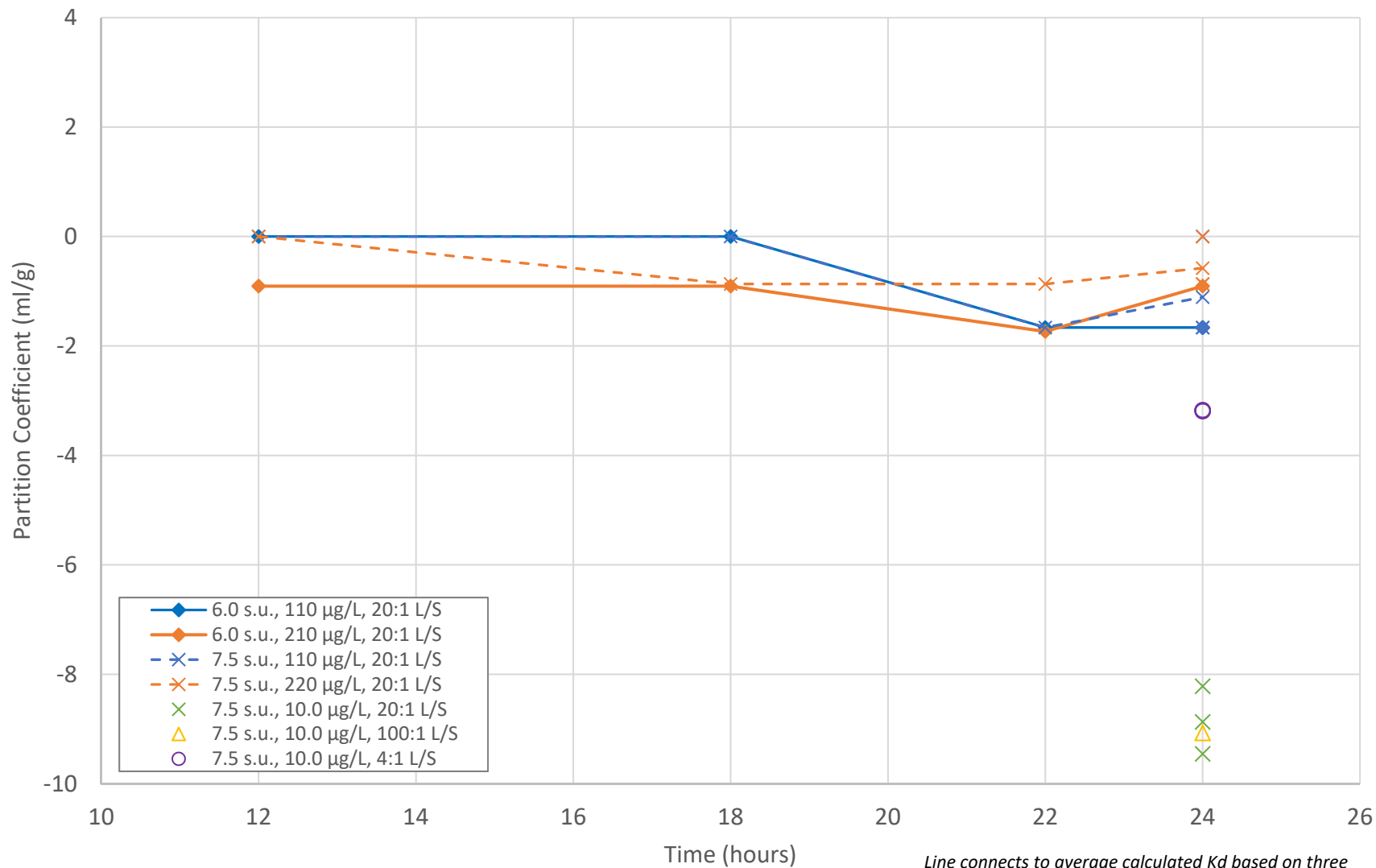
### Cobalt -- SB-1806 (70-76')

*Kd calculated as Adsorbed Concentration*



### Molybdenum -- SB-1806 (70-76')

*Kd calculated as Adsorbed Concentration*

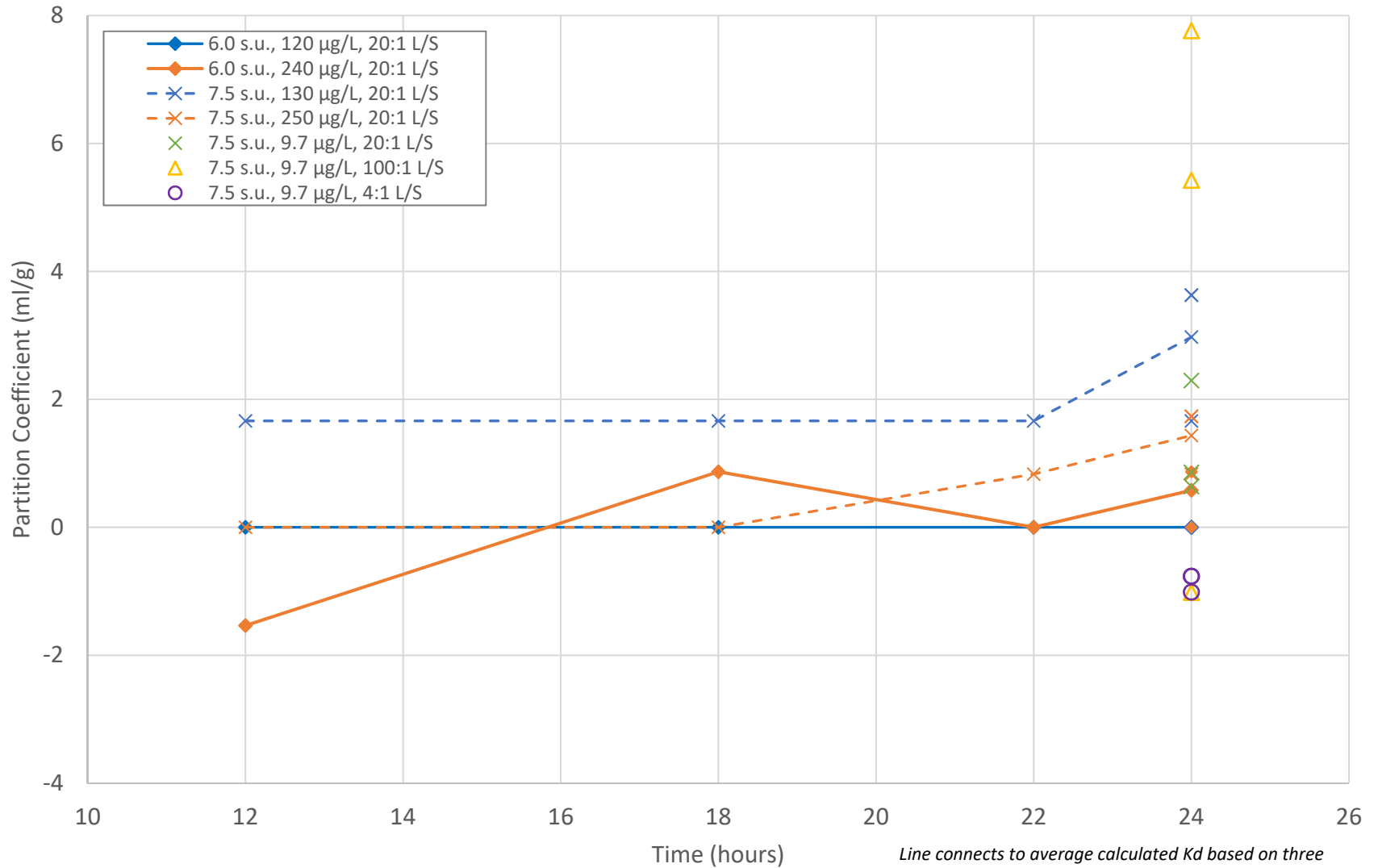


*Line connects to average calculated Kd based on three repetitions of the 24 hour leaching test (REP-1, -2 and -*



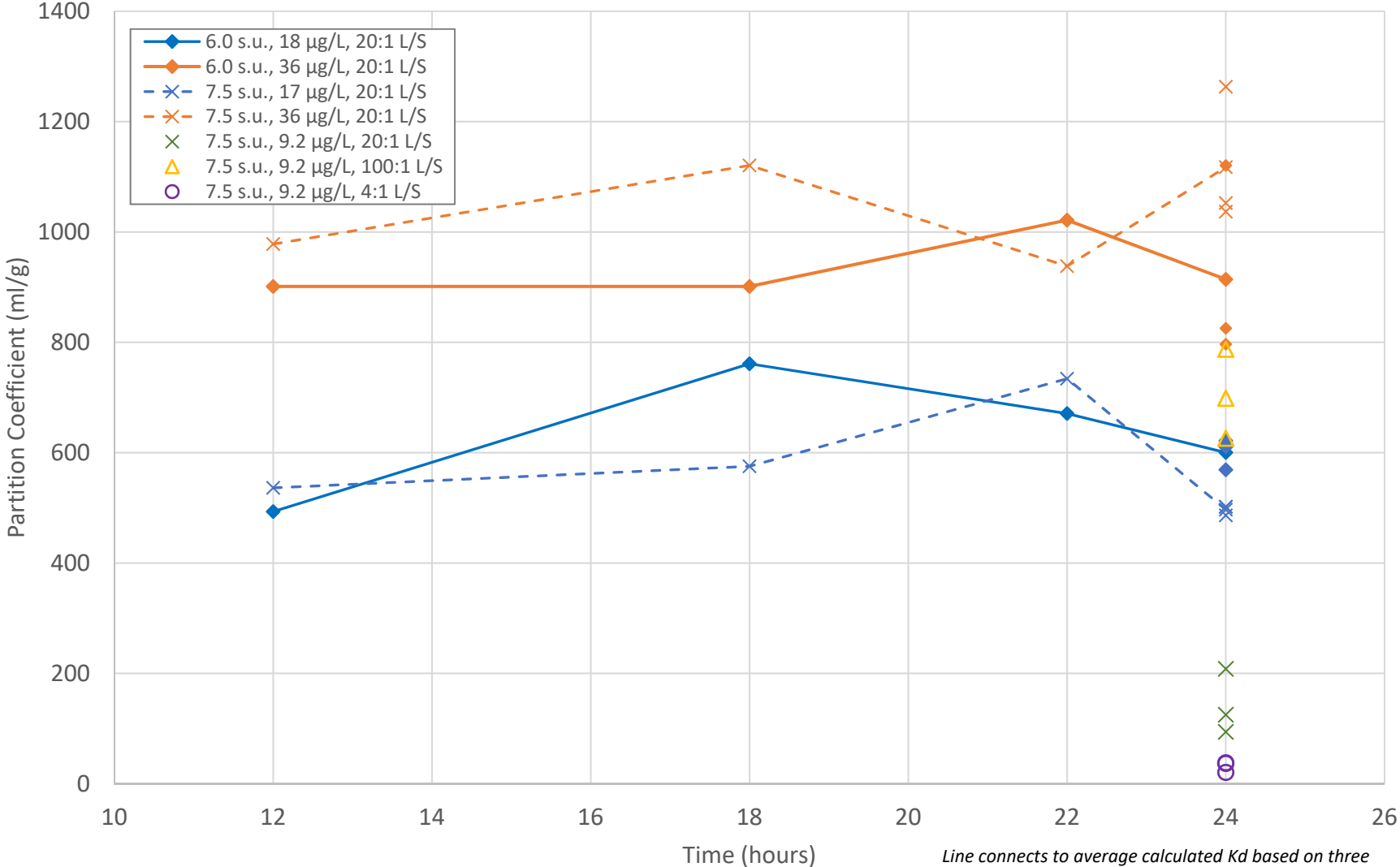
# Lithium -- SB-1806 (70-76')

*Kd calculated as Adsorbed Concentration*



Cobalt -- SB-1806 (45-57')

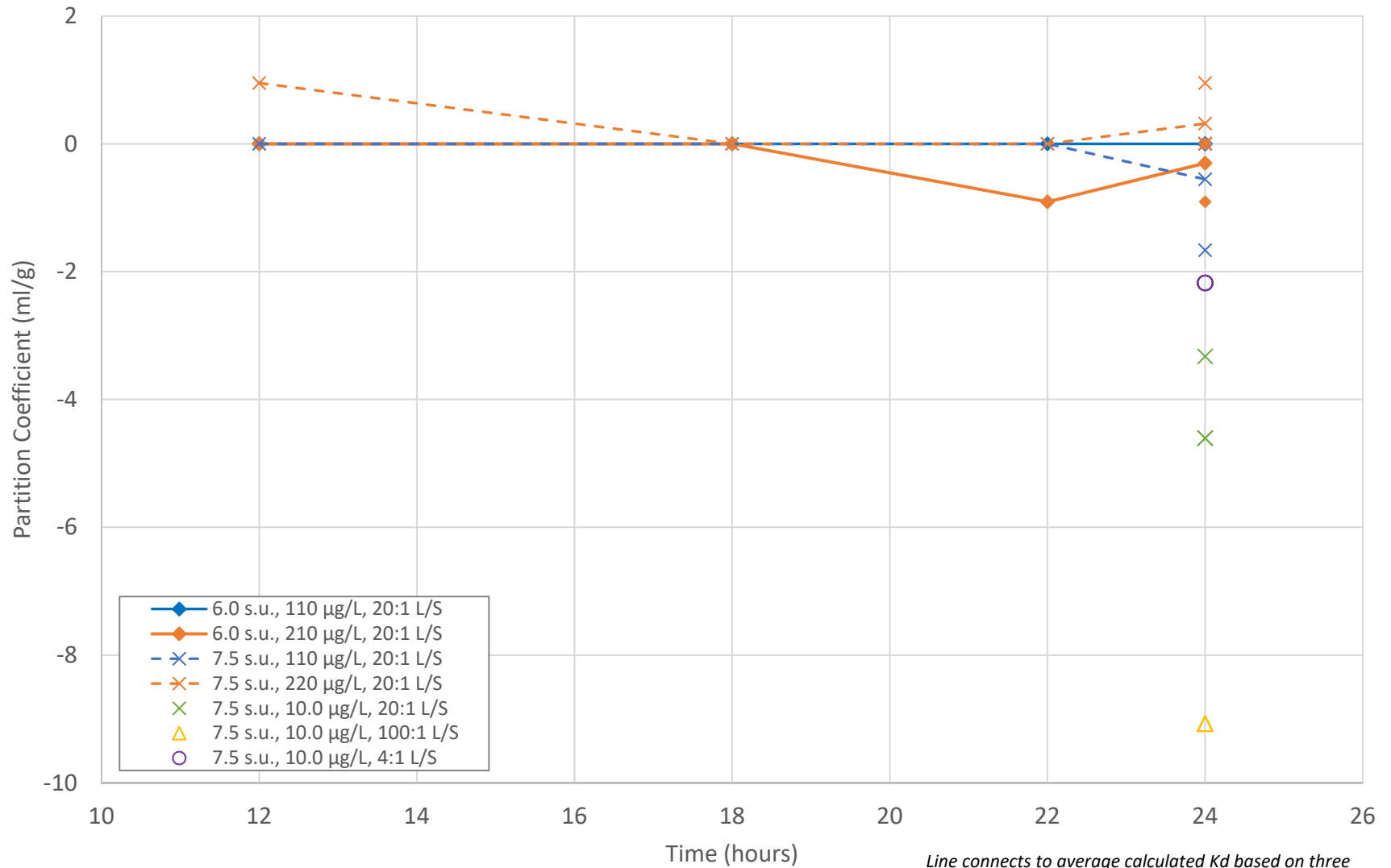
*Kd calculated as Adsorbed Concentration*



*Line connects to average calculated Kd based on three repetitions of the 24 hour leaching test (REP-1, -2 and -3).*

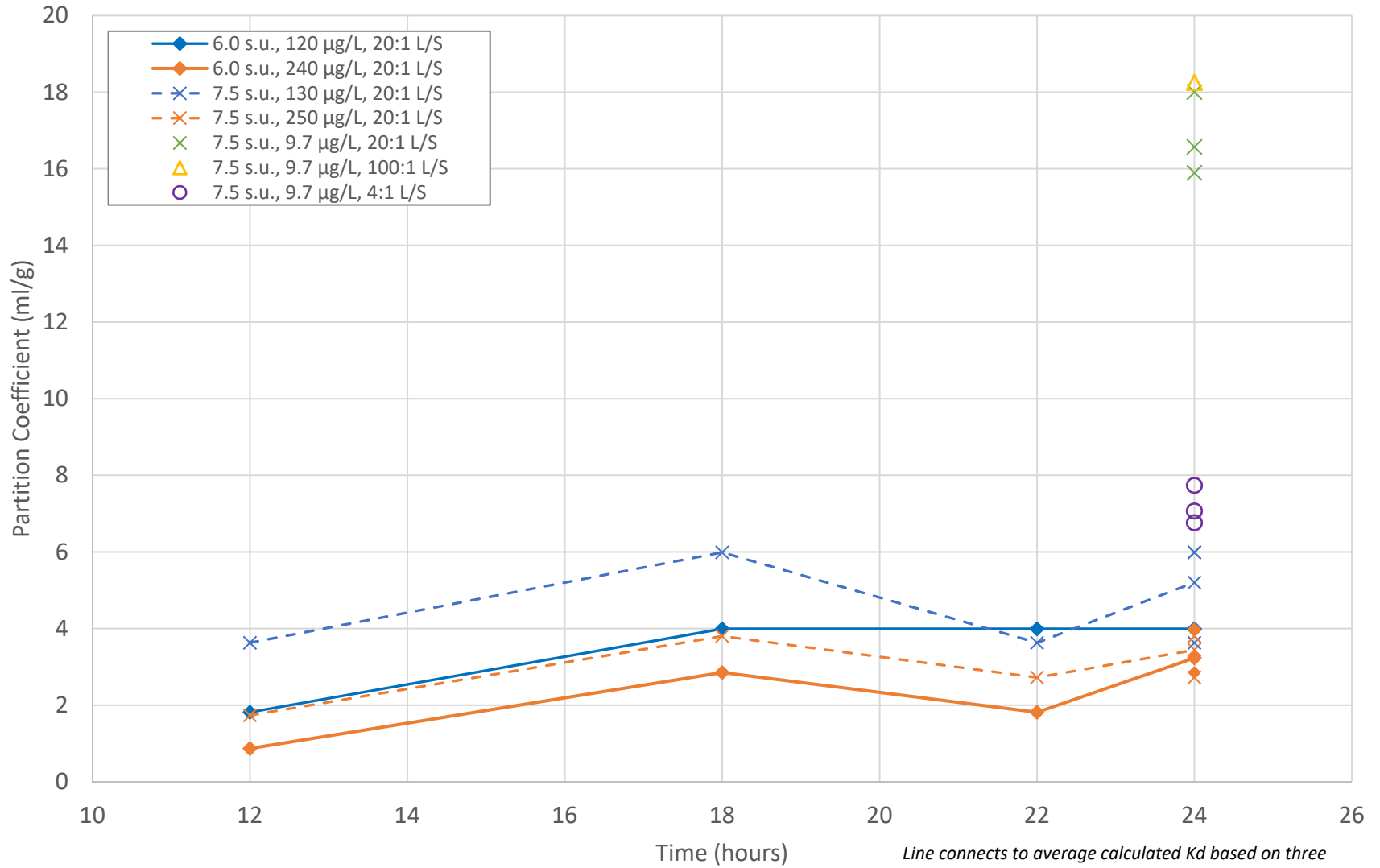
### Molybdenum -- SB-1806 (45-57')

*Kd calculated as Adsorbed Concentration*



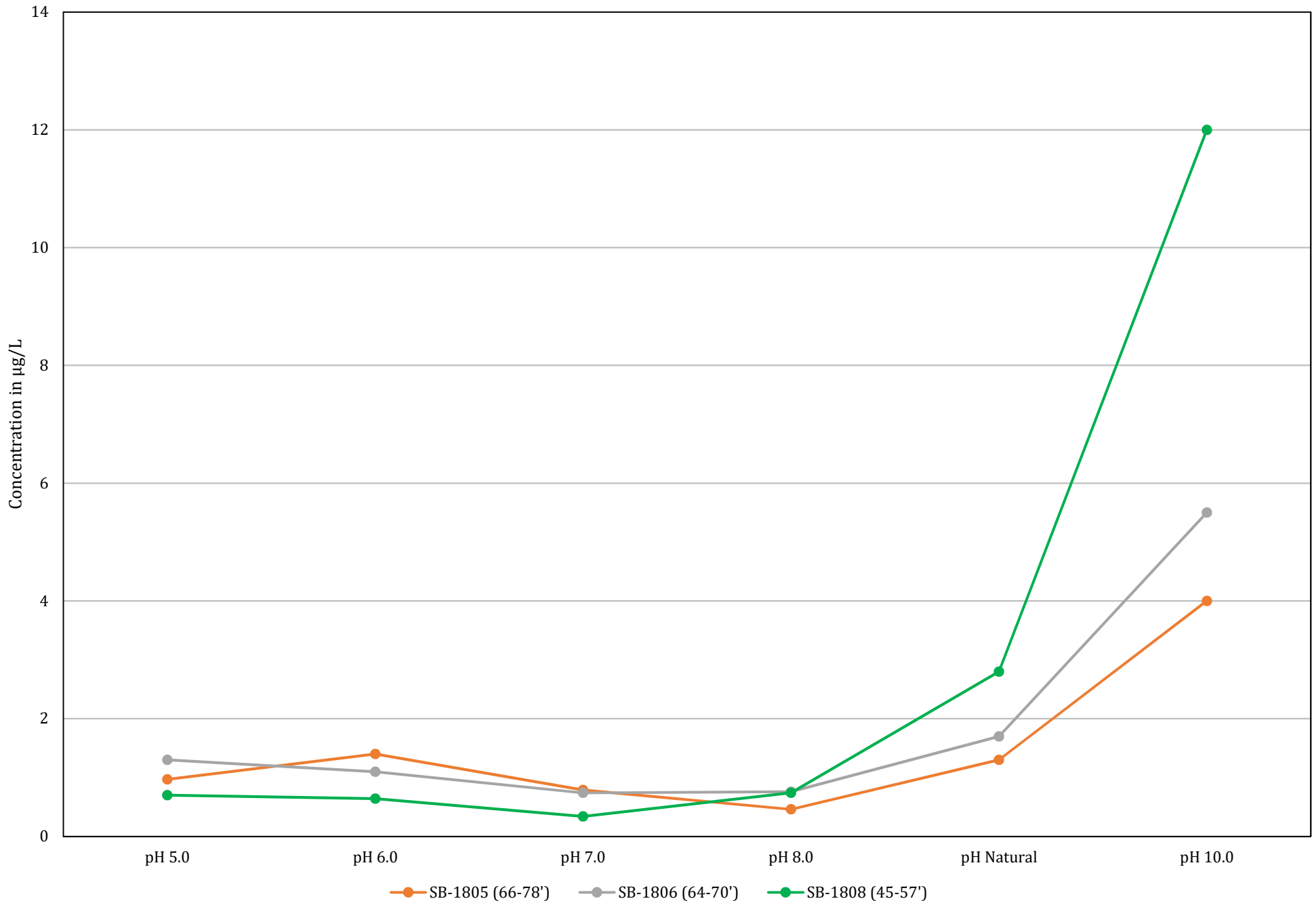
# Lithium -- SB-1806 (45-57')

*Kd calculated as Adsorbed Concentration*

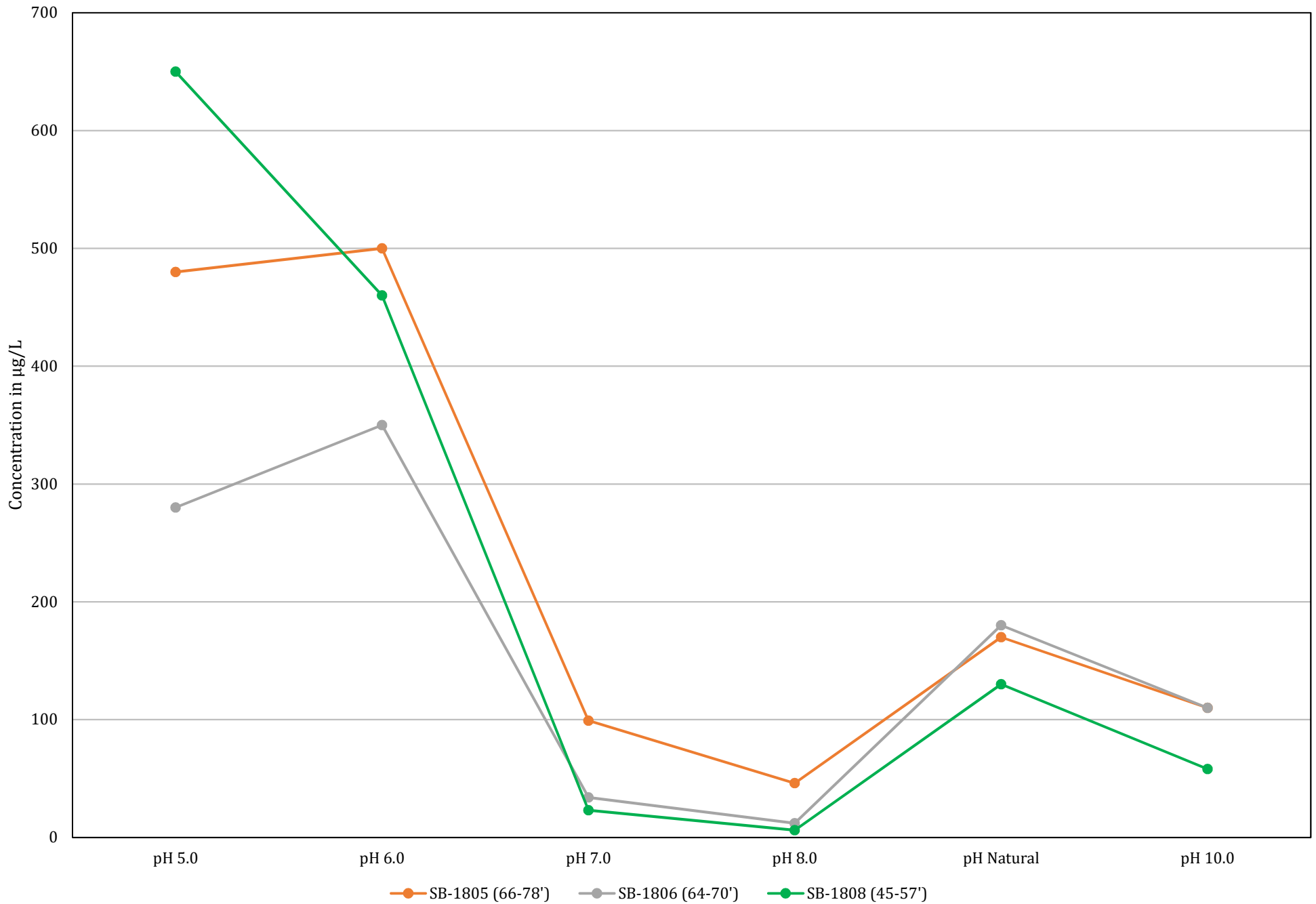


**APPENDIX F**  
**pH LEACHING CHARTS**

# Arsenic - pH Leaching Test Results

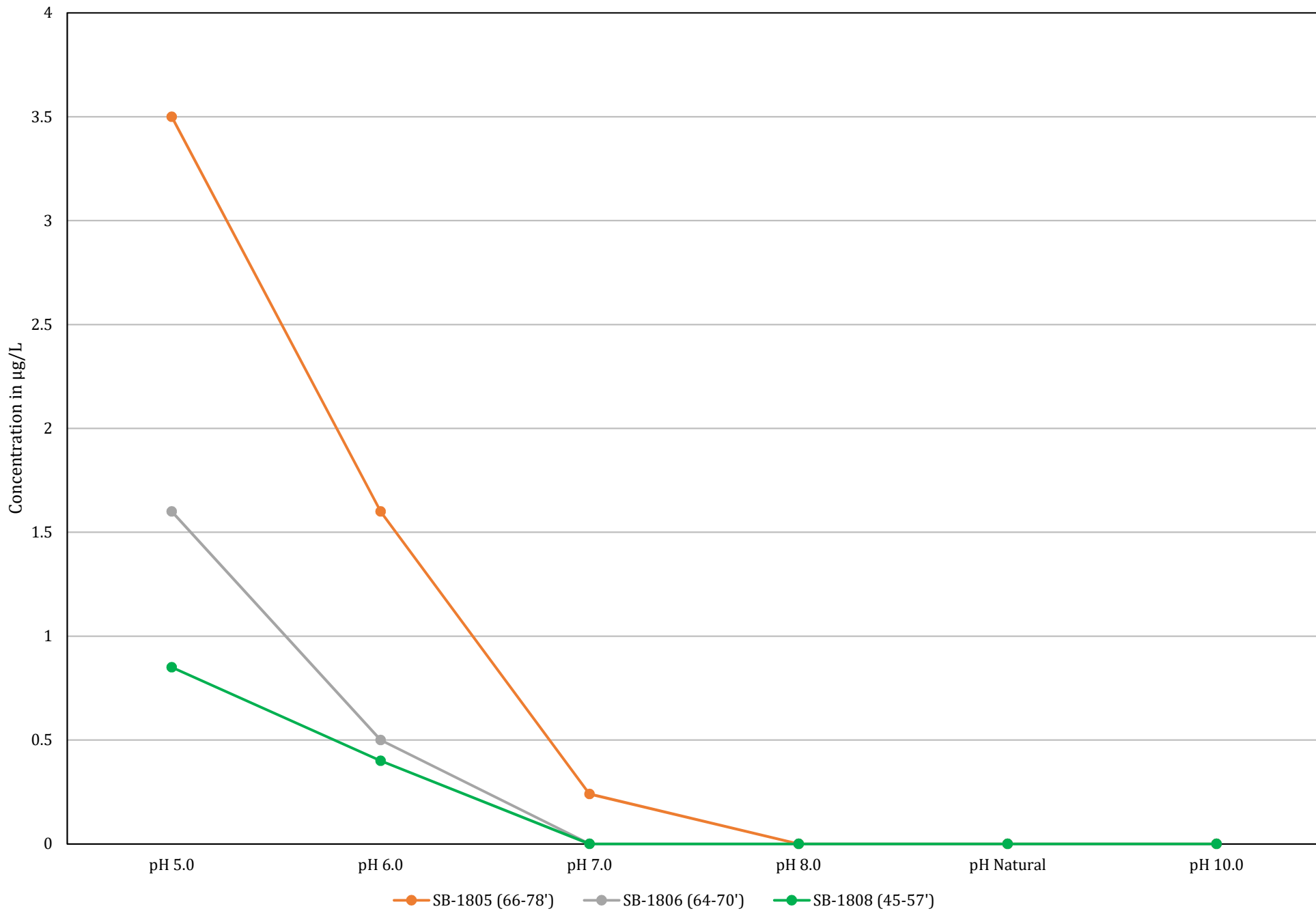


# Barium - pH Leaching Test Results

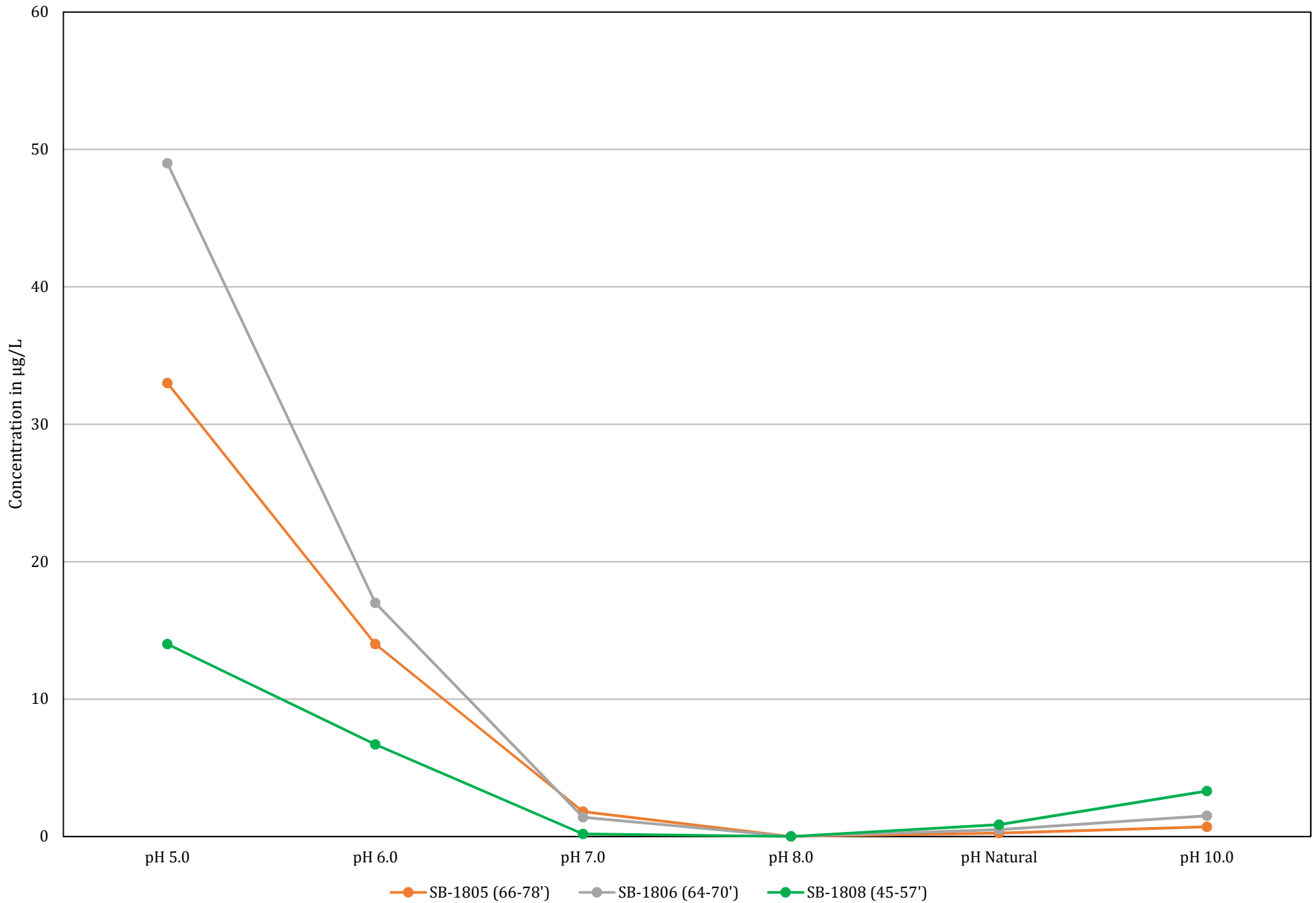




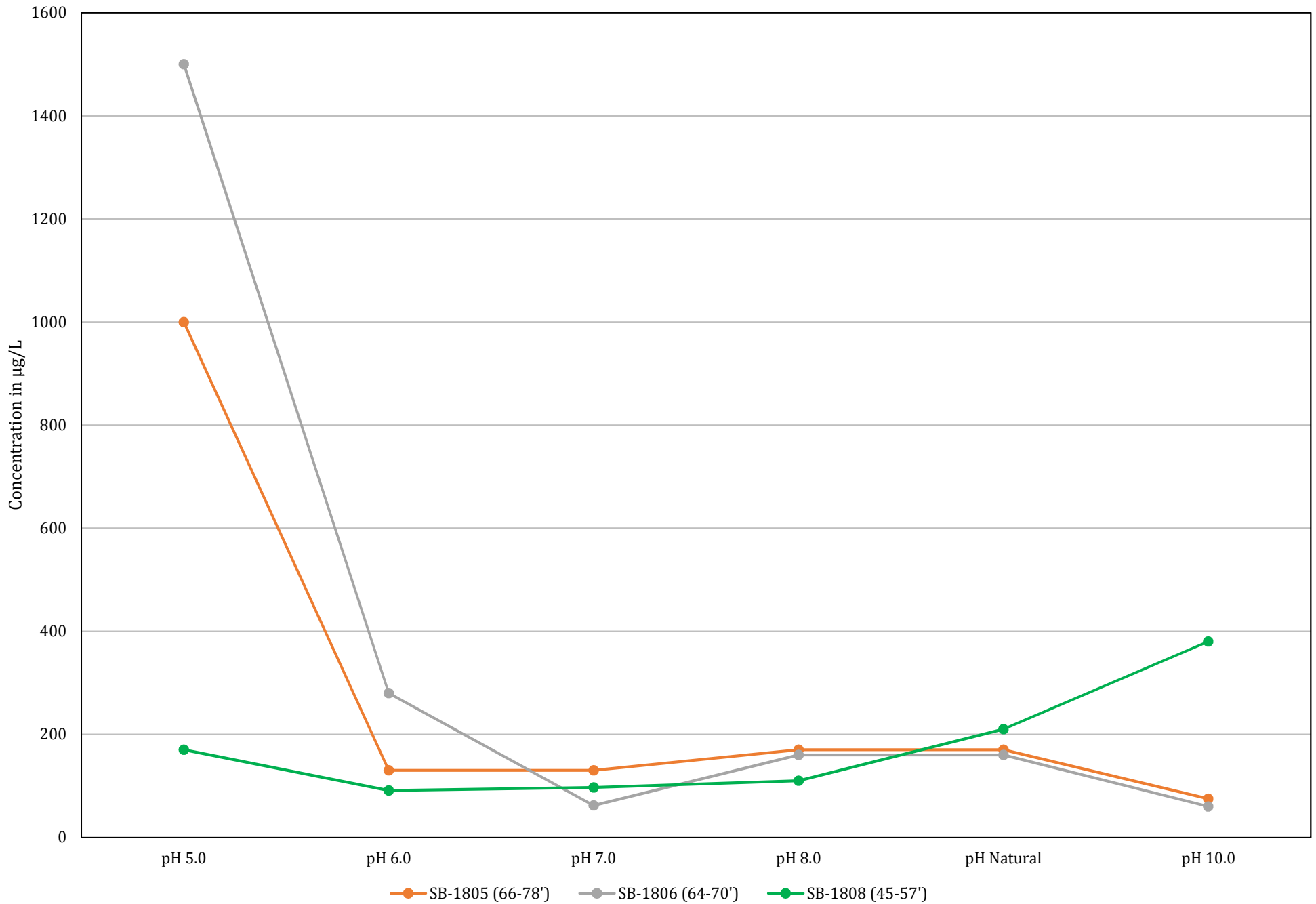
# Cadmium - pH Leaching Test Results



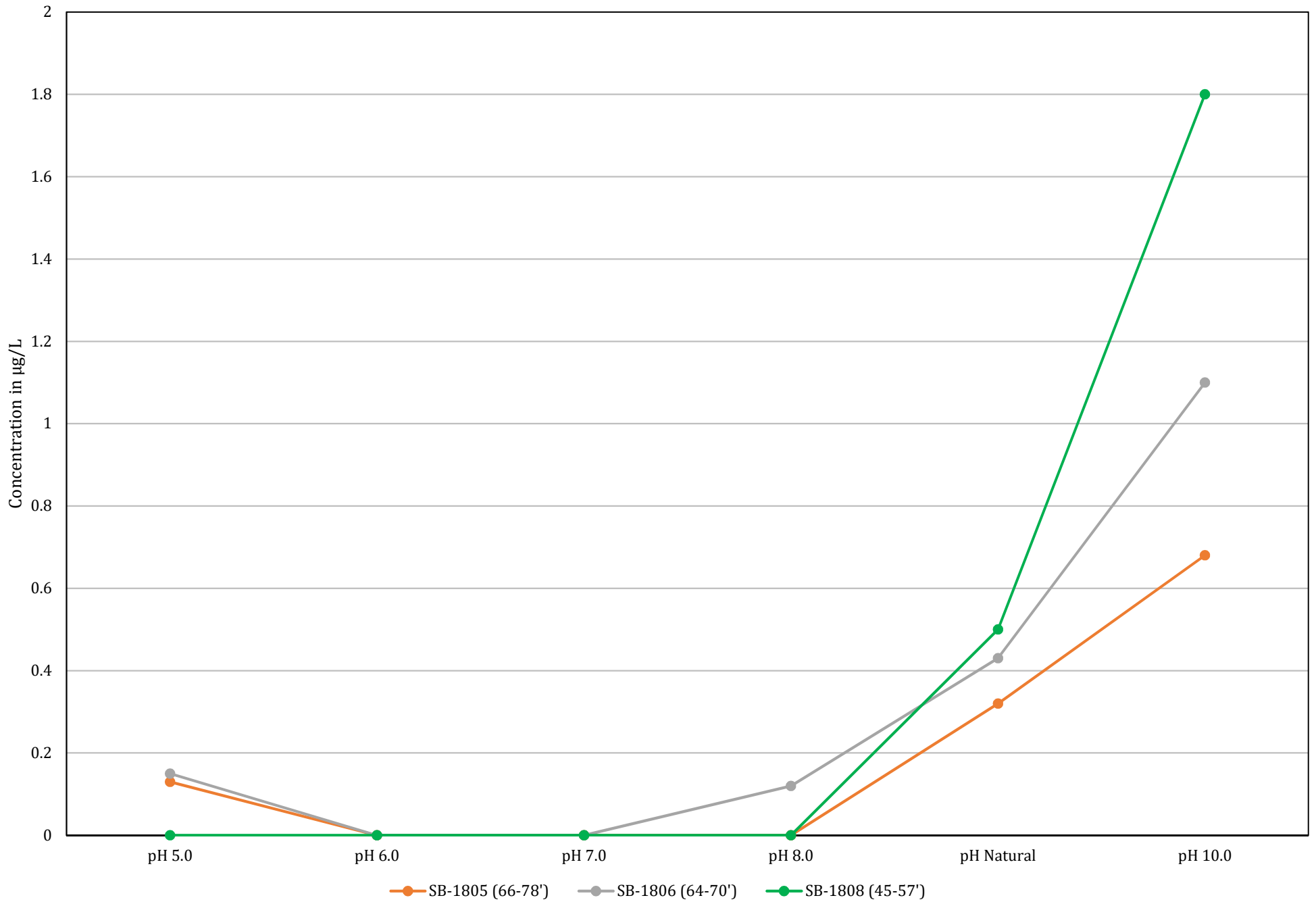
# Cobalt - pH Leaching Test Results



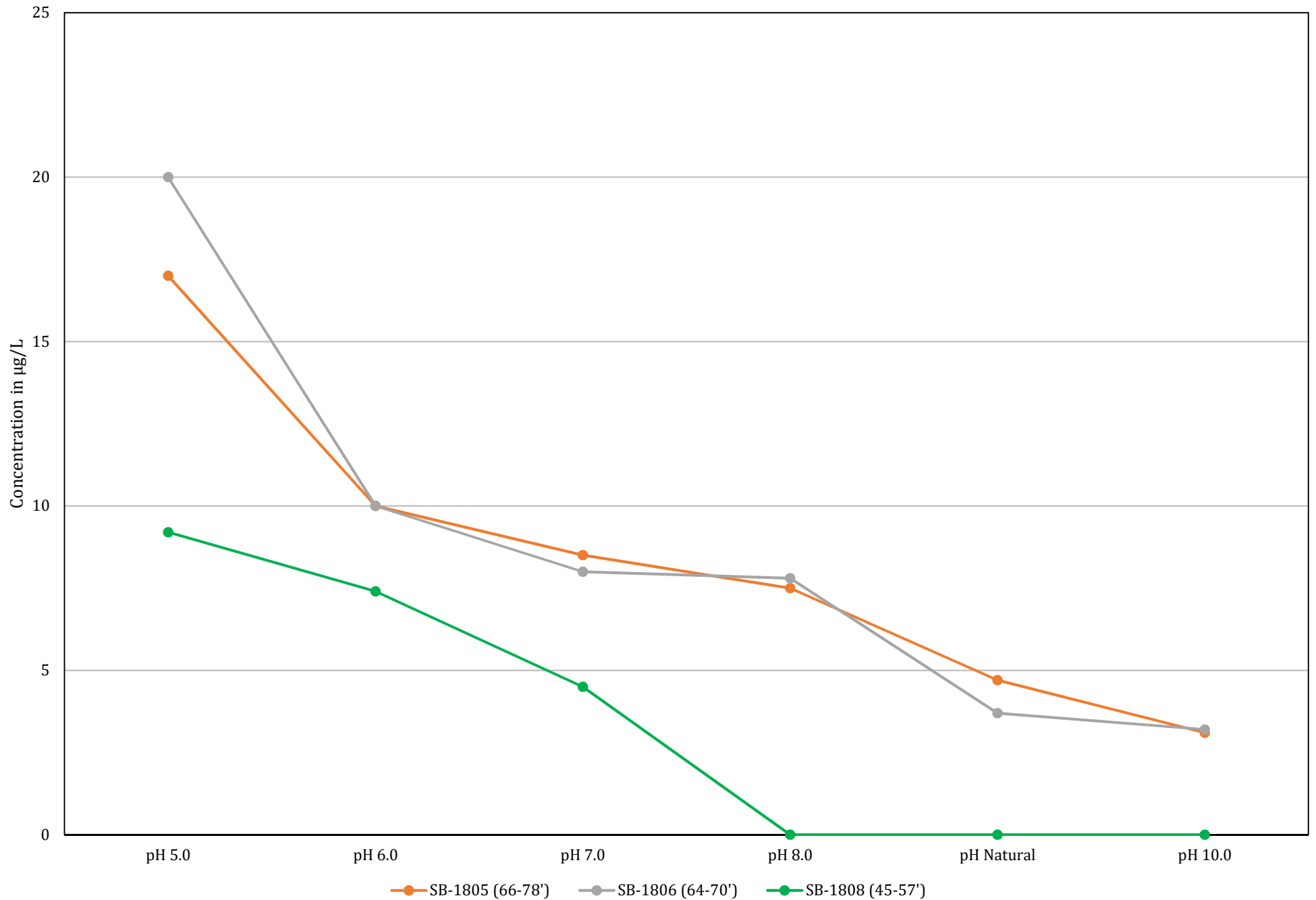
# Fluoride - pH Leaching Test Results



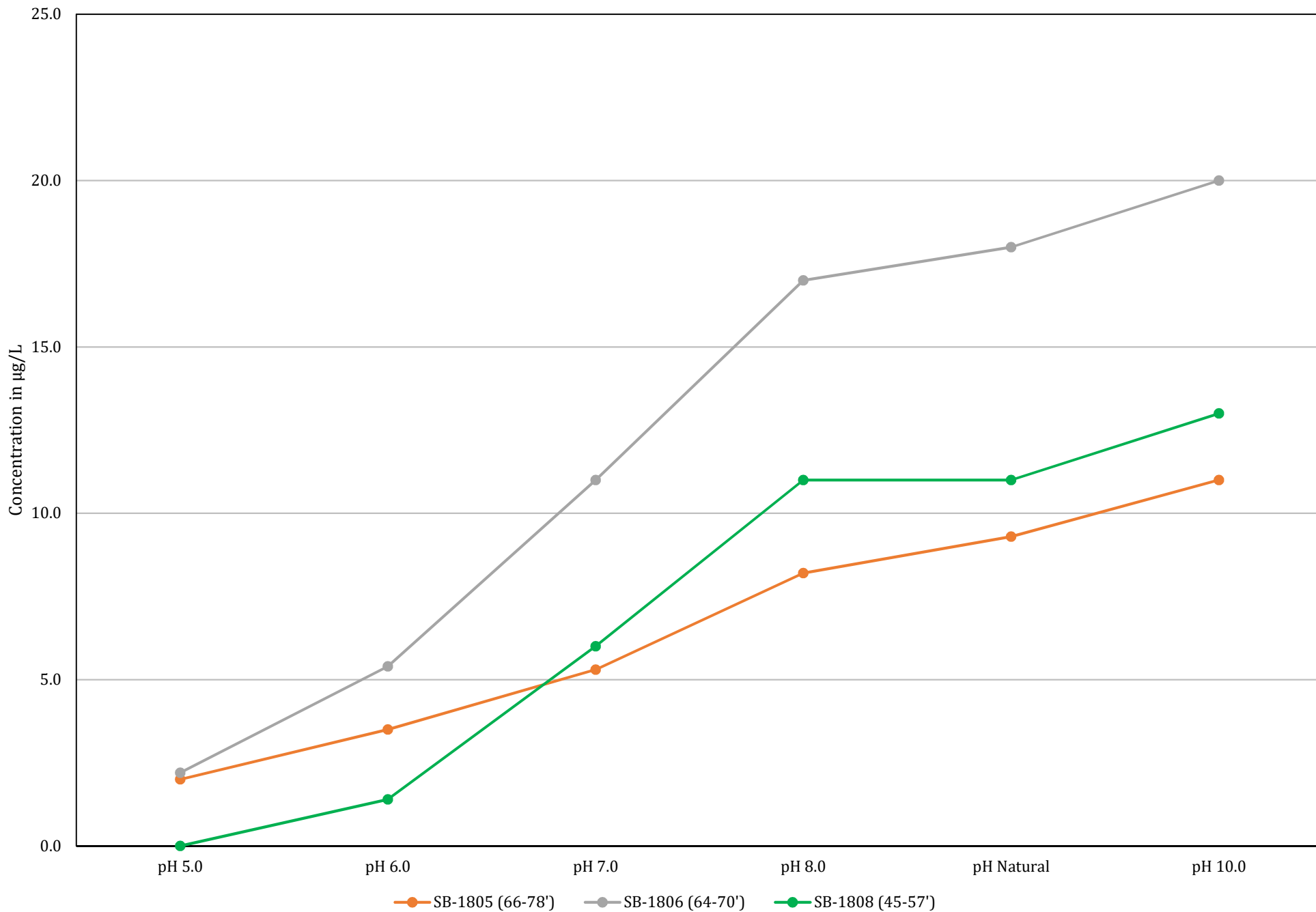
# Lead - pH Leaching Test Results



# Lithium - pH Leaching Test Results



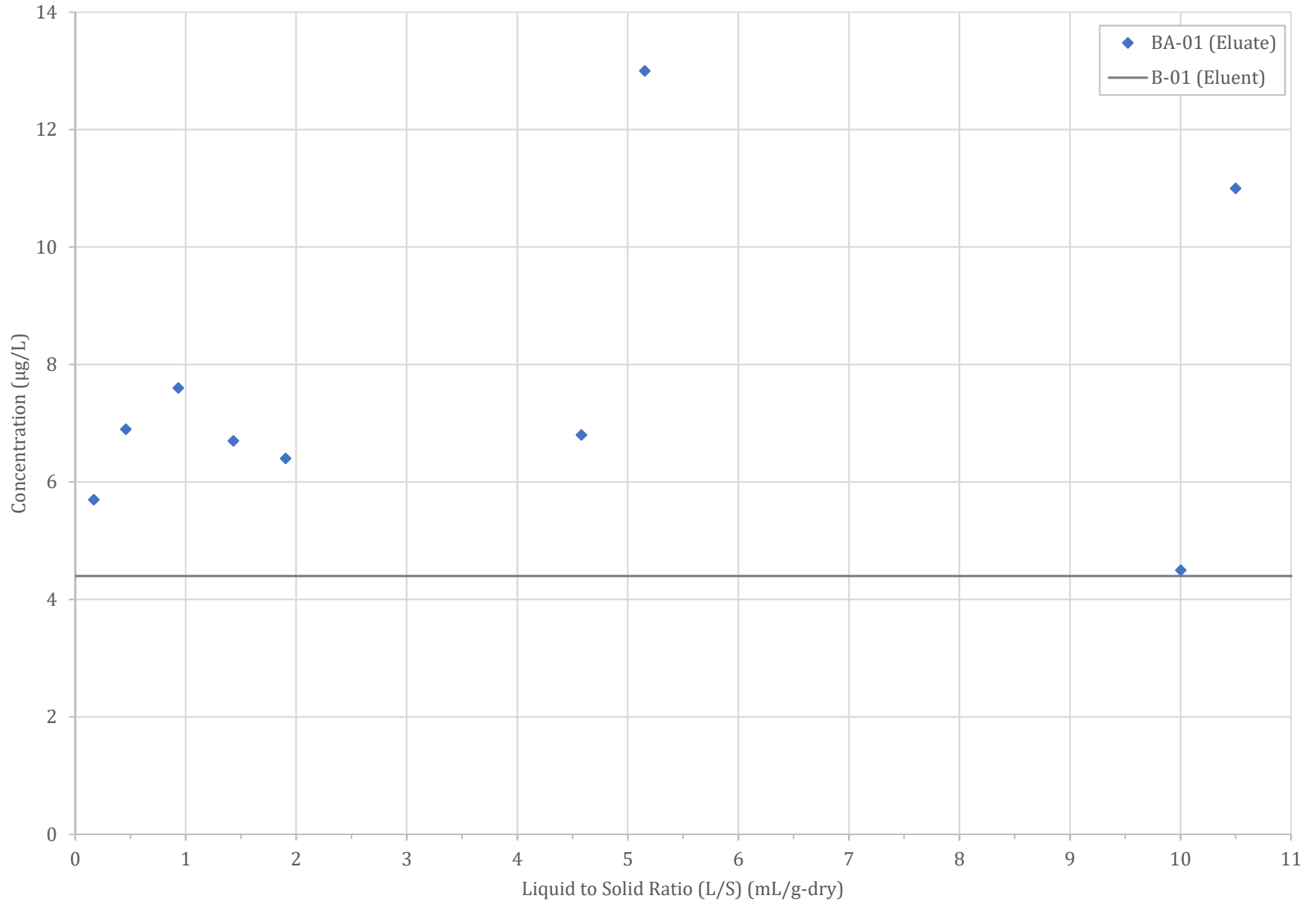
# Molybdenum - pH Leaching Test Results



## **APPENDIX G**

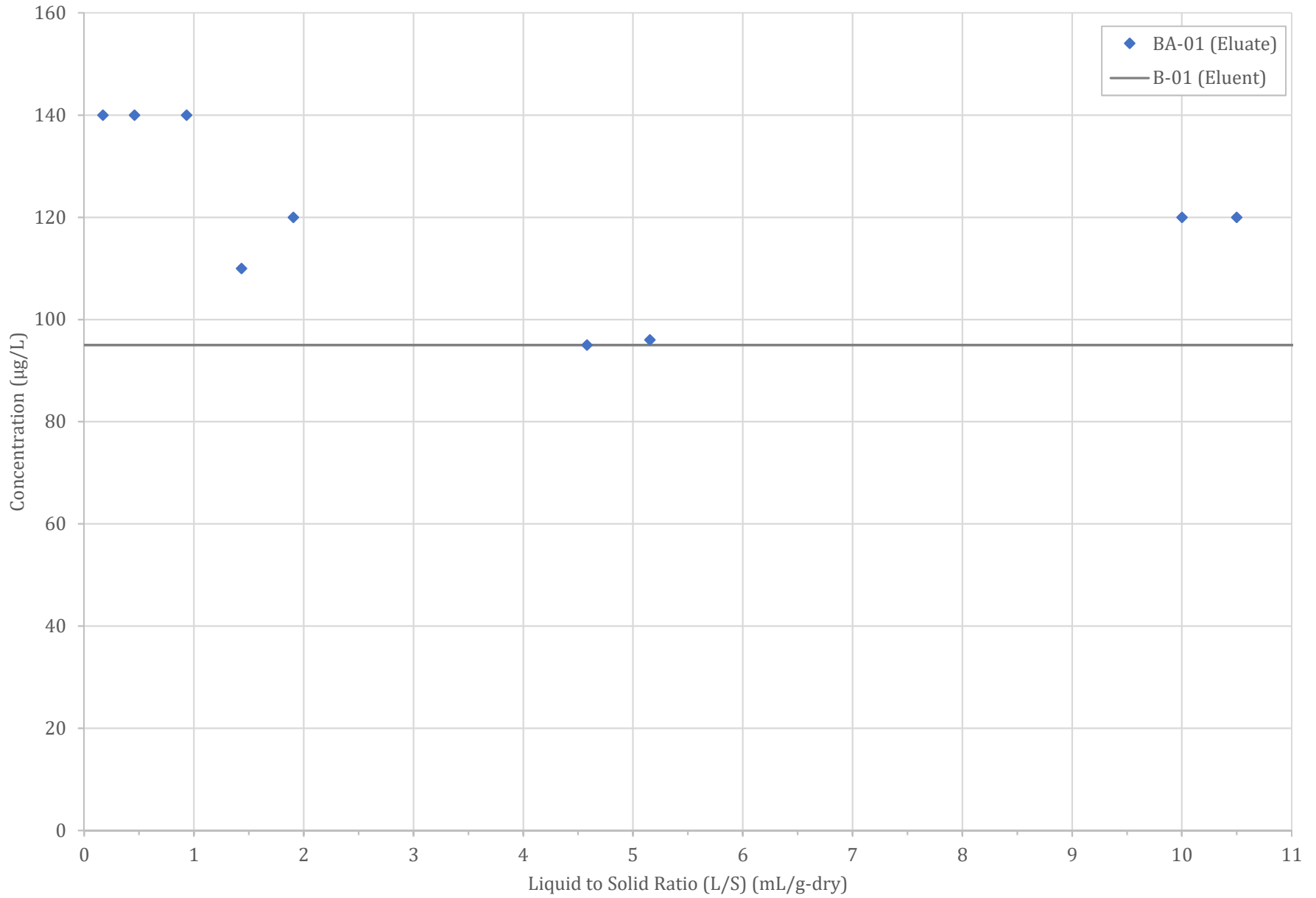
### **BA-01 ASH LEACHING CHARTS**

### Arsenic - BA-01 Leaching Test

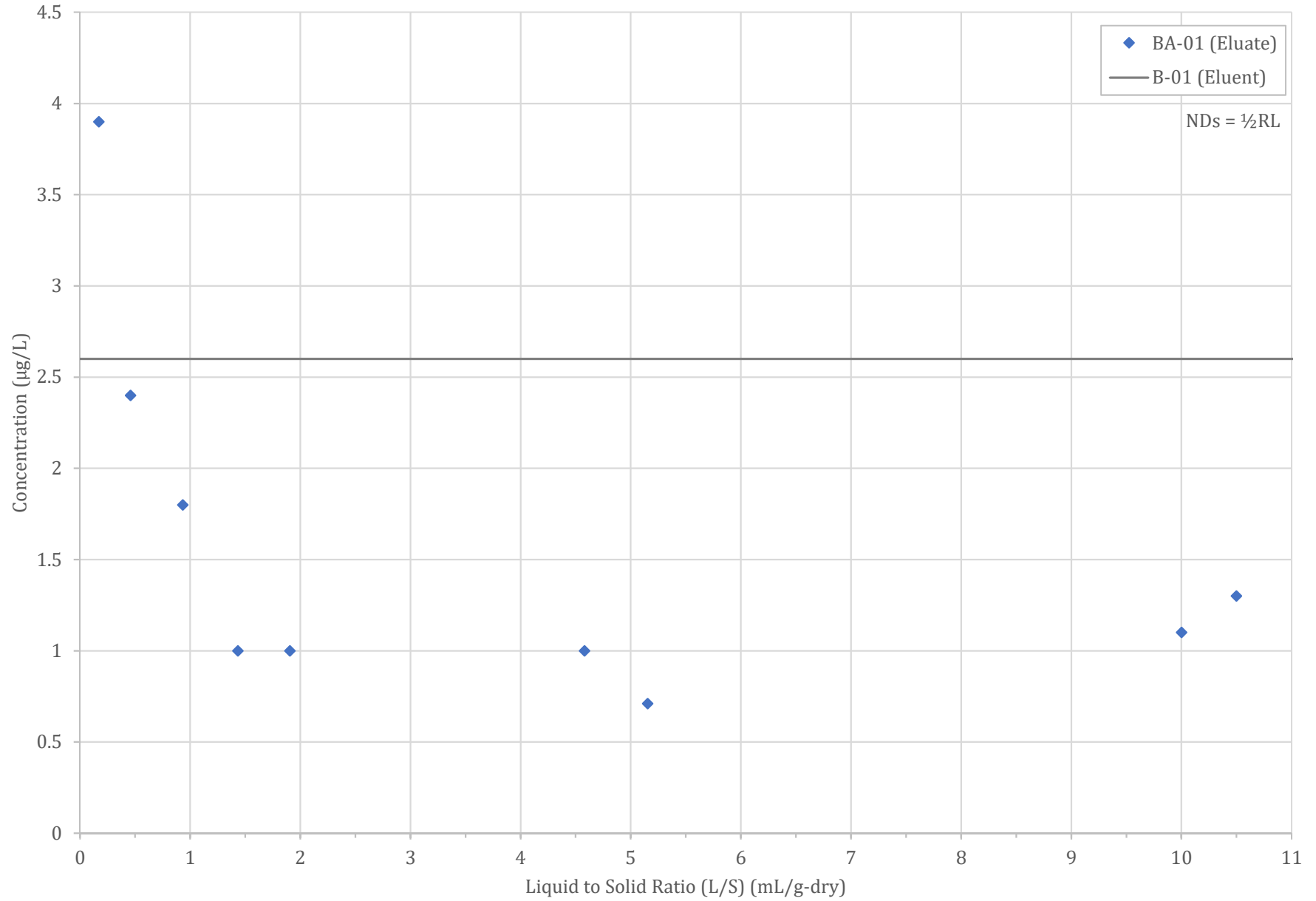




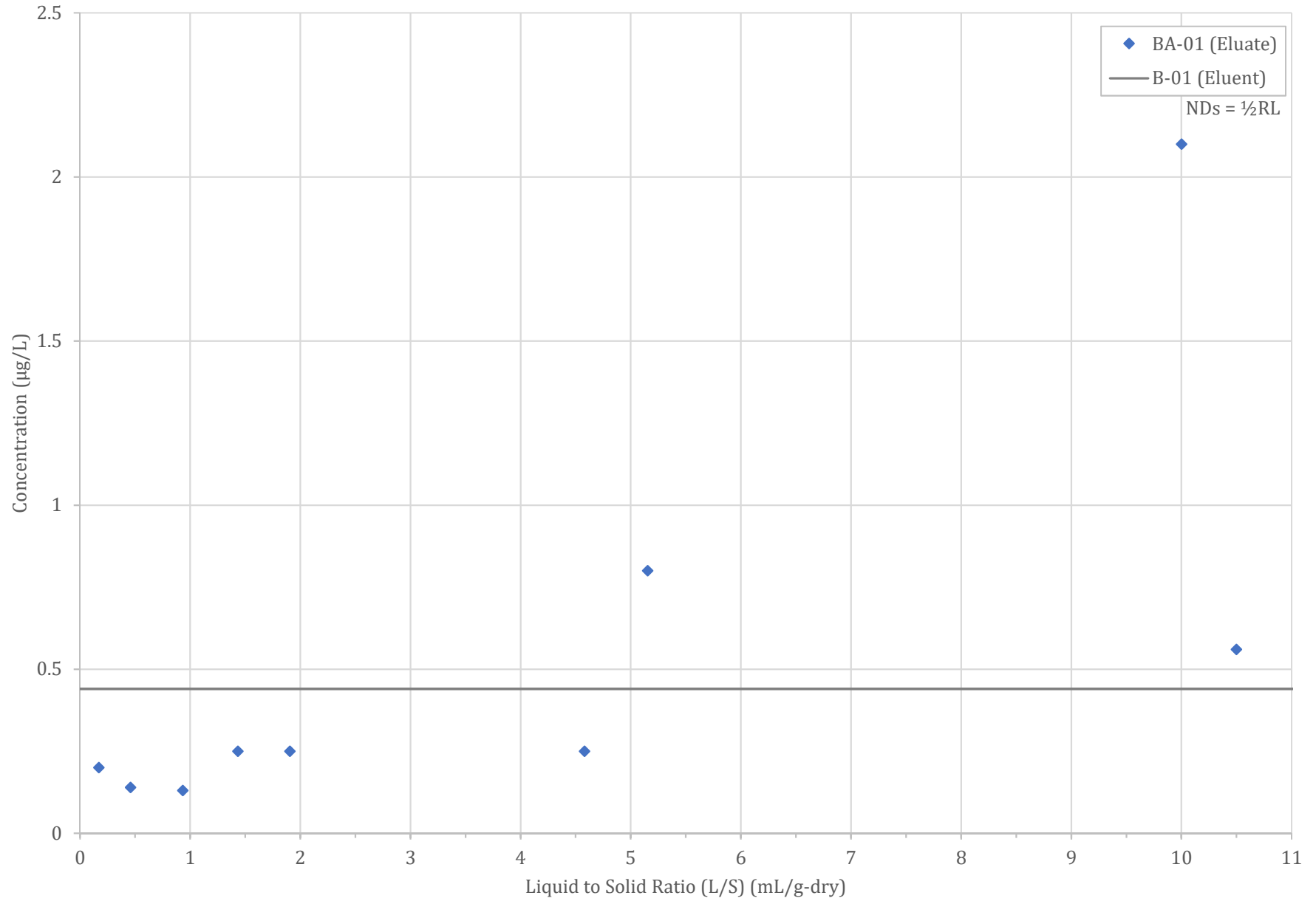
### Barium - BA-01 Leaching Test



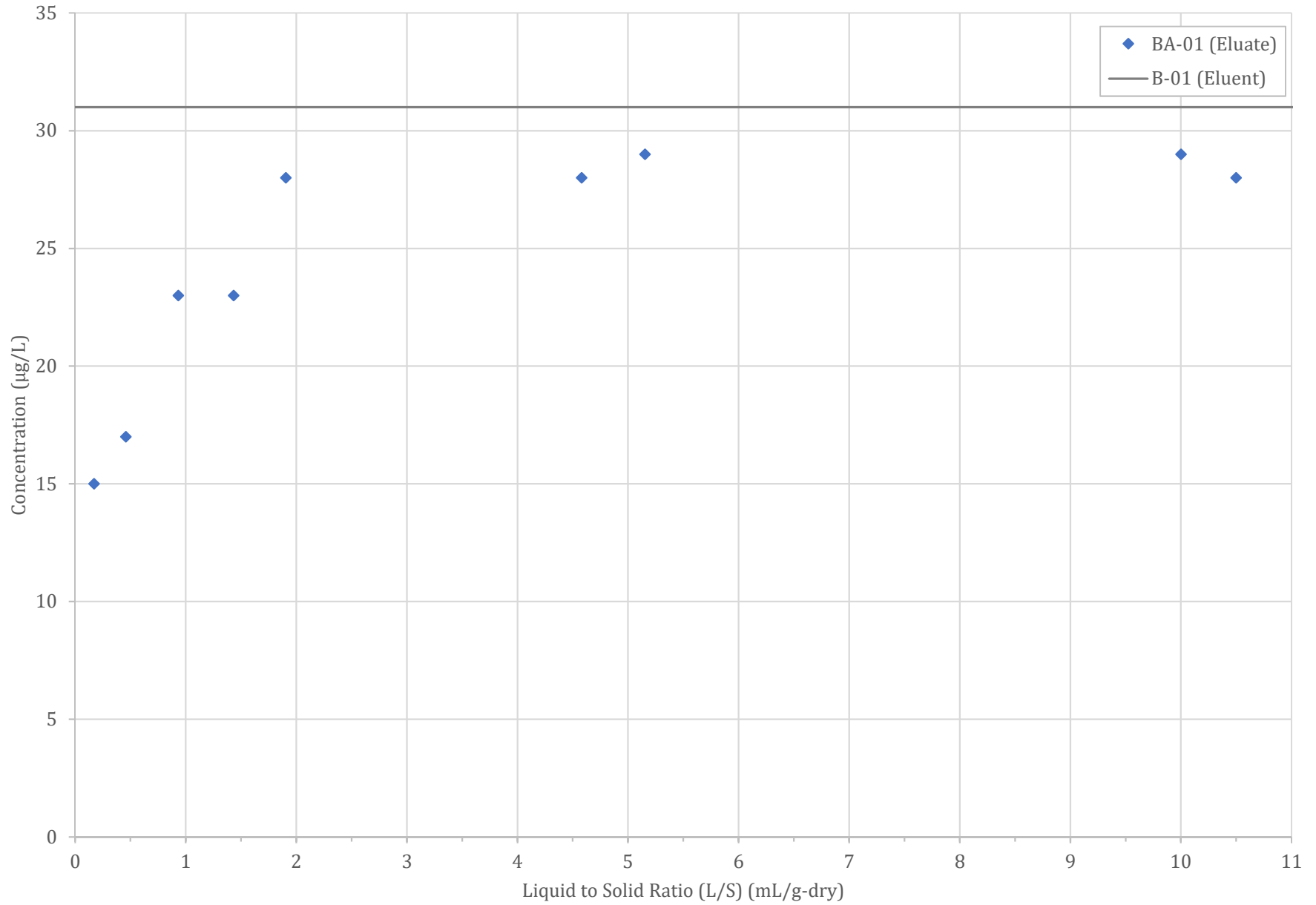
### Chromium - BA-01 Leaching Test



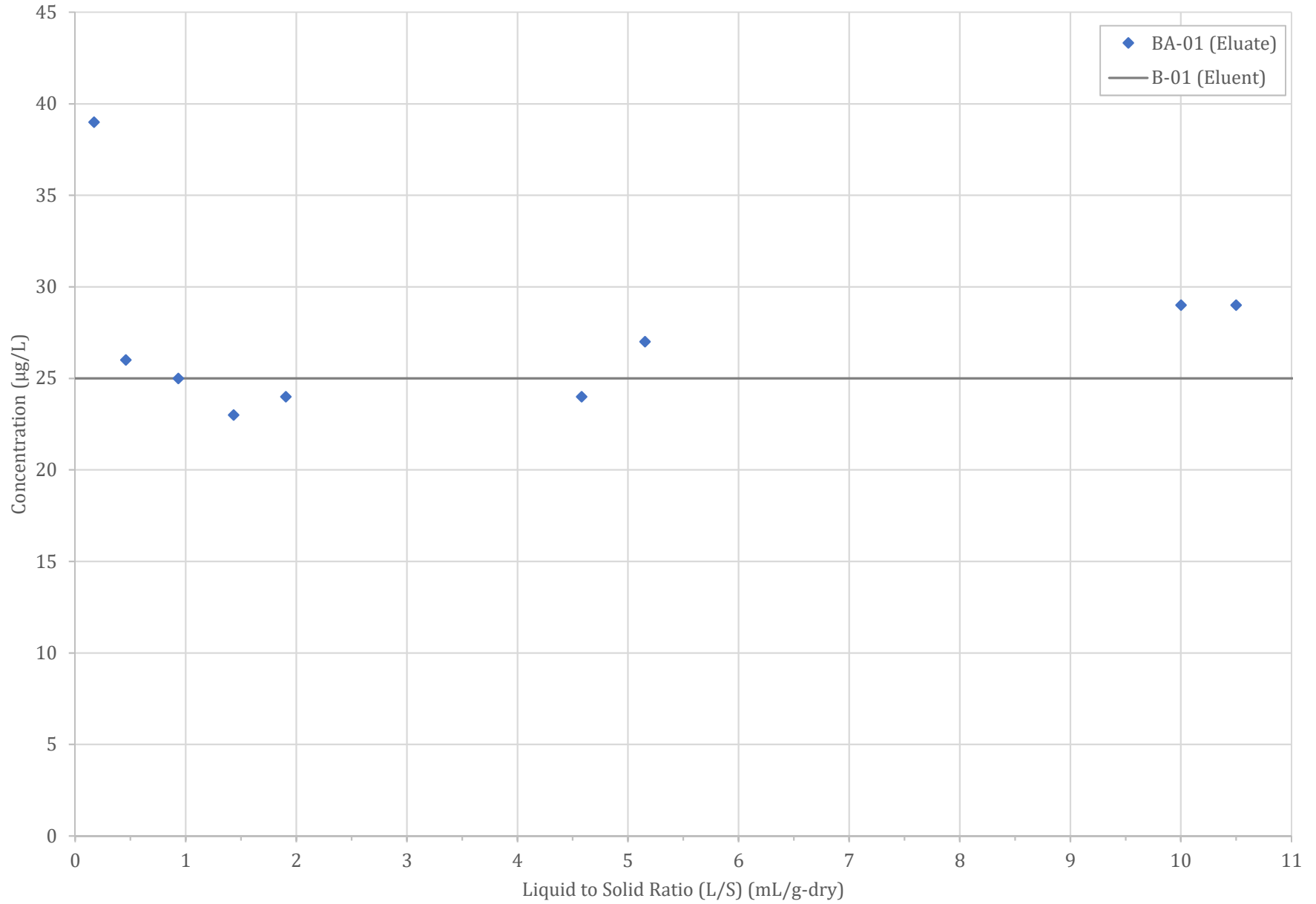
### Cobalt - BA-01 Leaching Test



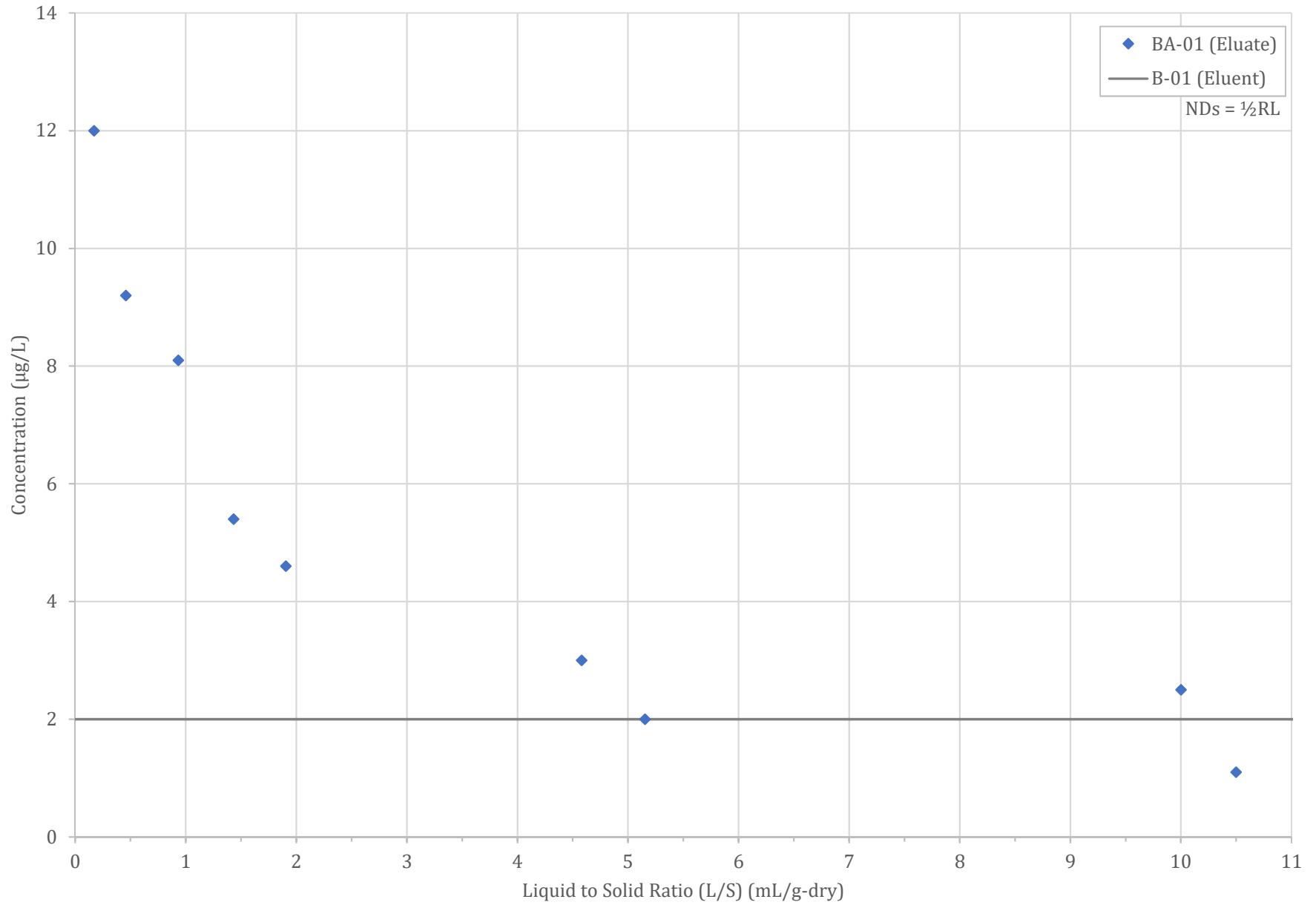
### Lithium - BA-01 Leaching Test



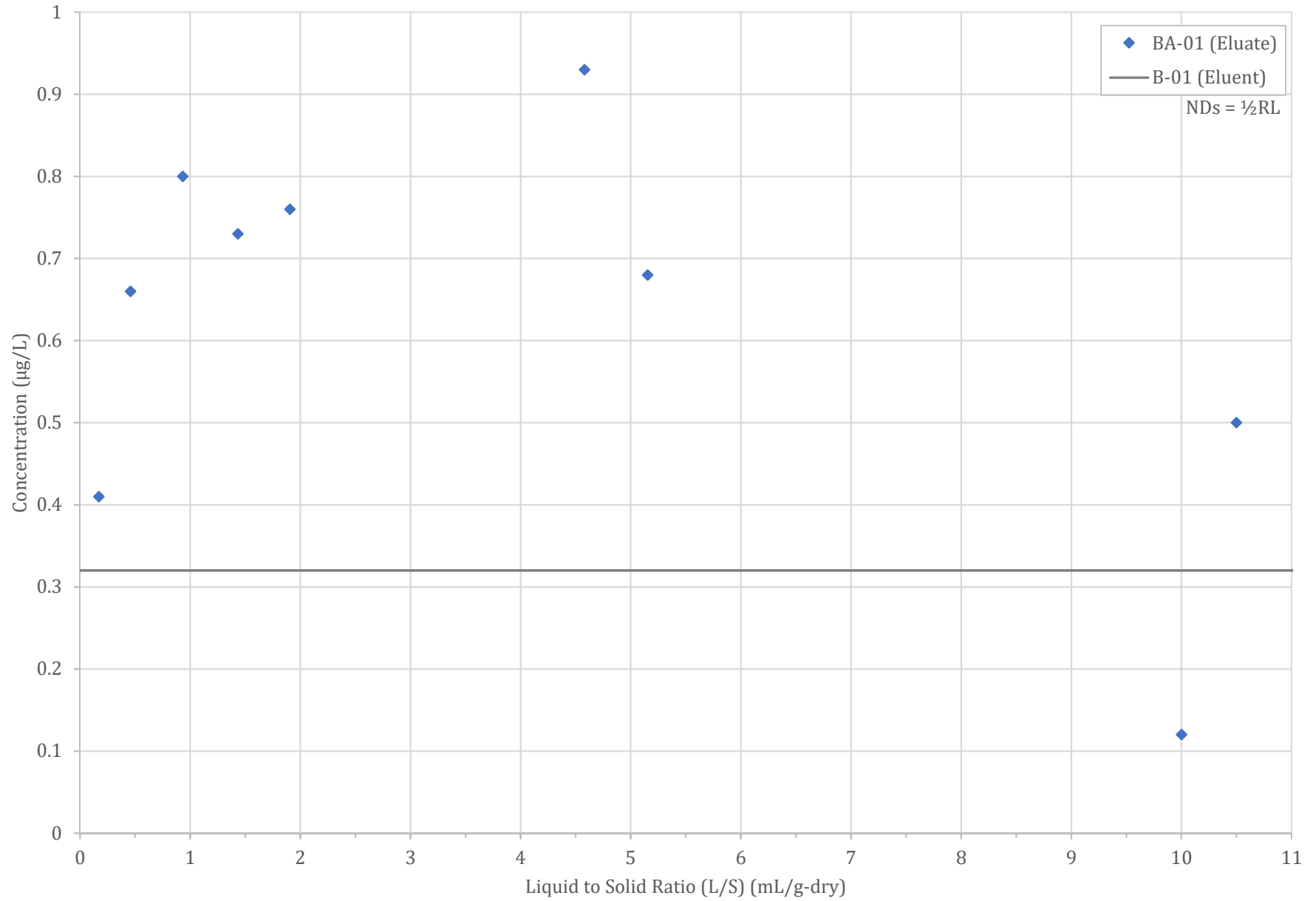
### Molybdenum - BA-01 Leaching Test



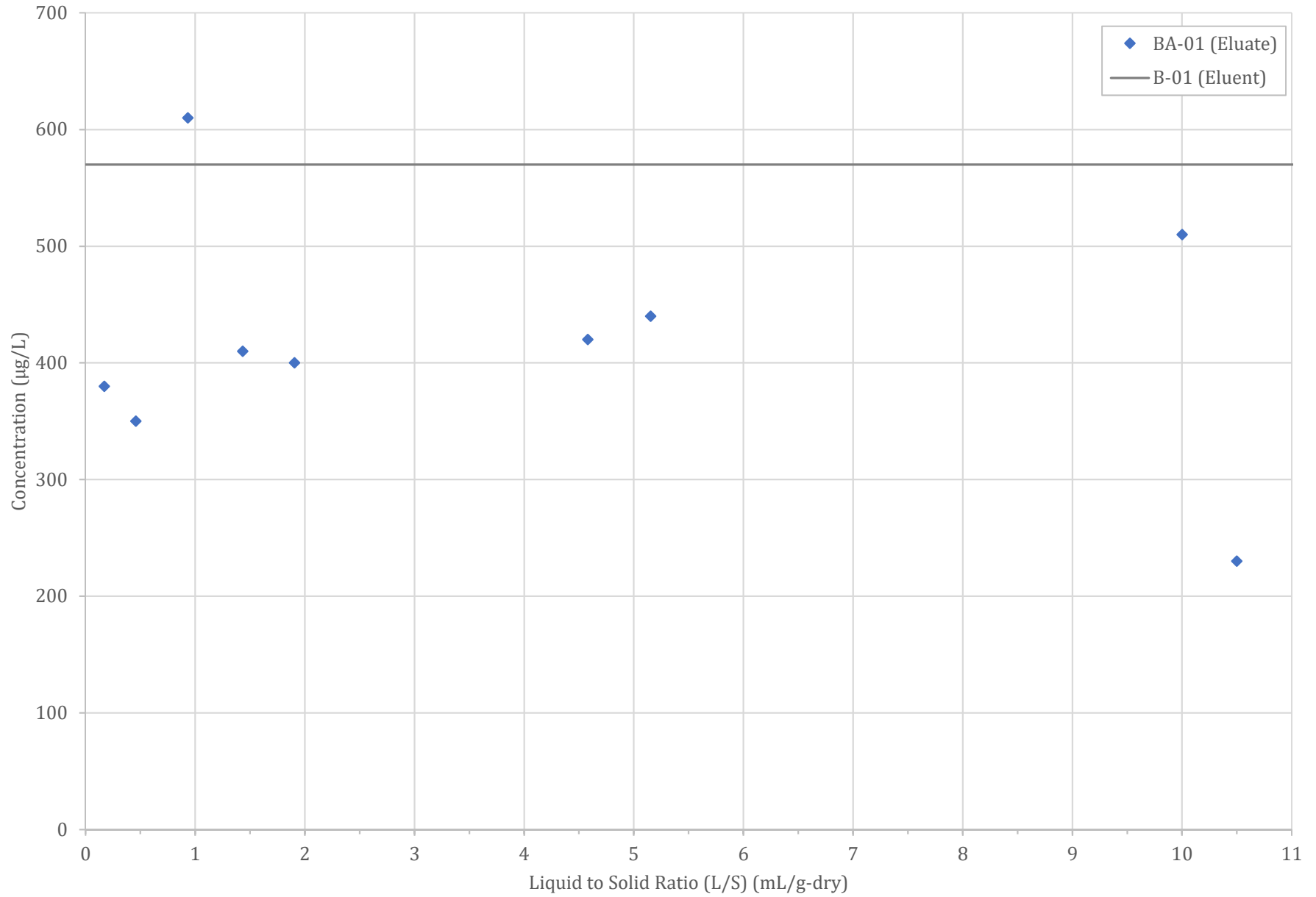
### Selenium - BA-01 Leaching Test



### Thallium - BA-01 Leaching Test

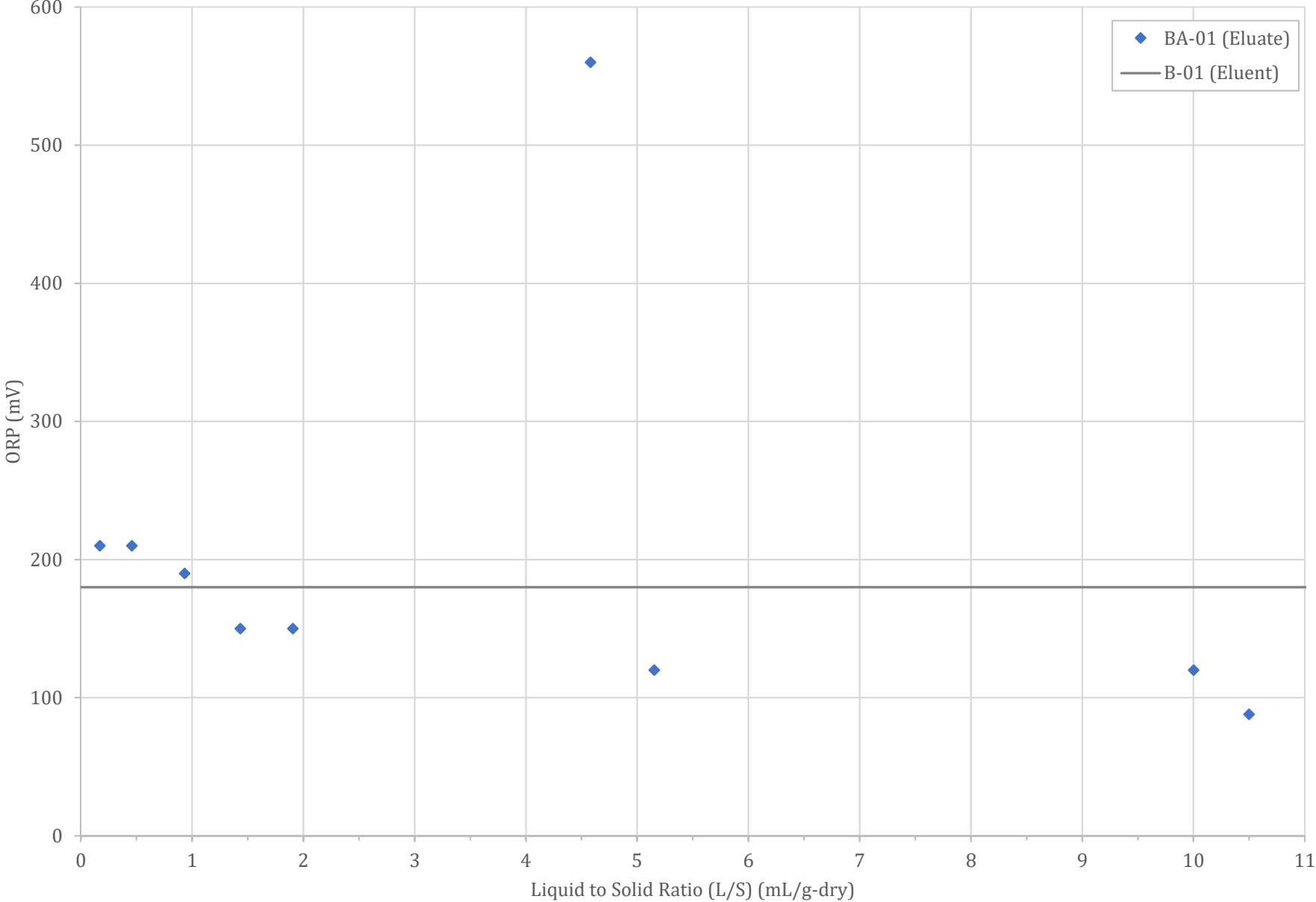


### Fluoride - BA-01 Leaching Test

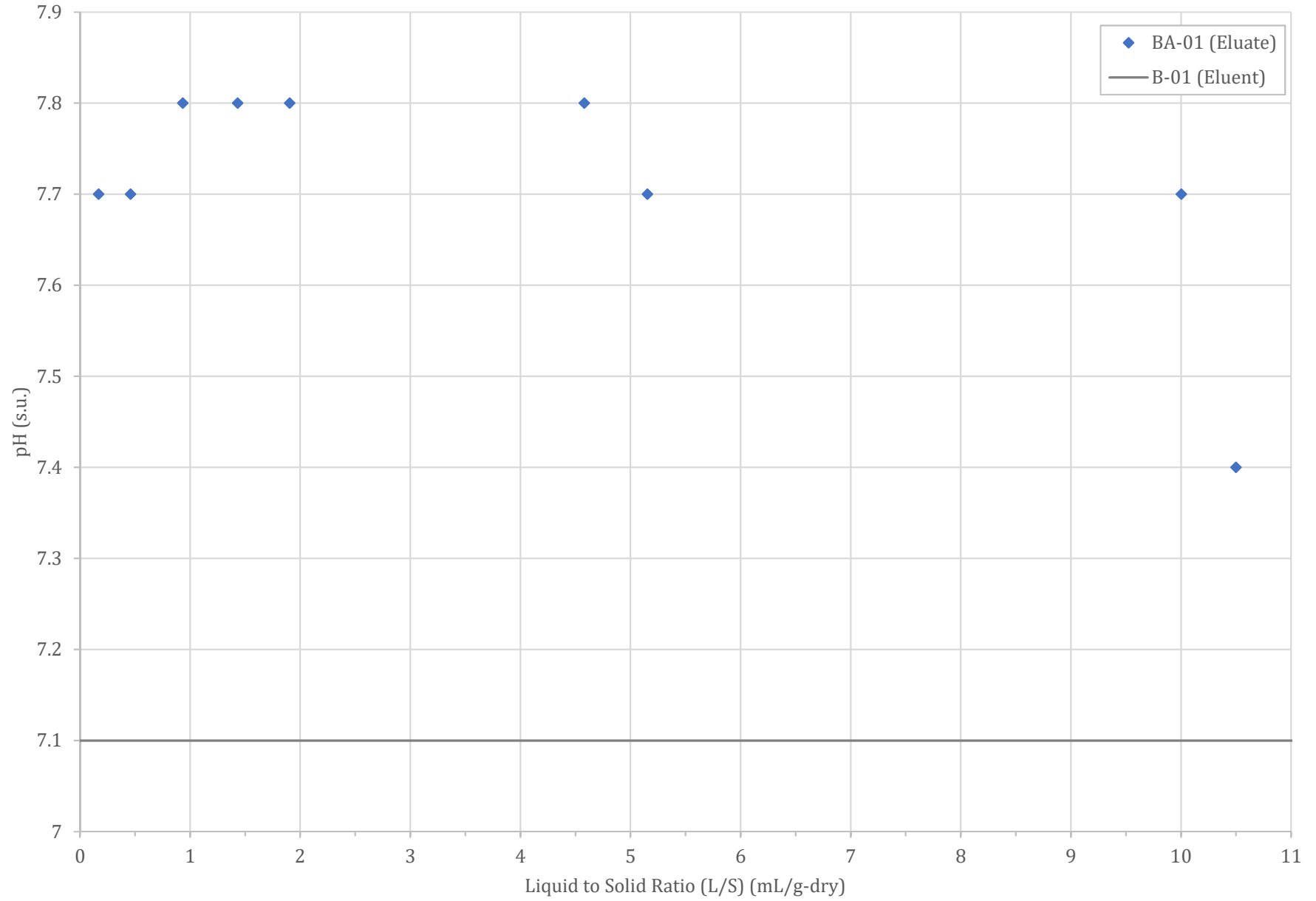




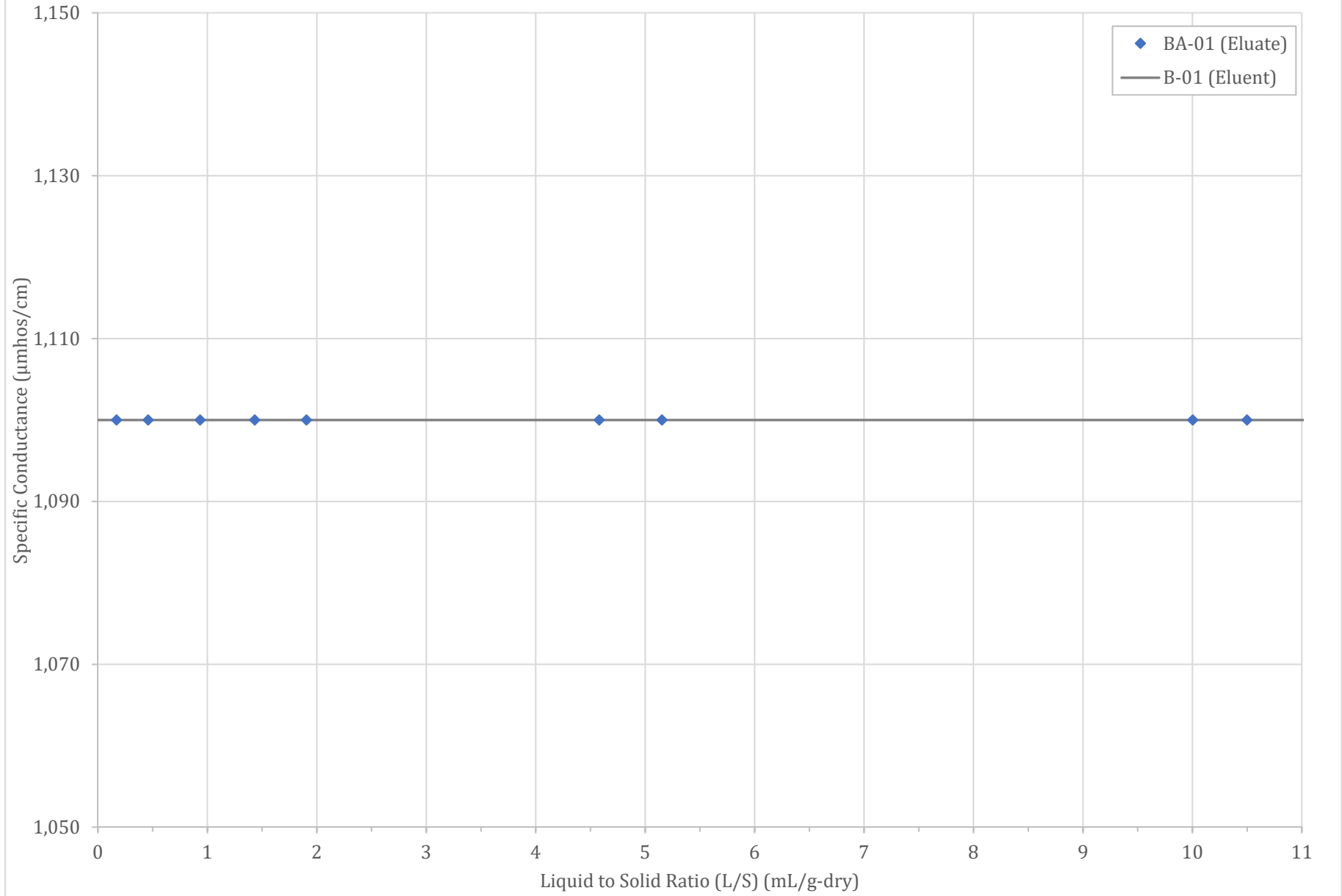
### Oxidation-Reduction Potential (ORP) - BA-01 Leaching Test



### pH - BA-01 Leaching Test



### Specific Conductance - BA-01 Leaching Test



**APPENDIX H**

**ANALYTICAL LABORATORY REPORTS**

**APPENDIX H.1**  
**BULK SOIL REPORTS**

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-79413-1

Client Project/Site: LEAF Metals and CCR Constituent Analysis

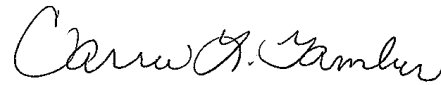
For:

Sanborn Head & Associates Inc

20 Foundry Street

Concord, New Hampshire 03301

Attn: Andrew Ashton



Authorized for release by:

7/23/2018 3:22:48 PM

Carrie Gamber, Senior Project Manager

(412)963-2428

[carrie.gamber@testamericainc.com](mailto:carrie.gamber@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions/Glossary . . . . .	4
Certification Summary . . . . .	5
Sample Summary . . . . .	6
Method Summary . . . . .	7
Lab Chronicle . . . . .	8
Client Sample Results . . . . .	15
QC Sample Results . . . . .	23
QC Association Summary . . . . .	26
Chain of Custody . . . . .	29
Receipt Checklists . . . . .	35

# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Job ID: 180-79413-1**

**Laboratory: TestAmerica Pittsburgh**

**Narrative**

## CASE NARRATIVE

**Client: Sanborn Head & Associates Inc**

**Project: LEAF Metals and CCR Constituent Analysis**

**Report Number: 180-79413-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 6/29/2018 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.8° C, 4.6° C and 4.8° C.

### **IC**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **METALS**

Lead was detected in method blank MB 180-249703/1-A at a level exceeding the reporting limit. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Associated samples were not re-extracted or re-analyzed because results were greater than 10X the value found in the method blank.

Lithium was detected in method blank MB 180-249703/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Arsenic failed the recovery criteria low for the MSD of sample SB-1802 (10-12') (180-79413-1) in batch 180-250588. The presence of the '4' qualifier indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

### **GENERAL CHEMISTRY**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# Definitions/Glossary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Qualifiers

### HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
F1	MS and/or MSD Recovery is outside acceptance limits.
B	Compound was found in the blank and sample.
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.

### General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Accreditation/Certification Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Laboratory: TestAmerica Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
West Virginia DEP	State Program	3	142	01-31-19

The following analytes are included in this report, but are not accredited/certified under this accreditation/certification:

Analysis Method	Prep Method	Matrix	Analyte
2540G		Solid	Percent Moisture
2540G		Solid	Percent Solids

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-79413-1	SB-1802 (10-12')	Solid	06/26/18 09:30	06/29/18 09:20
180-79413-2	SB-1802 (60-66')	Solid	06/26/18 11:30	06/29/18 09:20
180-79413-3	SB-1802 (66-72')	Solid	06/26/18 12:10	06/29/18 09:20
180-79413-4	SB-1805 (9-11')	Solid	06/18/18 13:50	06/29/18 09:20
180-79413-5	SB-1805 (50-60')	Solid	06/19/18 16:00	06/29/18 09:20
180-79413-6	SB-1805 (60-66')	Solid	06/19/18 17:15	06/29/18 09:20
180-79413-7	SB-1805 (66-78')	Solid	06/19/18 19:10	06/29/18 09:20
180-79413-8	SB-1806 (46-60')	Solid	06/25/18 11:35	06/29/18 09:20
180-79413-9	SB-1806 (64-70')	Solid	06/25/18 13:20	06/29/18 09:20
180-79413-10	SB-1806 (70-76')	Solid	06/25/18 15:05	06/29/18 09:20
180-79413-11	SB-1808 (45-57')	Solid	06/27/18 12:05	06/29/18 09:20



# Method Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

Method	Method Description	Protocol	Laboratory
EPA 9056A	Anions, Ion Chromatography	SW846	TAL PIT
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 7471B	Mercury (CVAA)	SW846	TAL PIT
2540G	SM 2540G	SM22	TAL PIT
EPA 9045D	pH	SW846	TAL PIT
3050B	Preparation, Metals	SW846	TAL PIT
7471B	Preparation, Mercury	SW846	TAL PIT
DI Leach	Deionized Water Leaching Procedure	ASTM	TAL PIT

#### Protocol References:

ASTM = ASTM International

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1802 (10-12')**

**Lab Sample ID: 180-79413-1**

**Date Collected: 06/26/18 09:30**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249632	07/05/18 09:44	CRM	TAL PIT
		Instrument ID: NOEQUIP								
Total/NA	Analysis	EPA 9045D		1	20.03 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1802 (10-12')**

**Lab Sample ID: 180-79413-1**

**Date Collected: 06/26/18 09:30**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 78.1**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.2990 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 15:39	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Total/NA	Prep	3050B			0.98 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 00:33	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	7471B			0.70 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:29	RJR	TAL PIT
		Instrument ID: HGZ								

**Client Sample ID: SB-1802 (60-66')**

**Lab Sample ID: 180-79413-2**

**Date Collected: 06/26/18 11:30**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249632	07/05/18 09:44	CRM	TAL PIT
		Instrument ID: NOEQUIP								
Total/NA	Analysis	EPA 9045D		1	20.02 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1802 (60-66')**

**Lab Sample ID: 180-79413-2**

**Date Collected: 06/26/18 11:30**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 90.9**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.0164 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 16:26	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Total/NA	Prep	3050B			1.03 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 00:56	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	7471B			0.68 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1802 (60-66')**

**Lab Sample ID: 180-79413-2**

**Date Collected: 06/26/18 11:30**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 90.9**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:30	RJR	TAL PIT
Instrument ID: HGZ										

**Client Sample ID: SB-1802 (66-72')**

**Lab Sample ID: 180-79413-3**

**Date Collected: 06/26/18 12:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249632	07/05/18 09:44	CRM	TAL PIT
Instrument ID: NOEQUIP										
Total/NA	Analysis	EPA 9045D		1	20.02 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1802 (66-72')**

**Lab Sample ID: 180-79413-3**

**Date Collected: 06/26/18 12:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 85.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.0222 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 16:42	MJH	TAL PIT
Instrument ID: CHICS2100B										
Total/NA	Prep	3050B			1.01 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 01:00	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	7471B			0.62 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:31	RJR	TAL PIT
Instrument ID: HGZ										

**Client Sample ID: SB-1805 (9-11')**

**Lab Sample ID: 180-79413-4**

**Date Collected: 06/18/18 13:50**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249632	07/05/18 09:44	CRM	TAL PIT
Instrument ID: NOEQUIP										
Total/NA	Analysis	EPA 9045D		1	20.00 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
Instrument ID: NOEQUIP										

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1805 (9-11')**

**Lab Sample ID: 180-79413-4**

**Date Collected: 06/18/18 13:50**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 80.7**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.4495 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 16:58	MJH	TAL PIT
Instrument ID: CHICS2100B										
Total/NA	Prep	3050B			0.99 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 01:05	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	7471B			0.67 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:32	RJR	TAL PIT
Instrument ID: HGZ										

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 180-79413-5**

**Date Collected: 06/19/18 16:00**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249632	07/05/18 09:44	CRM	TAL PIT
Instrument ID: NOEQUIP										
Total/NA	Analysis	EPA 9045D		1	20.03 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 180-79413-5**

**Date Collected: 06/19/18 16:00**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 84.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.5863 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 17:14	MJH	TAL PIT
Instrument ID: CHICS2100B										
Total/NA	Prep	3050B			1.02 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 01:09	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	7471B			0.63 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:33	RJR	TAL PIT
Instrument ID: HGZ										

**Client Sample ID: SB-1805 (60-66')**

**Lab Sample ID: 180-79413-6**

**Date Collected: 06/19/18 17:15**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249632	07/05/18 09:44	CRM	TAL PIT
Instrument ID: NOEQUIP										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1805 (60-66')**

**Lab Sample ID: 180-79413-6**

Date Collected: 06/19/18 17:15

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9045D		1	19.99 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1805 (60-66')**

**Lab Sample ID: 180-79413-6**

Date Collected: 06/19/18 17:15

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 85.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.0454 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 17:29	MJH	TAL PIT
Instrument ID: CHICS2100B										
Total/NA	Prep	3050B			1.02 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 01:27	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	7471B			0.70 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:34	RJR	TAL PIT
Instrument ID: HGZ										

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 180-79413-7**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249643	07/05/18 10:26	CRM	TAL PIT
Instrument ID: NOEQUIP										
Total/NA	Analysis	EPA 9045D		1	20.01 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 180-79413-7**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 85.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.4537 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 17:45	MJH	TAL PIT
Instrument ID: CHICS2100B										
Total/NA	Prep	3050B			1.03 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 01:32	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	7471B			0.69 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:35	RJR	TAL PIT
Instrument ID: HGZ										

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 180-79413-8**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249643	07/05/18 10:26	CRM	TAL PIT
		Instrument ID: NOEQUIP								
Total/NA	Analysis	EPA 9045D		1	20.02 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 180-79413-8**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 87.2**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.0513 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 18:01	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Total/NA	Prep	3050B			0.97 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 01:36	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	7471B			0.60 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:36	RJR	TAL PIT
		Instrument ID: HGZ								

**Client Sample ID: SB-1806 (64-70')**

**Lab Sample ID: 180-79413-9**

**Date Collected: 06/25/18 13:20**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249643	07/05/18 10:26	CRM	TAL PIT
		Instrument ID: NOEQUIP								
Total/NA	Analysis	EPA 9045D		1	20.03 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (64-70')**

**Lab Sample ID: 180-79413-9**

**Date Collected: 06/25/18 13:20**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 87.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.1638 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 18:17	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Total/NA	Prep	3050B			0.97 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 01:41	WTR	TAL PIT
		Instrument ID: M								
Total/NA	Prep	7471B			0.61 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1806 (64-70')**

**Lab Sample ID: 180-79413-9**

**Date Collected: 06/25/18 13:20**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 87.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:39	RJR	TAL PIT
Instrument ID: HGZ										

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 180-79413-10**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249643	07/05/18 10:26	CRM	TAL PIT
Instrument ID: NOEQUIP										
Total/NA	Analysis	EPA 9045D		1	19.98 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 180-79413-10**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 88.0**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.3635 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A		1	1 mL	1.0 mL	249727	07/06/18 18:33	MJH	TAL PIT
Instrument ID: CHICS2100B										
Total/NA	Prep	3050B			1.03 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	250588	07/13/18 01:46	WTR	TAL PIT
Instrument ID: M										
Total/NA	Prep	7471B			0.61 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B		1			250139	07/10/18 14:40	RJR	TAL PIT
Instrument ID: HGZ										

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 180-79413-11**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249643	07/05/18 10:26	CRM	TAL PIT
Instrument ID: NOEQUIP										
Total/NA	Analysis	EPA 9045D		1	20.01 g	20 mL	249310	07/02/18 12:36	CRM	TAL PIT
Instrument ID: NOEQUIP										

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 180-79413-11**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

**Percent Solids: 88.1**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			10.3814 g	100 mL	249744	07/06/18 09:34	MJH	TAL PIT
Soluble	Analysis	EPA 9056A Instrument ID: CHICS2100B		1	1 mL	1.0 mL	249727	07/06/18 18:48	MJH	TAL PIT
Total/NA	Prep	3050B			0.98 g	100 mL	249703	07/05/18 15:40	NAM	TAL PIT
Total/NA	Analysis	EPA 6020A Instrument ID: M		1	1.0 mL	1.0 mL	250588	07/13/18 01:50	WTR	TAL PIT
Total/NA	Prep	7471B			0.58 g	100 mL	250036	07/10/18 07:07	RJR	TAL PIT
Total/NA	Analysis	EPA 7471B Instrument ID: HGZ		1			250139	07/10/18 14:40	RJR	TAL PIT

**Laboratory References:**

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

**Analyst References:**

Lab: TAL PIT

Batch Type: Leach

MJH = Matthew Hartman

Batch Type: Prep

NAM = Nicole Marfisi

RJR = Ron Rosenbaum

Batch Type: Analysis

CRM = Caitlin McEvoy

MJH = Matthew Hartman

RJR = Ron Rosenbaum

WTR = Bill Reinheimer

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1802 (10-12')**

**Lab Sample ID: 180-79413-1**

Date Collected: 06/26/18 09:30

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 78.1

**Method: EPA 9056A - Anions, Ion Chromatography - Soluble**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		12	4.8	mg/Kg	☼		07/06/18 15:39	1
Fluoride	ND		1.2	0.59	mg/Kg	☼		07/06/18 15:39	1
<b>Sulfate</b>	<b>230</b>		12	8.4	mg/Kg	☼		07/06/18 15:39	1

**Method: EPA 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Antimony</b>	<b>0.21</b>	<b>J</b>	0.26	0.081	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Arsenic</b>	<b>15</b>	<b>F1</b>	0.13	0.034	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Barium</b>	<b>41</b>		1.3	0.074	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Beryllium</b>	<b>0.42</b>		0.13	0.0098	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Boron</b>	<b>2.4</b>	<b>J</b>	10	1.0	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Cadmium</b>	<b>0.17</b>		0.13	0.022	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Calcium</b>	<b>380</b>		65	12	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Chromium</b>	<b>12</b>		0.26	0.086	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Cobalt</b>	<b>8.4</b>		0.065	0.011	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Lead</b>	<b>12</b>	<b>B</b>	0.13	0.046	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Lithium</b>	<b>12</b>	<b>B</b>	0.65	0.36	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Molybdenum</b>	<b>1.7</b>		0.65	0.081	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Selenium</b>	<b>0.63</b>	<b>J</b>	0.65	0.078	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1
<b>Thallium</b>	<b>0.16</b>		0.13	0.017	mg/Kg	☼	07/05/18 15:40	07/13/18 00:33	1

**Method: EPA 7471B - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Mercury</b>	<b>0.012</b>	<b>J</b>	0.036	0.0081	mg/Kg	☼	07/10/18 07:07	07/10/18 14:29	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Percent Moisture</b>	<b>21.9</b>		0.1	0.1	%			07/05/18 09:44	1
<b>Percent Solids</b>	<b>78.1</b>		0.1	0.1	%			07/05/18 09:44	1
<b>pH</b>	<b>5.2</b>	<b>HF</b>	0.1	0.1	SU			07/02/18 12:36	1

**Client Sample ID: SB-1802 (60-66')**

**Lab Sample ID: 180-79413-2**

Date Collected: 06/26/18 11:30

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 90.9

**Method: EPA 9056A - Anions, Ion Chromatography - Soluble**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		11	4.3	mg/Kg	☼		07/06/18 16:26	1
Fluoride	ND		1.1	0.52	mg/Kg	☼		07/06/18 16:26	1
<b>Sulfate</b>	<b>20</b>		11	7.4	mg/Kg	☼		07/06/18 16:26	1

**Method: EPA 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Antimony</b>	<b>0.23</b>		0.21	0.066	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
<b>Arsenic</b>	<b>3.1</b>		0.11	0.028	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
<b>Barium</b>	<b>23</b>		1.1	0.061	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
<b>Beryllium</b>	<b>0.26</b>		0.11	0.0080	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
<b>Boron</b>	<b>1.6</b>	<b>J</b>	8.5	0.81	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
<b>Cadmium</b>	<b>0.12</b>		0.11	0.018	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
<b>Calcium</b>	<b>570</b>		53	9.6	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1802 (60-66')**

**Lab Sample ID: 180-79413-2**

Date Collected: 06/26/18 11:30

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 90.9

**Method: EPA 6020A - Metals (ICP/MS) (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	3.7		0.21	0.070	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
Cobalt	12		0.053	0.0089	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
Lead	3.7	B	0.11	0.037	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
Lithium	4.9	B	0.53	0.29	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
Molybdenum	0.62		0.53	0.066	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
Selenium	0.20	J	0.53	0.064	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1
Thallium	0.090	J	0.11	0.014	mg/Kg	☼	07/05/18 15:40	07/13/18 00:56	1

**Method: EPA 7471B - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.032	0.0072	mg/Kg	☼	07/10/18 07:07	07/10/18 14:30	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	9.1		0.1	0.1	%			07/05/18 09:44	1
Percent Solids	90.9		0.1	0.1	%			07/05/18 09:44	1
pH	7.0	HF	0.1	0.1	SU			07/02/18 12:36	1

**Client Sample ID: SB-1802 (66-72')**

**Lab Sample ID: 180-79413-3**

Date Collected: 06/26/18 12:10

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 85.0

**Method: EPA 9056A - Anions, Ion Chromatography - Soluble**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		12	4.5	mg/Kg	☼		07/06/18 16:42	1
Fluoride	ND		1.2	0.56	mg/Kg	☼		07/06/18 16:42	1
Sulfate	38		12	8.0	mg/Kg	☼		07/06/18 16:42	1

**Method: EPA 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.11	J	0.23	0.072	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Arsenic	3.4		0.12	0.030	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Barium	9.9		1.2	0.066	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Beryllium	0.12		0.12	0.0087	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Boron	0.95	J	9.3	0.89	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Cadmium	0.035	J	0.12	0.020	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Calcium	390		58	10	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Chromium	2.8		0.23	0.077	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Cobalt	5.0		0.058	0.0097	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Lead	3.4	B	0.12	0.041	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Lithium	3.6	B	0.58	0.32	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Molybdenum	0.45	J	0.58	0.072	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Selenium	0.15	J	0.58	0.070	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1
Thallium	0.049	J	0.12	0.015	mg/Kg	☼	07/05/18 15:40	07/13/18 01:00	1

**Method: EPA 7471B - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.038	0.0084	mg/Kg	☼	07/10/18 07:07	07/10/18 14:31	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Client Sample ID: SB-1802 (66-72')

Date Collected: 06/26/18 12:10

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-3

Matrix: Solid

Percent Solids: 85.0

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.0		0.1	0.1	%			07/05/18 09:44	1
Percent Solids	85.0		0.1	0.1	%			07/05/18 09:44	1
pH	7.2	HF	0.1	0.1	SU			07/02/18 12:36	1

## Client Sample ID: SB-1805 (9-11')

Date Collected: 06/18/18 13:50

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-4

Matrix: Solid

Percent Solids: 80.7

### Method: EPA 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		12	4.6	mg/Kg	☼		07/06/18 16:58	1
Fluoride	0.73	J	1.2	0.56	mg/Kg	☼		07/06/18 16:58	1
Sulfate	140		12	8.0	mg/Kg	☼		07/06/18 16:58	1

### Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.23	J	0.25	0.078	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Arsenic	12		0.13	0.033	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Barium	52		1.3	0.071	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Beryllium	0.60		0.13	0.0094	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Boron	2.3	J	10	0.96	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Cadmium	0.089	J	0.13	0.021	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Calcium	1100		63	11	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Chromium	15		0.25	0.083	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Cobalt	9.3		0.063	0.010	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Lead	12	B	0.13	0.044	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Lithium	14	B	0.63	0.35	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Molybdenum	1.0		0.63	0.078	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Selenium	0.79		0.63	0.075	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1
Thallium	0.17		0.13	0.016	mg/Kg	☼	07/05/18 15:40	07/13/18 01:05	1

### Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	J	0.037	0.0082	mg/Kg	☼	07/10/18 07:07	07/10/18 14:32	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.3		0.1	0.1	%			07/05/18 09:44	1
Percent Solids	80.7		0.1	0.1	%			07/05/18 09:44	1
pH	7.0	HF	0.1	0.1	SU			07/02/18 12:36	1

## Client Sample ID: SB-1805 (50-60')

Date Collected: 06/19/18 16:00

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-5

Matrix: Solid

Percent Solids: 84.2

### Method: EPA 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.9	J	11	4.3	mg/Kg	☼		07/06/18 17:14	1
Fluoride	0.63	J	1.1	0.53	mg/Kg	☼		07/06/18 17:14	1
Sulfate	56		11	7.6	mg/Kg	☼		07/06/18 17:14	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 180-79413-5**

Date Collected: 06/19/18 16:00

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 84.2

**Method: EPA 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.19	J	0.23	0.072	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Arsenic	5.4		0.12	0.030	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Barium	15		1.2	0.066	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Beryllium	0.21		0.12	0.0087	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Boron	2.2	J	9.3	0.89	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Cadmium	0.046	J	0.12	0.020	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Calcium	5500		58	10	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Chromium	5.6		0.23	0.077	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Cobalt	6.2		0.058	0.0097	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Lead	5.6	B	0.12	0.041	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Lithium	4.7	B	0.58	0.32	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Molybdenum	0.93		0.58	0.072	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Selenium	0.30	J	0.58	0.070	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1
Thallium	0.071	J	0.12	0.015	mg/Kg	☼	07/05/18 15:40	07/13/18 01:09	1

**Method: EPA 7471B - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.010	J	0.037	0.0084	mg/Kg	☼	07/10/18 07:07	07/10/18 14:33	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.8		0.1	0.1	%			07/05/18 09:44	1
Percent Solids	84.2		0.1	0.1	%			07/05/18 09:44	1
pH	8.2	HF	0.1	0.1	SU			07/02/18 12:36	1

**Client Sample ID: SB-1805 (60-66')**

**Lab Sample ID: 180-79413-6**

Date Collected: 06/19/18 17:15

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 85.1

**Method: EPA 9056A - Anions, Ion Chromatography - Soluble**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11	J	12	4.5	mg/Kg	☼		07/06/18 17:29	1
Fluoride	0.76	J	1.2	0.56	mg/Kg	☼		07/06/18 17:29	1
Sulfate	89		12	7.9	mg/Kg	☼		07/06/18 17:29	1

**Method: EPA 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.21	J	0.23	0.071	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Arsenic	4.6		0.12	0.030	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Barium	13		1.2	0.066	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Beryllium	0.25		0.12	0.0086	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Boron	3.1	J	9.2	0.88	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Cadmium	0.10	J	0.12	0.020	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Calcium	11000		58	10	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Chromium	4.8		0.23	0.076	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Cobalt	6.0		0.058	0.0096	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Lead	6.7	B	0.12	0.040	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Lithium	4.1	B	0.58	0.32	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Molybdenum	0.81		0.58	0.071	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1
Selenium	1.6		0.58	0.069	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1

TestAmerica Pittsburgh



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Client Sample ID: SB-1805 (60-66')

Date Collected: 06/19/18 17:15

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-6

Matrix: Solid

Percent Solids: 85.1

### Method: EPA 6020A - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Thallium	0.067	J	0.12	0.015	mg/Kg	☼	07/05/18 15:40	07/13/18 01:27	1

### Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.011	J	0.033	0.0074	mg/Kg	☼	07/10/18 07:07	07/10/18 14:34	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.9		0.1	0.1	%			07/05/18 09:44	1
Percent Solids	85.1		0.1	0.1	%			07/05/18 09:44	1
pH	8.3	HF	0.1	0.1	SU			07/02/18 12:36	1

## Client Sample ID: SB-1805 (66-78')

Date Collected: 06/19/18 19:10

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-7

Matrix: Solid

Percent Solids: 85.7

### Method: EPA 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	13		11	4.3	mg/Kg	☼		07/06/18 17:45	1
Fluoride	ND		1.1	0.53	mg/Kg	☼		07/06/18 17:45	1
Sulfate	130		11	7.6	mg/Kg	☼		07/06/18 17:45	1

### Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.16	J	0.23	0.070	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Arsenic	6.1		0.11	0.029	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Barium	11		1.1	0.065	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Beryllium	0.26		0.11	0.0085	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Boron	2.5	J	9.1	0.86	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Cadmium	0.086	J	0.11	0.019	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Calcium	23000		57	10	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Chromium	6.1		0.23	0.075	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Cobalt	8.3		0.057	0.0094	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Lead	7.2	B	0.11	0.040	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Lithium	6.1	B	0.57	0.31	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Molybdenum	0.89		0.57	0.070	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Selenium	0.30	J	0.57	0.068	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1
Thallium	0.053	J	0.11	0.015	mg/Kg	☼	07/05/18 15:40	07/13/18 01:32	1

### Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.033	0.0075	mg/Kg	☼	07/10/18 07:07	07/10/18 14:35	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.3		0.1	0.1	%			07/05/18 10:26	1
Percent Solids	85.7		0.1	0.1	%			07/05/18 10:26	1
pH	8.8	HF	0.1	0.1	SU			07/02/18 12:36	1

TestAmerica Pittsburgh



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 180-79413-8**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 87.2

**Method: EPA 9056A - Anions, Ion Chromatography - Soluble**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	11		11	4.4	mg/Kg	☼		07/06/18 18:01	1
Fluoride	0.65	J	1.1	0.54	mg/Kg	☼		07/06/18 18:01	1
Sulfate	56		11	7.7	mg/Kg	☼		07/06/18 18:01	1

**Method: EPA 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.22	J	0.24	0.073	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Arsenic	7.9		0.12	0.031	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Barium	15		1.2	0.067	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Beryllium	0.16		0.12	0.0089	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Boron	2.3	J	9.5	0.90	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Cadmium	0.10	J	0.12	0.020	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Calcium	11000		59	11	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Chromium	5.9		0.24	0.078	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Cobalt	7.6		0.059	0.0098	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Lead	6.1	B	0.12	0.041	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Lithium	5.7	B	0.59	0.33	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Molybdenum	2.1		0.59	0.073	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Selenium	0.41	J	0.59	0.071	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1
Thallium	0.078	J	0.12	0.015	mg/Kg	☼	07/05/18 15:40	07/13/18 01:36	1

**Method: EPA 7471B - Mercury (CVAA)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.038	0.0085	mg/Kg	☼	07/10/18 07:07	07/10/18 14:36	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.8		0.1	0.1	%			07/05/18 10:26	1
Percent Solids	87.2		0.1	0.1	%			07/05/18 10:26	1
pH	8.5	HF	0.1	0.1	SU			07/02/18 12:36	1

**Client Sample ID: SB-1806 (64-70')**

**Lab Sample ID: 180-79413-9**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Percent Solids: 87.0

**Method: EPA 9056A - Anions, Ion Chromatography - Soluble**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	15		11	4.4	mg/Kg	☼		07/06/18 18:17	1
Fluoride	ND		1.1	0.54	mg/Kg	☼		07/06/18 18:17	1
Sulfate	64		11	7.7	mg/Kg	☼		07/06/18 18:17	1

**Method: EPA 6020A - Metals (ICP/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.14	J	0.24	0.073	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Arsenic	4.6		0.12	0.031	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Barium	6.5		1.2	0.068	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Beryllium	0.17		0.12	0.0089	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Boron	2.4	J	9.5	0.90	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Cadmium	0.042	J	0.12	0.020	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Calcium	24000		59	11	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Chromium	4.9		0.24	0.078	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Client Sample ID: SB-1806 (64-70')

Date Collected: 06/25/18 13:20

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-9

Matrix: Solid

Percent Solids: 87.0

### Method: EPA 6020A - Metals (ICP/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	8.2		0.059	0.0098	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Lead	5.1	B	0.12	0.041	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Lithium	5.6	B	0.59	0.33	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Molybdenum	1.0		0.59	0.073	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Selenium	0.32	J	0.59	0.071	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1
Thallium	0.047	J	0.12	0.015	mg/Kg	☼	07/05/18 15:40	07/13/18 01:41	1

### Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.037	0.0084	mg/Kg	☼	07/10/18 07:07	07/10/18 14:39	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13.0		0.1	0.1	%			07/05/18 10:26	1
Percent Solids	87.0		0.1	0.1	%			07/05/18 10:26	1
pH	8.6	HF	0.1	0.1	SU			07/02/18 12:36	1

## Client Sample ID: SB-1806 (70-76')

Date Collected: 06/25/18 15:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-10

Matrix: Solid

Percent Solids: 88.0

### Method: EPA 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	16		11	4.2	mg/Kg	☼		07/06/18 18:33	1
Fluoride	ND		1.1	0.52	mg/Kg	☼		07/06/18 18:33	1
Sulfate	76		11	7.4	mg/Kg	☼		07/06/18 18:33	1

### Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.13	J	0.22	0.068	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Arsenic	4.6		0.11	0.029	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Barium	6.9		1.1	0.063	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Beryllium	0.16		0.11	0.0083	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Boron	2.2	J	8.8	0.84	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Cadmium	0.043	J	0.11	0.019	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Calcium	19000		55	9.9	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Chromium	5.1		0.22	0.073	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Cobalt	7.9		0.055	0.0092	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Lead	5.1	B	0.11	0.039	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Lithium	6.3	B	0.55	0.30	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Molybdenum	0.93		0.55	0.068	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Selenium	0.53	J	0.55	0.066	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1
Thallium	0.042	J	0.11	0.014	mg/Kg	☼	07/05/18 15:40	07/13/18 01:46	1

### Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.037	0.0083	mg/Kg	☼	07/10/18 07:07	07/10/18 14:40	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.0		0.1	0.1	%			07/05/18 10:26	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Client Sample ID: SB-1806 (70-76')

Date Collected: 06/25/18 15:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-10

Matrix: Solid

Percent Solids: 88.0

### General Chemistry (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	88.0		0.1	0.1	%			07/05/18 10:26	1
pH	8.6	HF	0.1	0.1	SU			07/02/18 12:36	1

## Client Sample ID: SB-1808 (45-57')

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-11

Matrix: Solid

Percent Solids: 88.1

### Method: EPA 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		11	4.2	mg/Kg	☼		07/06/18 18:48	1
Fluoride	0.58	J	1.1	0.52	mg/Kg	☼		07/06/18 18:48	1
Sulfate	34		11	7.4	mg/Kg	☼		07/06/18 18:48	1

### Method: EPA 6020A - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.17	J	0.23	0.072	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Arsenic	5.6		0.12	0.030	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Barium	29		1.2	0.066	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Beryllium	0.19		0.12	0.0087	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Boron	1.1	J	9.3	0.88	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Cadmium	0.072	J	0.12	0.020	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Calcium	1900		58	10	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Chromium	4.8		0.23	0.076	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Cobalt	6.5		0.058	0.0096	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Lead	5.3	B	0.12	0.041	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Lithium	4.0	B	0.58	0.32	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Molybdenum	0.89		0.58	0.072	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Selenium	0.22	J	0.58	0.069	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1
Thallium	0.055	J	0.12	0.015	mg/Kg	☼	07/05/18 15:40	07/13/18 01:50	1

### Method: EPA 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.039	0.0087	mg/Kg	☼	07/10/18 07:07	07/10/18 14:40	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	11.9		0.1	0.1	%			07/05/18 10:26	1
Percent Solids	88.1		0.1	0.1	%			07/05/18 10:26	1
pH	8.4	HF	0.1	0.1	SU			07/02/18 12:36	1

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Method: EPA 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 180-249744/1-A**  
**Matrix: Solid**  
**Analysis Batch: 249727**

**Client Sample ID: Method Blank**  
**Prep Type: Soluble**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		10	3.9	mg/Kg			07/06/18 13:48	1
Fluoride	ND		1.0	0.48	mg/Kg			07/06/18 13:48	1
Sulfate	ND		10	6.8	mg/Kg			07/06/18 13:48	1

**Lab Sample ID: LCS 180-249744/2-A**  
**Matrix: Solid**  
**Analysis Batch: 249727**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Soluble**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	250	249		mg/Kg		100	80 - 120
Fluoride	12.5	11.0		mg/Kg		88	80 - 120
Sulfate	250	248		mg/Kg		99	80 - 120

## Method: EPA 6020A - Metals (ICP/MS)

**Lab Sample ID: MB 180-249703/1-A**  
**Matrix: Solid**  
**Analysis Batch: 250588**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 249703**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.20	0.062	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Arsenic	ND		0.10	0.026	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Barium	ND		1.0	0.057	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Beryllium	ND		0.10	0.0075	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Boron	ND		8.0	0.76	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Cadmium	ND		0.10	0.017	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Calcium	ND		50	9.0	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Chromium	ND		0.20	0.066	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Cobalt	ND		0.050	0.0083	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Lead	0.117		0.10	0.035	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Lithium	0.442	J	0.50	0.28	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Molybdenum	ND		0.50	0.062	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Selenium	ND		0.50	0.060	mg/Kg		07/05/18 15:40	07/13/18 00:06	1
Thallium	ND		0.10	0.013	mg/Kg		07/05/18 15:40	07/13/18 00:06	1

**Lab Sample ID: LCS 180-249703/2-A**  
**Matrix: Solid**  
**Analysis Batch: 250588**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 249703**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	45.5		mg/Kg		91	80 - 120
Arsenic	4.00	3.65		mg/Kg		91	80 - 120
Barium	200	184		mg/Kg		92	80 - 120
Beryllium	5.00	4.76		mg/Kg		95	80 - 120
Boron	100	88.3		mg/Kg		88	80 - 120
Cadmium	5.00	4.54		mg/Kg		91	80 - 120
Calcium	5000	4570		mg/Kg		91	80 - 120
Chromium	20.0	17.0		mg/Kg		85	80 - 120

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: LCS 180-249703/2-A**  
**Matrix: Solid**  
**Analysis Batch: 250588**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 249703**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cobalt	50.0	43.4		mg/Kg		87	80 - 120
Lead	2.00	2.20		mg/Kg		110	80 - 120
Lithium	5.00	4.36		mg/Kg		87	80 - 120
Molybdenum	100	92.7		mg/Kg		93	80 - 120
Selenium	1.00	0.857		mg/Kg		86	80 - 120
Thallium	5.00	4.83		mg/Kg		97	80 - 120

**Lab Sample ID: 180-79413-1 MS**  
**Matrix: Solid**  
**Analysis Batch: 250588**

**Client Sample ID: SB-1802 (10-12')**  
**Prep Type: Total/NA**  
**Prep Batch: 249703**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.21	J	65.3	51.7		mg/Kg	☼	79	75 - 125
Arsenic	15	F1	5.22	19.5		mg/Kg	☼	92	75 - 125
Barium	41		261	285		mg/Kg	☼	93	75 - 125
Beryllium	0.42		6.53	6.32		mg/Kg	☼	90	75 - 125
Boron	2.4	J	131	116		mg/Kg	☼	87	75 - 125
Cadmium	0.17		6.53	6.27		mg/Kg	☼	93	75 - 125
Calcium	380		6530	6320		mg/Kg	☼	91	75 - 125
Chromium	12		26.1	39.5		mg/Kg	☼	105	75 - 125
Cobalt	8.4		65.3	74.2		mg/Kg	☼	101	75 - 125
Lead	12	B	2.61	15.2	4	mg/Kg	☼	122	75 - 125
Lithium	12	B	6.53	19.4		mg/Kg	☼	113	75 - 125
Molybdenum	1.7		131	125		mg/Kg	☼	95	75 - 125
Selenium	0.63	J	1.31	1.98		mg/Kg	☼	103	75 - 125
Thallium	0.16		6.53	6.35		mg/Kg	☼	95	75 - 125

**Lab Sample ID: 180-79413-1 MSD**  
**Matrix: Solid**  
**Analysis Batch: 250588**

**Client Sample ID: SB-1802 (10-12')**  
**Prep Type: Total/NA**  
**Prep Batch: 249703**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.21	J	65.3	49.8		mg/Kg	☼	76	75 - 125	4	20
Arsenic	15	F1	5.22	18.1	F1	mg/Kg	☼	66	75 - 125	7	20
Barium	41		261	287		mg/Kg	☼	94	75 - 125	1	20
Beryllium	0.42		6.53	6.64		mg/Kg	☼	95	75 - 125	5	20
Boron	2.4	J	131	118		mg/Kg	☼	89	75 - 125	2	20
Cadmium	0.17		6.53	6.31		mg/Kg	☼	94	75 - 125	1	20
Calcium	380		6530	6390		mg/Kg	☼	92	75 - 125	1	20
Chromium	12		26.1	37.4		mg/Kg	☼	96	75 - 125	6	20
Cobalt	8.4		65.3	68.8		mg/Kg	☼	92	75 - 125	8	20
Lead	12	B	2.61	14.2	4	mg/Kg	☼	81	75 - 125	7	20
Lithium	12	B	6.53	18.4		mg/Kg	☼	98	75 - 125	5	20
Molybdenum	1.7		131	122		mg/Kg	☼	92	75 - 125	3	20
Selenium	0.63	J	1.31	1.98		mg/Kg	☼	103	75 - 125	0	20
Thallium	0.16		6.53	6.33		mg/Kg	☼	94	75 - 125	0	20

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Method: EPA 7471B - Mercury (CVAA)

Lab Sample ID: MB 180-250036/1-A  
 Matrix: Solid  
 Analysis Batch: 250139

Client Sample ID: Method Blank  
 Prep Type: Total/NA  
 Prep Batch: 250036

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil	Fac
Mercury	ND		0.033	0.0074	mg/Kg		07/10/18 06:54	07/10/18 14:16	1	

Lab Sample ID: LCS 180-250036/2-A  
 Matrix: Solid  
 Analysis Batch: 250139

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA  
 Prep Batch: 250036

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.417	0.451		mg/Kg		108	80 - 120

## Method: 2540G - SM 2540G

Lab Sample ID: 180-79413-6 DU  
 Matrix: Solid  
 Analysis Batch: 249632

Client Sample ID: SB-1805 (60-66')  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	14.9		14.6		%		2	20
Percent Solids	85.1		85.4		%		0.4	20

Lab Sample ID: 180-79413-7 DU  
 Matrix: Solid  
 Analysis Batch: 249643

Client Sample ID: SB-1805 (66-78')  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	14.3		13.8		%		4	20
Percent Solids	85.7		86.2		%		0.6	20

## Method: EPA 9045D - pH

Lab Sample ID: LCS 180-249310/1  
 Matrix: Solid  
 Analysis Batch: 249310

Client Sample ID: Lab Control Sample  
 Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

Lab Sample ID: 180-79413-11 DU  
 Matrix: Solid  
 Analysis Batch: 249310

Client Sample ID: SB-1808 (45-57')  
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
pH	8.4	HF	8.4		SU		0.1	2

# QC Association Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## HPLC/IC

### Analysis Batch: 249727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Soluble	Solid	EPA 9056A	249744
180-79413-2	SB-1802 (60-66')	Soluble	Solid	EPA 9056A	249744
180-79413-3	SB-1802 (66-72')	Soluble	Solid	EPA 9056A	249744
180-79413-4	SB-1805 (9-11')	Soluble	Solid	EPA 9056A	249744
180-79413-5	SB-1805 (50-60')	Soluble	Solid	EPA 9056A	249744
180-79413-6	SB-1805 (60-66')	Soluble	Solid	EPA 9056A	249744
180-79413-7	SB-1805 (66-78')	Soluble	Solid	EPA 9056A	249744
180-79413-8	SB-1806 (46-60')	Soluble	Solid	EPA 9056A	249744
180-79413-9	SB-1806 (64-70')	Soluble	Solid	EPA 9056A	249744
180-79413-10	SB-1806 (70-76')	Soluble	Solid	EPA 9056A	249744
180-79413-11	SB-1808 (45-57')	Soluble	Solid	EPA 9056A	249744
MB 180-249744/1-A	Method Blank	Soluble	Solid	EPA 9056A	249744
LCS 180-249744/2-A	Lab Control Sample	Soluble	Solid	EPA 9056A	249744

### Leach Batch: 249744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Soluble	Solid	DI Leach	
180-79413-2	SB-1802 (60-66')	Soluble	Solid	DI Leach	
180-79413-3	SB-1802 (66-72')	Soluble	Solid	DI Leach	
180-79413-4	SB-1805 (9-11')	Soluble	Solid	DI Leach	
180-79413-5	SB-1805 (50-60')	Soluble	Solid	DI Leach	
180-79413-6	SB-1805 (60-66')	Soluble	Solid	DI Leach	
180-79413-7	SB-1805 (66-78')	Soluble	Solid	DI Leach	
180-79413-8	SB-1806 (46-60')	Soluble	Solid	DI Leach	
180-79413-9	SB-1806 (64-70')	Soluble	Solid	DI Leach	
180-79413-10	SB-1806 (70-76')	Soluble	Solid	DI Leach	
180-79413-11	SB-1808 (45-57')	Soluble	Solid	DI Leach	
MB 180-249744/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 180-249744/2-A	Lab Control Sample	Soluble	Solid	DI Leach	

## Metals

### Prep Batch: 249703

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	3050B	
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	3050B	
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	3050B	
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	3050B	
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	3050B	
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	3050B	
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	3050B	
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	3050B	
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	3050B	
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	3050B	
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	3050B	
MB 180-249703/1-A	Method Blank	Total/NA	Solid	3050B	
LCS 180-249703/2-A	Lab Control Sample	Total/NA	Solid	3050B	
180-79413-1 MS	SB-1802 (10-12')	Total/NA	Solid	3050B	
180-79413-1 MSD	SB-1802 (10-12')	Total/NA	Solid	3050B	

TestAmerica Pittsburgh



# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## Metals (Continued)

### Prep Batch: 250036

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	7471B	
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	7471B	
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	7471B	
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	7471B	
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	7471B	
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	7471B	
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	7471B	
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	7471B	
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	7471B	
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	7471B	
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	7471B	
MB 180-250036/1-A	Method Blank	Total/NA	Solid	7471B	
LCS 180-250036/2-A	Lab Control Sample	Total/NA	Solid	7471B	

### Analysis Batch: 250139

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	EPA 7471B	250036
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	EPA 7471B	250036
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	EPA 7471B	250036
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	EPA 7471B	250036
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	EPA 7471B	250036
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	EPA 7471B	250036
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	EPA 7471B	250036
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	EPA 7471B	250036
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	EPA 7471B	250036
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	EPA 7471B	250036
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	EPA 7471B	250036
MB 180-250036/1-A	Method Blank	Total/NA	Solid	EPA 7471B	250036
LCS 180-250036/2-A	Lab Control Sample	Total/NA	Solid	EPA 7471B	250036

### Analysis Batch: 250588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	EPA 6020A	249703
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	EPA 6020A	249703
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	EPA 6020A	249703
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	EPA 6020A	249703
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	EPA 6020A	249703
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	EPA 6020A	249703
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	EPA 6020A	249703
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	EPA 6020A	249703
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	EPA 6020A	249703
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	EPA 6020A	249703
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	EPA 6020A	249703
MB 180-249703/1-A	Method Blank	Total/NA	Solid	EPA 6020A	249703
LCS 180-249703/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	249703
180-79413-1 MS	SB-1802 (10-12')	Total/NA	Solid	EPA 6020A	249703
180-79413-1 MSD	SB-1802 (10-12')	Total/NA	Solid	EPA 6020A	249703

TestAmerica Pittsburgh



# QC Association Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-1

## General Chemistry

### Analysis Batch: 249310

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	EPA 9045D	
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	EPA 9045D	
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	EPA 9045D	
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	EPA 9045D	
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	EPA 9045D	
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	EPA 9045D	
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	EPA 9045D	
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	EPA 9045D	
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	EPA 9045D	
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	EPA 9045D	
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	EPA 9045D	
LCS 180-249310/1	Lab Control Sample	Total/NA	Solid	EPA 9045D	
180-79413-11 DU	SB-1808 (45-57')	Total/NA	Solid	EPA 9045D	

### Analysis Batch: 249632

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	2540G	
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	2540G	
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	2540G	
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	2540G	
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	2540G	
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	2540G	
180-79413-6 DU	SB-1805 (60-66')	Total/NA	Solid	2540G	

### Analysis Batch: 249643

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	2540G	
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	2540G	
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	2540G	
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	2540G	
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	2540G	
180-79413-7 DU	SB-1805 (66-78')	Total/NA	Solid	2540G	

TestAmerica Pittsburgh  
301 Alpha Drive  
RIDC Park  
Pittsburgh, PA 15238-2907  
phone 412.963.7058 fax 412.963.2468

### Chain of Custody Record

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program:  DW  NPDES  RCRA  Other: USEPA CCR

Project Manager: Andrew Ashton  
Tel/Fax: (603) 415-6173

Client Contact  
Samborn, Head & Associates, Inc.  
20 Foundry Street  
Concord, NH 03301  
(603) 229-1900 Phone  
(603) 229-1919 FAX  
Project Name: Mountaineer  
Site: New Haven, West Virginia  
P O #: 4345.00

Analysis Turnaround Time  
 CALENDAR DAYS  WORKING DAYS  
TAT if different from Below Standard  
 2 weeks  
 1 week  
 2 days  
 1 day

Site Contact: \_\_\_\_\_  
Lab Contact: Carrie Gamber  
Date: \_\_\_\_\_  
Carrier: \_\_\_\_\_

COB No: \_\_\_\_\_ of \_\_\_\_\_ COCs  
Sampler: Lilly Central  
For Lab Use Only:  
Walk-in Client:  
Lab Sampling:  
Job / SDG No.:

Sample Specific Notes:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y / N)	% moisture/solids (2540G)	CCR App III/IV Metals (6020A)	Mercury (7471B)	Cl, F, SO4 (9056A, DI Leach)	pH (9045D)	Radium-226 (9315)	Radium-228 (9320)	LEAF Method 1313 (see comment)
SB-1802 (10-12')	6/26/18	0930	C	SO1	2	N									
SB-1802 (60-66')	6/26/18	1130	C		2										
SB-1802 (66-72')	6/26/18	1210	C		2										
SB-1805 (9-11')	6/18/18	1350	C		2										
SB-1805 (50-60')	6/19/18	1600	C		2										
SB-1805 (60-66')	6/19/18	1715	C		2										
SB-1805 (66-78')	6/19/18	1910	C		4										
SB-1806 (46-60')	6/25/18	1135	C		4										
SB-1806 (64-70')	6/25/18	1320	C		4										
SB-1806 (70-76')	6/25/18	1505	C		4										
SB-1806 (45-57')	6/27/18	1265	C		6										



180-79413 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification: \_\_\_\_\_  
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)  
 Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Special Instructions/QC Requirements & Comments:  
ASTM D4646 modified to three concentration points (Co: 20 ug/l, 40 ug/l and spike; Li: 130 ug/l, 250 ug/l, and spike; Mo: 110 ug/l, 220 ug/l, and spike) and two pH points (6.0 and 7.5)  
LEAF Method 1313 modified to 6 pH points (5.0, 6.0, 7.0, 8.0, 9.0, and DI water)

Custody Seal No.:	Yes	No	Cooler Temp. (°C):	Obs'd:	Corrd:	Therm ID No.:
Relinquished by: Lilly Central						
Relinquished by: Samborn Head & Associates						
Relinquished by: FedEx						
Relinquished by: Deluce Watson						
Relinquished by: T. Allett						
Relinquished by: _____						

Form No. CA-C-WI-002, Rev. 4.15, dated 9/27/2017



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



180-79413 Login

PM: Gamber, Carrie L.

Company: Sanborn Head & Associates Inc

Controlled Document

Pittsburgh

WI No. PT-SR-WI-015\_R2

Effective Date: 11/9/2017

Temperature Check Performed by: *pw*

Date: *6-29-18 9:20*

IR Temp. Gun ID and Correction Factor: *# 9*

Sample ID	Uncorrected Temp. °C	Corrected Temp. °C
 180-79413-A-11 SB-1808 (45-57) Location: St. Louis Bottle: Clear Glass 8oz Wide - Unpreserved Sampled: 6/27/2018 12:05 PM 180-2811796 COC		<i>4.8</i> <i>2.8</i> <i>4.6</i>
 180-79413-B-11 SB-1808 (45-57) Location: 1688 Bottle: Clear Glass 4oz Wide - Unpreserved Sampled: 6/27/2018 12:05 PM 180-2811796 COC		

Sample ID	Uncorrected Temp. °C	Corrected Temp. °C

*2.8 4.8 4.6 CFED*

INSTRUCTIONS: The temperature of ALL sample containers received from the state of West Virginia are to be checked and this document is





Temperature Check Performed by:

IR Temp. Gun ID and Correction Factor:

Date:

Sample ID	Uncorrected Temp. °C	Corrected Temp. °C
 180-79413-A-6 SB-1805 (60-66) Location: St. Louis Bottle: Clear Glass 8oz Wide - Unpreserved Sampled: 6/19/2018 5:15 PM 180-2811785 COC	48/146 2.8	48/146 2.8
 180-79413-B-6 SB-1805 (60-66) Location: St. Louis Bottle: Clear Glass 8oz Wide - Unpreserved Sampled: 6/19/2018 5:15 PM 180-2811786 COC		
 180-79413-A-7 SB-1805 (66-78) Location: St. Louis Bottle: Clear Glass 8oz Wide - Unpreserved Sampled: 6/19/2018 7:10 PM 180-2811787 COC		
 180-79413-B-7 SB-1805 (66-78) Location: St. Louis Bottle: Clear Glass 8oz Wide - Unpreserved Sampled: 6/19/2018 7:10 PM 180-2811788 COC		
 180-79413-A-8 SB-1805 (46-60) Location: St. Louis Bottle: Clear Glass 8oz Wide - Unpreserved Sampled: 6/25/2018 11:35 AM 180-2811789 COC		

Sample ID	Uncorrected Temp. °C	Corrected Temp. °C
 180-79413-B-8 SB-1805 (46-60) Location: 16BB Bottle: Clear Glass 4oz Wide - Unpreserved Sampled: 6/25/2018 11:35 AM 180-2811790 COC	48/146 2.8	48/146 2.8
 180-79413-A-9 SB-1805 (64-70) Location: St. Louis Bottle: Clear Glass 8oz Wide - Unpreserved Sampled: 6/25/2018 1:20 PM 180-2811791 COC		
 180-79413-B-9 SB-1805 (64-70) Location: 16BB Bottle: Clear Glass 4oz Wide - Unpreserved Sampled: 6/25/2018 1:20 PM 180-2811792 COC		
 180-79413-A-10 SB-1805 (70-76) Location: St. Louis Bottle: Clear Glass 8oz Wide - Unpreserved		
 180-79413-B-10 SB-1805 (70-76) Location: 16BB Bottle: Clear Glass 4oz Wide - Unpreserved Sampled: 6/25/2018 3:05 PM 180-2811794 COC		

Sample containers received from the state of West Virginia are to be checked and this document is



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Controlled Document  
 Pittsburgh  
 WI No. PT-SR-WI-015\_R2  
 Effective Date: 11/9/2017

IR Temp. Gun ID and Correction Factor:

Temperature Check Performed by:

Date:

Sample ID	Uncorrected Temp. °C	Corrected Temp. °C	Uncorrected Temp. °C	Corrected Temp. °C
 180-79413-A-1 SB-1802 (10-12) Location: St. Louis Bottle: Clear Glass 8oz Wide - unpreserved Sampled 6/26/2018 9:30 AM 180-2811775 COC	4.8/4.6	4.8/4.6	4.8/4.6	4.07/4.06
 180-79413-B-1 SB-1802 (10-12) Location: 16BB Bottle: Clear Glass 4oz Wide - unpreserved Sampled 6/26/2018 9:30 AM 180-2811776 COC	2.8	2.8	2.8	2.8
 180-79413-A-2 SB-1802 (60-66) Location: St. Louis Bottle: Clear Glass 8oz Wide - unpreserved Sampled 6/26/2018 11:30 AM 180-2811777 COC				
 180-79413-B-2 SB-1802 (60-66) Location: 16BB Bottle: Clear Glass 4oz Wide - unpreserved Sampled 6/26/2018 11:30 AM 180-2811778 COC				
 180-79413-A-3 SB-1802 (66-72) Location: St. Louis Bottle: Clear Glass 8oz Wide - unpreserved Sampled 6/26/2018 12:10 PM 180-2811779 COC				
 180-79413-B-3 SB-1802 (66-72) Location: 16BB Bottle: Clear Glass 4oz Wide - unpreserved Sampled 6/26/2018 12:10 PM 180-2811780 COC				
 180-79413-A-4 SB-1805 (9-11) Location: St. Louis Bottle: Clear Glass 8oz Wide - unpreserved Sampled 6/18/2018 1:50 PM 180-2811781 COC				
 180-79413-B-4 SB-1805 (9-11) Location: 16BB Bottle: Clear Glass 4oz Wide - unpreserved Sampled 6/18/2018 1:50 PM 180-2811782 COC				
 180-79413-A-5 SB-1805 (60-60) Location: St. Louis Bottle: Clear Glass 8oz Wide - unpreserved Sampled 6/19/2018 4:00 PM 180-2811783 COC				
 180-79413-B-5 SB-1805 (50-60) Location: 16BB Bottle: Clear Glass 4oz Wide - unpreserved Sampled 6/19/2018 4:00 PM 180-2811784 COC				

INSTRUCTIONS: The temperature of ALL sample containers received from the state of west virginia are to be checked and this document is



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**Do Not Lift Using This Tag**



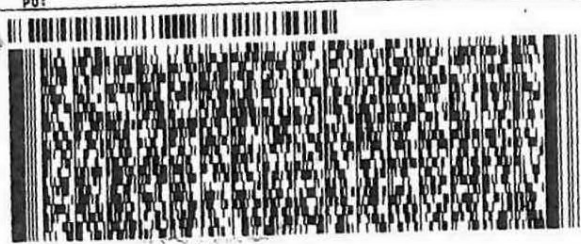
ORIGIN ID:CRWA (603) 415-6128  
 LILLY CORENTHAL  
 20 FOUNDRY ST.  
 CONCORD, NH 03301  
 UNITED STATES US

SHIP DATE: 28JUN18  
 ACTWGT: 53.30 LB  
 CAD: 6996935/SSF01904  
 DIMS: 25x14x14 IN  
 BILL THIRD PARTY

Part # 15059000/01505900/EXP 05/18

TO TEST AMERICA  
 TEST AMERICA  
 301 ALPHA DR  
 RIDC PARK  
 PITTSBURGH PA 15238

(412) 963-7058 REF: DEPT:  
 INU: PO:



3 61 3  
 MPS# 7816 2476 7050  
 Mstr# 7816 2476 7039 0201

FRI - 29 JUN 10:30A  
 PRIORITY OVERNIGHT  
 AHS  
 15238  
 PA-US PIT

**XH AGCA**

Uncorrected temp 4.6 °C  
 Thermometer ID 9

CF 0 Initials JS

PT-WI-SR-001 effective 7/26/13



Do Not Lift Using This Tag

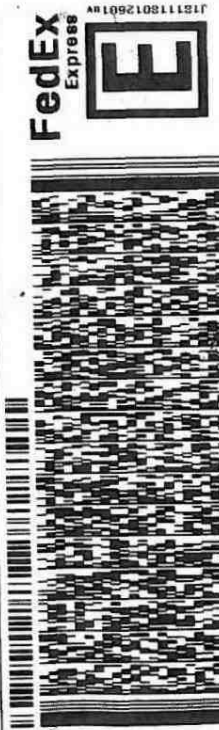
Part # 1562875-28 JUN 18 EXP 05/19

ORIGIN ID:CRMA (603) 415-6128  
LILLY CORENTHAL  
20 FOUNDRY ST  
CONCORD, NH 03301  
UNITED STATES US

SHIP DATE: 28 JUN 18  
ACT WGT: 60.10 LB  
CAD: 6996935/SSFO1904  
DIMS: 25x14x14 IN  
BILL THIRD PARTY

TO TEST AMERICA  
TEST AMERICA  
301 ALPHA DR  
RIDC PARK  
PITTSBURGH PA 15238

(412) 963-7068 REF:  
INU: POI: DEPT:



FRI - 29 JUN 10:30A  
PRIORITY OVERNIGHT  
AHS  
15238  
PA-US PIT

2 of 3  
MPS# 7816 2476 7040  
0263  
Mstr# 7816 2476 7039  
0201  
XH AGCA

Uncorrected temp 4.8 °C  
Thermometer ID a  
CF 0 Initials BS

PT-WI-SR-001 effective 7/26/13

Do Not Lift Using This Tag

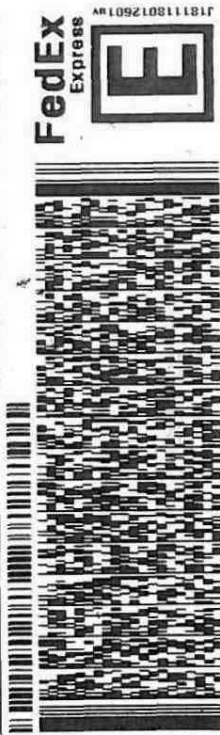
Part # 1562875-28 JUN 18 EXP 05/19

ORIGIN ID:CRMA (603) 415-6128  
LILLY CORENTHAL  
20 FOUNDRY ST  
CONCORD, NH 03301  
UNITED STATES US

SHIP DATE: 28 JUN 18  
ACT WGT: 40.10 LB  
CAD: 6996935/SSFO1904  
DIMS: 25x14x14 IN  
BILL THIRD PARTY

TO TEST AMERICA  
TEST AMERICA  
301 ALPHA DR  
RIDC PARK  
PITTSBURGH PA 15238

(412) 963-7068 REF:  
INU: POI: DEPT:



FRI - 29 JUN 10:30A  
PRIORITY OVERNIGHT  
AHS  
15238  
PA-US PIT

1 of 3  
TRK# 7816 2476 7039  
0201  
# MASTER #  
XH AGCA

Uncorrected temp 2.8 °C  
Thermometer ID a  
CF 0 Initials BS

PT-WI-SR-001 effective 7/26/13

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- 11
- 12
- 13

# Login Sample Receipt Checklist

Client: Sanborn Head & Associates Inc

Job Number: 180-79413-1

**Login Number: 79413**

**List Number: 1**

**Creator: Watson, Debbie**

**List Source: TestAmerica Pittsburgh**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-79413-2

Client Project/Site: LEAF Metals and CCR Constituent Analysis

For:

Sanborn Head & Associates Inc

20 Foundry Street

Concord, New Hampshire 03301

Attn: Andrew Ashton



Authorized for release by:

8/14/2018 2:48:13 PM

Julie Unger, Project Management Assistant I

[julie.unger@testamericainc.com](mailto:julie.unger@testamericainc.com)

Designee for

Carrie Gamber, Senior Project Manager

(412)963-2428

[carrie.gamber@testamericainc.com](mailto:carrie.gamber@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

PA Lab ID: 02-00416

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

1

2

3

4

5

6

7

8

9

10

11

12

13



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions/Glossary . . . . .	4
Certification Summary . . . . .	5
Sample Summary . . . . .	6
Method Summary . . . . .	7
Lab Chronicle . . . . .	8
Client Sample Results . . . . .	12
QC Sample Results . . . . .	17
QC Association Summary . . . . .	19
Chain of Custody . . . . .	20
Receipt Checklists . . . . .	25

# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

**Job ID: 180-79413-2**

**Laboratory: TestAmerica Pittsburgh**

**Narrative**

## CASE NARRATIVE

**Client: Sanborn Head & Associates Inc**

**Project: LEAF Metals and CCR Constituent Analysis**

**Report Number: 180-79413-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### RECEIPT

The samples were received on 6/29/2018 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.8° C, 4.6° C and 4.8° C.

### DRY AND GRIND

Radium-226 was detected in method blank MB 160-374856/14-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Radium-228 exceeded the RPD limit for the duplicate of sample SB-1802 (10-12')DU (180-79413-1).

The following samples could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: SB-1802 (10-12') (180-79413-1), SB-1802 (60-66') (180-79413-2), SB-1802 (66-72') (180-79413-3), SB-1805 (9-11') (180-79413-4), SB-1805 (50-60') (180-79413-5), SB-1805 (60-66') (180-79413-6), SB-1805 (66-78') (180-79413-7), SB-1806 (46-60') (180-79413-8), SB-1806 (64-70') (180-79413-9), SB-1806 (70-76') (180-79413-10), SB-1808 (45-57') (180-79413-11) and (180-79413-A-1-A DU). The samples contained detritus material and rocks of varying sizes.

# Definitions/Glossary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

## Qualifiers

### Rad

Qualifier	Qualifier Description
U	Result is less than the sample detection limit.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Accreditation/Certification Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

## Laboratory: TestAmerica Pittsburgh

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
West Virginia DEP	State Program	3	142	01-31-19

## Laboratory: TestAmerica St. Louis

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska	State Program	10	MO00054	06-30-19
ANAB	DoD ELAP		L2305	04-06-19
Arizona	State Program	9	AZ0813	12-08-18
California	State Program	9	2886	06-30-19
Connecticut	State Program	1	PH-0241	03-31-19
Florida	NELAP	4	E87689	06-30-19
Illinois	NELAP	5	200023	11-30-18
Iowa	State Program	7	373	12-01-18
Kansas	NELAP	7	E-10236	10-31-18
Kentucky (DW)	State Program	4	90125	12-31-18
Louisiana	NELAP	6	04080	06-30-19
Louisiana (DW)	NELAP	6	LA180017	12-31-18
Maryland	State Program	3	310	09-30-18 *
Michigan	State Program	5	9005	06-30-18 *
Missouri	State Program	7	780	06-30-18 *
Nevada	State Program	9	MO000542018-1	07-31-18 *
New Jersey	NELAP	2	MO002	06-30-19
New York	NELAP	2	11616	03-31-19
North Dakota	State Program	8	R207	06-30-19
NRC	NRC		24-24817-01	12-31-22
Oklahoma	State Program	6	9997	08-31-18 *
Pennsylvania	NELAP	3	68-00540	02-28-19
South Carolina	State Program	4	85002001	06-30-18 *
Texas	NELAP	6	T104704193-18-12	07-31-19
US Fish & Wildlife	Federal		058448	07-31-19
USDA	Federal		P330-17-0028	02-02-20
Utah	NELAP	8	MO000542016-8	07-31-18 *
Virginia	NELAP	3	460230	06-14-19
Washington	State Program	10	C592	08-30-18 *
West Virginia DEP	State Program	3	381	08-31-18 *

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-79413-1	SB-1802 (10-12')	Solid	06/26/18 09:30	06/29/18 09:20
180-79413-2	SB-1802 (60-66')	Solid	06/26/18 11:30	06/29/18 09:20
180-79413-3	SB-1802 (66-72')	Solid	06/26/18 12:10	06/29/18 09:20
180-79413-4	SB-1805 (9-11')	Solid	06/18/18 13:50	06/29/18 09:20
180-79413-5	SB-1805 (50-60')	Solid	06/19/18 16:00	06/29/18 09:20
180-79413-6	SB-1805 (60-66')	Solid	06/19/18 17:15	06/29/18 09:20
180-79413-7	SB-1805 (66-78')	Solid	06/19/18 19:10	06/29/18 09:20
180-79413-8	SB-1806 (46-60')	Solid	06/25/18 11:35	06/29/18 09:20
180-79413-9	SB-1806 (64-70')	Solid	06/25/18 13:20	06/29/18 09:20
180-79413-10	SB-1806 (70-76')	Solid	06/25/18 15:05	06/29/18 09:20
180-79413-11	SB-1808 (45-57')	Solid	06/27/18 12:05	06/29/18 09:20



# Method Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

Method	Method Description	Protocol	Laboratory
9315	Radium-226 (GFPC)	SW846	TAL SL
9320	Radium-228 (GFPC)	SW846	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
DPS-21	Preparation, Digestion/Precipitate Separation (21-Day In-Growth)	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL

#### Protocol References:

None = None

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

**Client Sample ID: SB-1802 (10-12')**

**Lab Sample ID: 180-79413-1**

Date Collected: 06/26/18 09:30

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			0.9996 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:33	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			0.9996 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 09:59	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1802 (60-66')**

**Lab Sample ID: 180-79413-2**

Date Collected: 06/26/18 11:30

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			0.9991 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			0.9991 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 09:59	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1802 (66-72')**

**Lab Sample ID: 180-79413-3**

Date Collected: 06/26/18 12:10

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			0.9992 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			0.9992 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 10:00	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1805 (9-11')**

**Lab Sample ID: 180-79413-4**

Date Collected: 06/18/18 13:50

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			1.0001 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

**Client Sample ID: SB-1805 (9-11')**

**Lab Sample ID: 180-79413-4**

**Date Collected: 06/18/18 13:50**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			1.0001 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 10:00	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 180-79413-5**

**Date Collected: 06/19/18 16:00**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			0.9996 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			0.9996 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 10:00	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1805 (60-66')**

**Lab Sample ID: 180-79413-6**

**Date Collected: 06/19/18 17:15**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			1.0005 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			1.0005 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 10:00	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 180-79413-7**

**Date Collected: 06/19/18 19:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			0.9995 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 180-79413-7**

**Date Collected: 06/19/18 19:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			0.9995 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 10:00	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 180-79413-8**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			0.9994 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			0.9994 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 10:00	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1806 (64-70')**

**Lab Sample ID: 180-79413-9**

**Date Collected: 06/25/18 13:20**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			1.0008 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			1.0008 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 10:00	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 180-79413-10**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			0.9993 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			0.9993 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 180-79413-10**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9320		1			379762	08/01/18 10:01	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 180-79413-11**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-21			0.9995 g	1.0 g	374856	07/11/18 09:24	CLP	TAL SL
Total/NA	Analysis	9315		1			380987	08/08/18 05:34	RTM	TAL SL
Instrument ID: GFPCPURPLE										
Total/NA	Leach	Dry and Grind			1.0 g	1.0 g	374032	07/05/18 08:36	DRO	TAL SL
Total/NA	Prep	DPS-0			0.9995 g	1.0 g	374857	07/11/18 09:27	CLP	TAL SL
Total/NA	Analysis	9320		1			379762	08/01/18 10:01	CDR	TAL SL
Instrument ID: GFPCPROTEAN										

**Laboratory References:**

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

**Analyst References:**

Lab: TAL SL

Batch Type: Leach  
 DRO = David Oetter

Batch Type: Prep  
 CLP = Cassandra Park

Batch Type: Analysis  
 CDR = Conrad Reuscher

RTM = Rachel Mueller

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

**Client Sample ID: SB-1802 (10-12')**

Date Collected: 06/26/18 09:30

Date Received: 06/29/18 09:20

**Lab Sample ID: 180-79413-1**

Matrix: Solid

**Method: 9315 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.856		0.160	0.177	1.00	0.0805	pCi/g	07/11/18 09:24	08/08/18 05:33	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	97.5		40 - 110					07/11/18 09:24	08/08/18 05:33	1

**Method: 9320 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.513		0.258	0.262	1.00	0.383	pCi/g	07/11/18 09:27	08/01/18 09:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	97.6		40 - 110					07/11/18 09:27	08/01/18 09:59	1
Y Carrier	89.7		40 - 110					07/11/18 09:27	08/01/18 09:59	1

**Client Sample ID: SB-1802 (60-66')**

Date Collected: 06/26/18 11:30

Date Received: 06/29/18 09:20

**Lab Sample ID: 180-79413-2**

Matrix: Solid

**Method: 9315 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.461		0.127	0.134	1.00	0.0889	pCi/g	07/11/18 09:24	08/08/18 05:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.2		40 - 110					07/11/18 09:24	08/08/18 05:34	1

**Method: 9320 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.181	U	0.285	0.286	1.00	0.478	pCi/g	07/11/18 09:27	08/01/18 09:59	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	90.3		40 - 110					07/11/18 09:27	08/01/18 09:59	1
Y Carrier	88.2		40 - 110					07/11/18 09:27	08/01/18 09:59	1

**Client Sample ID: SB-1802 (66-72')**

Date Collected: 06/26/18 12:10

Date Received: 06/29/18 09:20

**Lab Sample ID: 180-79413-3**

Matrix: Solid

**Method: 9315 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.412		0.126	0.132	1.00	0.0887	pCi/g	07/11/18 09:24	08/08/18 05:34	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

## Client Sample ID: SB-1802 (66-72')

Date Collected: 06/26/18 12:10

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-3

Matrix: Solid

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	80.8		40 - 110	07/11/18 09:24	08/08/18 05:34	1

**Method: 9320 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.532		0.303	0.307	1.00	0.458	pCi/g	07/11/18 09:27	08/01/18 10:00	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	80.8		40 - 110	07/11/18 09:27	08/01/18 10:00	1
Y Carrier	86.4		40 - 110	07/11/18 09:27	08/01/18 10:00	1

## Client Sample ID: SB-1805 (9-11')

Date Collected: 06/18/18 13:50

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-4

Matrix: Solid

**Method: 9315 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.901		0.167	0.186	1.00	0.0811	pCi/g	07/11/18 09:24	08/08/18 05:34	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	99.0		40 - 110	07/11/18 09:24	08/08/18 05:34	1

**Method: 9320 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.493		0.247	0.251	1.00	0.365	pCi/g	07/11/18 09:27	08/01/18 10:00	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	99.1		40 - 110	07/11/18 09:27	08/01/18 10:00	1
Y Carrier	87.9		40 - 110	07/11/18 09:27	08/01/18 10:00	1

## Client Sample ID: SB-1805 (50-60')

Date Collected: 06/19/18 16:00

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-5

Matrix: Solid

**Method: 9315 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.544		0.140	0.149	1.00	0.0913	pCi/g	07/11/18 09:24	08/08/18 05:34	1

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Ba Carrier	87.9		40 - 110	07/11/18 09:24	08/08/18 05:34	1

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

## Client Sample ID: SB-1805 (50-60')

Date Collected: 06/19/18 16:00

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-5

Matrix: Solid

### Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.138	U	0.253	0.253	1.00	0.429	pCi/g	07/11/18 09:27	08/01/18 10:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	87.9		40 - 110					07/11/18 09:27	08/01/18 10:00	1
Y Carrier	84.9		40 - 110					07/11/18 09:27	08/01/18 10:00	1

## Client Sample ID: SB-1805 (60-66')

Date Collected: 06/19/18 17:15

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-6

Matrix: Solid

### Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.397		0.119	0.124	1.00	0.0961	pCi/g	07/11/18 09:24	08/08/18 05:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.1		40 - 110					07/11/18 09:24	08/08/18 05:34	1

### Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.491	U	0.322	0.325	1.00	0.499	pCi/g	07/11/18 09:27	08/01/18 10:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	91.2		40 - 110					07/11/18 09:27	08/01/18 10:00	1
Y Carrier	75.1		40 - 110					07/11/18 09:27	08/01/18 10:00	1

## Client Sample ID: SB-1805 (66-78')

Date Collected: 06/19/18 19:10

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-7

Matrix: Solid

### Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.467		0.125	0.131	1.00	0.0893	pCi/g	07/11/18 09:24	08/08/18 05:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.1		40 - 110					07/11/18 09:24	08/08/18 05:34	1

### Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.337	U	0.239	0.241	1.00	0.372	pCi/g	07/11/18 09:27	08/01/18 10:00	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	96.2		40 - 110					07/11/18 09:27	08/01/18 10:00	1

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# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

## Client Sample ID: SB-1805 (66-78')

Date Collected: 06/19/18 19:10

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-7

Matrix: Solid

### Method: 9320 - Radium-228 (GFPC) (Continued)

Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Y Carrier	86.7		40 - 110	07/11/18 09:27	08/01/18 10:00	1

## Client Sample ID: SB-1806 (46-60')

Date Collected: 06/25/18 11:35

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-8

Matrix: Solid

### Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.478		0.131	0.138	1.00	0.102	pCi/g	07/11/18 09:24	08/08/18 05:34	1
Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac				
Ba Carrier	91.1		40 - 110	07/11/18 09:24	08/08/18 05:34	1				

### Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.293	U	0.266	0.268	1.00	0.429	pCi/g	07/11/18 09:27	08/01/18 10:00	1
Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac				
Ba Carrier	91.2		40 - 110	07/11/18 09:27	08/01/18 10:00	1				
Y Carrier	84.1		40 - 110	07/11/18 09:27	08/01/18 10:00	1				

## Client Sample ID: SB-1806 (64-70')

Date Collected: 06/25/18 13:20

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79413-9

Matrix: Solid

### Method: 9315 - Radium-226 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.499		0.129	0.137	1.00	0.0843	pCi/g	07/11/18 09:24	08/08/18 05:34	1
Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac				
Ba Carrier	92.0		40 - 110	07/11/18 09:24	08/08/18 05:34	1				

### Method: 9320 - Radium-228 (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	-0.0355	U	0.230	0.230	1.00	0.417	pCi/g	07/11/18 09:27	08/01/18 10:00	1
Carrier	%Yield	Qualifier	Limits	Prepared	Analyzed	Dil Fac				
Ba Carrier	92.0		40 - 110	07/11/18 09:27	08/01/18 10:00	1				
Y Carrier	86.4		40 - 110	07/11/18 09:27	08/01/18 10:00	1				

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# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 180-79413-10**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: 9315 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.315		0.106	0.110	1.00	0.0936	pCi/g	07/11/18 09:24	08/08/18 05:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.9		40 - 110					07/11/18 09:24	08/08/18 05:34	1

**Method: 9320 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.426		0.262	0.264	1.00	0.400	pCi/g	07/11/18 09:27	08/01/18 10:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	95.9		40 - 110					07/11/18 09:27	08/01/18 10:01	1
Y Carrier	83.0		40 - 110					07/11/18 09:27	08/01/18 10:01	1

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 180-79413-11**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: 9315 - Radium-226 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-226	0.485		0.129	0.136	1.00	0.0970	pCi/g	07/11/18 09:24	08/08/18 05:34	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.8		40 - 110					07/11/18 09:24	08/08/18 05:34	1

**Method: 9320 - Radium-228 (GFPC)**

Analyte	Result	Qualifier	Count Uncert. (2σ+/-)	Total Uncert. (2σ+/-)	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
Radium-228	0.360		0.231	0.233	1.00	0.354	pCi/g	07/11/18 09:27	08/01/18 10:01	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Ba Carrier	92.9		40 - 110					07/11/18 09:27	08/01/18 10:01	1
Y Carrier	91.2		40 - 110					07/11/18 09:27	08/01/18 10:01	1



# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

## Method: 9315 - Radium-226 (GFPC)

**Lab Sample ID: MB 160-374856/14-A**  
**Matrix: Solid**  
**Analysis Batch: 380987**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 374856**

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-226	0.1683		0.0860	0.0873	1.00	0.101	pCi/g	07/11/18 09:24	08/08/18 05:35	1
Carrier	MB MB		Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	%Yield	Qualifier	Limits							
Ba Carrier	93.2		40 - 110		07/11/18 09:24	08/08/18 05:35	1			

**Lab Sample ID: LCS 160-374856/1-A**  
**Matrix: Solid**  
**Analysis Batch: 380987**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 374856**

Analyte	Spike Added	LCS Result	LCS Qual	Total	RL	MDC	Unit	%Rec	%Rec. Limits
				Uncert. (2σ+/-)					
Radium-226	11.4	10.53		1.09	1.00	0.109	pCi/g	93	65 - 140
Carrier	LCS LCS		Limits		Prepared	Analyzed	Dil Fac		
Ba Carrier	%Yield	Qualifier	Limits						
Ba Carrier	101		40 - 110						

**Lab Sample ID: 180-79413-1 DU**  
**Matrix: Solid**  
**Analysis Batch: 380987**

**Client Sample ID: SB-1802 (10-12')**  
**Prep Type: Total/NA**  
**Prep Batch: 374856**

Analyte	Sample Sample		DU	DU	Total	RL	MDC	Unit	RER	RER Limit
	Result	Qual	Result	Qual	Uncert. (2σ+/-)					
Radium-226	0.856		0.7636		0.169	1.00	0.0856	pCi/g	0.27	1
Carrier	DU DU		Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	%Yield	Qualifier	Limits							
Ba Carrier	98.1		40 - 110							

## Method: 9320 - Radium-228 (GFPC)

**Lab Sample ID: MB 160-374857/14-A**  
**Matrix: Solid**  
**Analysis Batch: 379762**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 374857**

Analyte	MB MB		Count	Total	RL	MDC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert. (2σ+/-)	Uncert. (2σ+/-)						
Radium-228	0.01505	U	0.249	0.249	1.00	0.440	pCi/g	07/11/18 09:27	08/01/18 10:01	1
Carrier	MB MB		Limits		Prepared	Analyzed	Dil Fac			
Ba Carrier	%Yield	Qualifier	Limits							
Ba Carrier	93.2		40 - 110		07/11/18 09:27	08/01/18 10:01	1			
Y Carrier	MB MB		Limits		Prepared	Analyzed	Dil Fac			
Y Carrier	%Yield	Qualifier	Limits							
Y Carrier	87.9		40 - 110		07/11/18 09:27	08/01/18 10:01	1			

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

## Method: 9320 - Radium-228 (GFPC) (Continued)

**Lab Sample ID: LCS 160-374857/1-A**  
**Matrix: Solid**  
**Analysis Batch: 379762**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 374857**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	%Rec	%Rec. Limits
Radium-228	11.2	11.78		1.32	1.00	0.457	pCi/g	106	61 - 139

Carrier	LCS %Yield	LCS Qualifier	Limits
Ba Carrier	101		40 - 110
Y Carrier	82.6		40 - 110

**Lab Sample ID: 180-79413-1 DU**  
**Matrix: Solid**  
**Analysis Batch: 379762**

**Client Sample ID: SB-1802 (10-12')**  
**Prep Type: Total/NA**  
**Prep Batch: 374857**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2σ+/-)	RL	MDC	Unit	RER	RER Limit
Radium-228	0.513		0.3264	U	0.255	1.00	0.403	pCi/g	0.36	1

Carrier	DU %Yield	DU Qualifier	Limits
Ba Carrier	98.2		40 - 110
Y Carrier	90.1		40 - 110

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79413-2

## Rad

### Leach Batch: 374032

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	Dry and Grind	
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	Dry and Grind	
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	Dry and Grind	
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	Dry and Grind	
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	Dry and Grind	
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	Dry and Grind	
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	Dry and Grind	
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	Dry and Grind	
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	Dry and Grind	
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	Dry and Grind	
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	Dry and Grind	
180-79413-1 DU	SB-1802 (10-12')	Total/NA	Solid	Dry and Grind	

### Prep Batch: 374856

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	DPS-21	374032
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	DPS-21	374032
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	DPS-21	374032
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	DPS-21	374032
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	DPS-21	374032
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	DPS-21	374032
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	DPS-21	374032
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	DPS-21	374032
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	DPS-21	374032
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	DPS-21	374032
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	DPS-21	374032
MB 160-374856/14-A	Method Blank	Total/NA	Solid	DPS-21	
LCS 160-374856/1-A	Lab Control Sample	Total/NA	Solid	DPS-21	
180-79413-1 DU	SB-1802 (10-12')	Total/NA	Solid	DPS-21	374032

### Prep Batch: 374857

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79413-1	SB-1802 (10-12')	Total/NA	Solid	DPS-0	374032
180-79413-2	SB-1802 (60-66')	Total/NA	Solid	DPS-0	374032
180-79413-3	SB-1802 (66-72')	Total/NA	Solid	DPS-0	374032
180-79413-4	SB-1805 (9-11')	Total/NA	Solid	DPS-0	374032
180-79413-5	SB-1805 (50-60')	Total/NA	Solid	DPS-0	374032
180-79413-6	SB-1805 (60-66')	Total/NA	Solid	DPS-0	374032
180-79413-7	SB-1805 (66-78')	Total/NA	Solid	DPS-0	374032
180-79413-8	SB-1806 (46-60')	Total/NA	Solid	DPS-0	374032
180-79413-9	SB-1806 (64-70')	Total/NA	Solid	DPS-0	374032
180-79413-10	SB-1806 (70-76')	Total/NA	Solid	DPS-0	374032
180-79413-11	SB-1808 (45-57')	Total/NA	Solid	DPS-0	374032
MB 160-374857/14-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-374857/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	
180-79413-1 DU	SB-1802 (10-12')	Total/NA	Solid	DPS-0	374032

TestAmerica Pittsburgh

TestAmerica Pittsburgh  
301 Alpha Drive  
RIDC Park  
Pittsburgh, PA 15238-2907  
phone 412.963.7058 fax 412.963.2468

### Chain of Custody Record

TestAmerica  
THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program:  DW  NPDES  RCRA  Other: USEPA CCR

Project Manager: Andrew Ashton  
Tel/Fax: (603) 415-6173

Client Contact  
Samborn, Head & Associates, Inc.  
20 Foundry Street  
Concord, NH 03301  
(603) 229-1900 Phone  
(603) 229-1919 FAX  
Project Name: Mountaineer  
Site: New Haven, West Virginia  
P O #: 4345.00

Analysis Turnaround Time  
 CALENDAR DAYS  WORKING DAYS  
TAT if different from Below Standard  
 2 weeks  
 1 week  
 2 days  
 1 day

Site Contact: \_\_\_\_\_  
Lab Contact: Carrie Gamber  
Date: \_\_\_\_\_  
Carrier: \_\_\_\_\_

COB No: \_\_\_\_\_ of \_\_\_\_\_ COCs  
Sampler: Lilly Cantelmo  
For Lab Use Only:  
Walk-in Client:  
Lab Sampling:  
Job / SDG No.:

Sample Specific Notes:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y / N)	% moisture/solids (2540G)	CCR App III/IV Metals (6020A)	Mercury (7471B)	Cl, F, SO4 (9056A, DI Leach)	pH (9045D)	Radium-226 (9315)	Radium-228 (9320)	LEAF Method 1313 (see comment)	ASTM D4646 (see comments)
SB-1802 (10-12')	6/26/18	0930	C	SO1	2	N										
SB-1802 (60-66')	6/26/18	1130	C		2											
SB-1802 (66-72')	6/26/18	1210	C		2											
SB-1805 (9-11')	6/18/18	1350	C		2											
SB-1805 (50-60')	6/19/18	1600	C		2											
SB-1805 (60-66')	6/19/18	1715	C		2											
SB-1805 (66-78')	6/19/18	1910	C		4											
SB-1806 (46-60')	6/25/18	1135	C		4											
SB-1806 (64-70')	6/25/18	1320	C		4											
SB-1806 (70-76')	6/25/18	1505	C		4											
SB-1806 (45-57')	6/27/18	1265	C		6											



180-79413 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification: \_\_\_\_\_ Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Special Instructions/QC Requirements & Comments:  
ASTM D4646 modified to three concentration points (Co: 20 ug/l, 40 ug/l and spike; Mo: 110 ug/l, 220 ug/l, and spike; Li: 130 ug/l, 250 ug/l, and spike); and two pH points (6.0 and 7.5)  
LEAF Method 1313 modified to 6 pH points (5.0, 6.0, 7.0, 8.0, 9.0, and DI water)

Custody Seal No.: \_\_\_\_\_  
Relinquished by: *Lilly Cantelmo*  
Relinquished by: *Samborn Head & Associates*  
Relinquished by: *FedEx*  
Relinquished by: *Deluxe Water*

Received by: \_\_\_\_\_  
Received by: *T. Allett*  
Received by: \_\_\_\_\_

Date/Time: \_\_\_\_\_  
Date/Time: *6/29/18 09:15*  
Date/Time: \_\_\_\_\_

Company: \_\_\_\_\_  
Company: *FedEx*  
Company: \_\_\_\_\_

Company: \_\_\_\_\_  
Company: \_\_\_\_\_  
Company: \_\_\_\_\_

Therm ID No.: \_\_\_\_\_  
Cooler Temp. (°C): \_\_\_\_\_  
Obs'd: \_\_\_\_\_  
Corrd: \_\_\_\_\_





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**Do Not Lift Using This Tag**

ORIGIN ID:CRWA (603) 415-6128  
 LILLY CORENTHAL  
 20 FOUNDRY ST.  
 CONCORD, NH 03301  
 UNITED STATES US

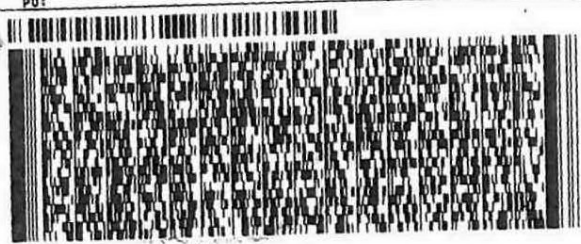
SHIP DATE: 28JUN18  
 ACTWGT: 53.30 LB  
 CAD: 6996935/SSF01904  
 DIMS: 25x14x14 IN  
 BILL THIRD PARTY

Part # 15059000/01505900/EXP 05/18



TO TEST AMERICA  
 TEST AMERICA  
 301 ALPHA DR  
 RIDC PARK  
 PITTSBURGH PA 15238

(412) 963-7058 REF: DEPT:  
 INU: PO:



3 61 3  
 MPS# 7816 2476 7050  
 Mstr# 7816 2476 7039 0201

FRI - 29 JUN 10:30A  
 PRIORITY OVERNIGHT  
 AHS  
 15238  
 PA-US PIT

**XH AGCA**

Uncorrected temp 4.6 °C  
 Thermometer ID 9

CF 0 Initials JS

PT-WI-SR-001 effective 7/26/13

Do Not Lift Using This Tag

Part # 1562875-18-0505 EXP 05/19

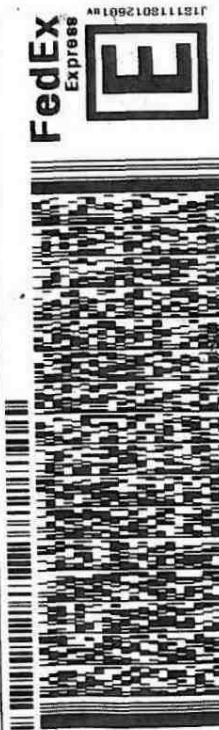
ORIGIN ID:CRMA (603) 415-6128  
LILLY CORENTHAL  
20 FOUNDRY ST  
CONCORD, NH 03301  
UNITED STATES US

SHIP DATE: 28 JUN 18  
ACT WGT: 60.10 LB  
CAD: 6996935/SSFO1904  
DIMS: 25x14x14 IN  
BILL THIRD PARTY

TO TEST AMERICA  
TEST AMERICA  
301 ALPHA DR  
RIDC PARK  
PITTSBURGH PA 15238

(412) 963-7058 REF:  
INU: PO1

DEPT:



FRI - 29 JUN 10:30A  
PRIORITY OVERNIGHT  
AHS  
15238  
PA-US PIT

MPS# 7816 2476 7040  
0263  
Mstr# 7816 2476 7039  
0201

XH AGCA

Uncorrected temp 4.8 °C  
Thermometer ID a  
CF 0 Initials BS

PT-WI-SR-001 effective 7/26/13

Do Not Lift Using This Tag

Part # 1562875-18-0505 EXP 05/19

ORIGIN ID:CRMA (603) 415-6128  
LILLY CORENTHAL  
20 FOUNDRY ST  
CONCORD, NH 03301  
UNITED STATES US

SHIP DATE: 28 JUN 18  
ACT WGT: 40 LB  
CAD: 6996935/SSFO1904  
DIMS: 25x14x14 IN  
BILL THIRD PARTY

TO TEST AMERICA  
TEST AMERICA  
301 ALPHA DR  
RIDC PARK  
PITTSBURGH PA 15238

(412) 963-7058 REF:  
INU: PO1

DEPT:



FRI - 29 JUN 10:30A  
PRIORITY OVERNIGHT  
AHS  
15238  
PA-US PIT

1 of 3  
TRK# 7816 2476 7039  
0201  
# MASTER #

XH AGCA

Uncorrected temp 2.8 °C  
Thermometer ID a  
CF 0 Initials BS

PT-WI-SR-001 effective 7/26/13

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# Chain of Custody Record



<b>Client Information (Sub Contract Lab)</b>		Sampler:	Lab PM:	Carrier Tracking No(s):	GOC No:
Client Contact: Shipping/Receiving		Phone:	Gamber, Carrie L	180-333057.1	180-333057.1
Company: TestAmerica Laboratories, Inc.		E-Mail:	carrie.gamber@testamericainc.com	State of Origin:	Page:
Address: 13715 Rider Trail North,		Accreditations Required (See note):	State Program - West Virginia DEP	West Virginia	Page 1 of 2
City: Earth City		Due Date Requested:	7/12/2018	Job #:	180-79413-2
State, Zip: MO, 63045		TAT Requested (days):		Preservation Codes:	
Phone: 314-298-8566(Tel) 314-298-8757(Fax)		PO #:		A - HCl	M - Hexane
Email:		WO #:		B - NaOH	N - None
Project #: 18018931		Project #:		C - Zn Acetate	O - AsNaO2
Site:		SSOW#:		D - Nitric Acid	P - Na2O4S
				E - NaHSO4	Q - Na2SO3
				F - MeOH	R - Na2S2O3
				G - Amchlor	S - H2SO4
				H - Ascorbic Acid	T - TSP Dodecahydrate
				I - Ice	U - Acetone
				J - DI Water	V - MCAA
				K - EDTA	W - pH 4-5
				L - EDA	Z - other (specify)
				Other:	

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=other, BT=Tissue, AA=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	925_Ra226/Dry_Grind Radium-226	920_Ra228/Dry_Grind Radium-228	Total Number of Containers	Special Instructions/Note:
SB-1802 (10-12) (180-79413-1)	6/26/18	09:30 Eastern	Solid	Solid	X	X			1	
SB-1802 (60-66) (180-79413-2)	6/26/18	11:30 Eastern	Solid	Solid	X	X			1	
SB-1802 (66-72) (180-79413-3)	6/26/18	12:10 Eastern	Solid	Solid	X	X			1	
SB-1805 (9-11) (180-79413-4)	6/18/18	13:50 Eastern	Solid	Solid	X	X			1	
SB-1805 (50-60) (180-79413-5)	6/19/18	16:00 Eastern	Solid	Solid	X	X			1	
SB-1805 (60-66) (180-79413-6)	6/19/18	17:15 Eastern	Solid	Solid	X	X			1	
SB-1805 (66-78) (180-79413-7)	6/19/18	19:10 Eastern	Solid	Solid	X	X			1	
SB-1806 (46-60) (180-79413-8)	6/25/18	11:35 Eastern	Solid	Solid	X	X			1	
SB-1806 (64-70) (180-79413-9)	6/25/18	13:20 Eastern	Solid	Solid	X	X			1	

Note: Since laboratory accreditations are subject to change, TestAmerica Laboratories, Inc. places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/less/matrix being analyzed, the samples must be shipped back to the TestAmerica laboratory or other instructions will be provided. Any changes to accreditation status should be brought to TestAmerica Laboratories, Inc. attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to TestAmerica Laboratories, Inc.

<b>Possible Hazard Identification</b>	
Unconfirmed	Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For <input type="checkbox"/> Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:
Primary Deliverable Rank: 2	
Empty-Kit Relinquished by:	Time:
Relinquished by: <i>[Signature]</i>	Date: 7/12/18 17:00
Relinquished by: <i>[Signature]</i>	Date: 7/12/18 09:00
Relinquished by:	Date/Time:
Relinquished by:	Date/Time:
Relinquished by:	Date/Time:
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks:	







## Login Sample Receipt Checklist

Client: Sanborn Head & Associates Inc

Job Number: 180-79413-2

**Login Number: 79413**

**List Source: TestAmerica Pittsburgh**

**List Number: 1**

**Creator: Watson, Debbie**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## Login Sample Receipt Checklist

Client: Sanborn Head & Associates Inc

Job Number: 180-79413-2

**Login Number: 79413**  
**List Number: 2**  
**Creator: Press, Nicholas B**

**List Source: TestAmerica St. Louis**  
**List Creation: 07/03/18 07:43 PM**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



**APPENDIX H.2**

**SEQUENTIAL EXTRACTION  
PROCEDURE REPORTS**

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.  
TestAmerica Knoxville  
5815 Middlebrook Pike  
Knoxville, TN 37921  
Tel: (865)291-3000

TestAmerica Job ID: 140-11946-1

Client Project/Site: Mountaineer, New Haven, WV - SEP Metals

For:  
Sanborn Head & Associates Inc  
20 Foundry Street  
Concord, New Hampshire 03301

Attn: Andrew Ashton



Authorized for release by:  
7/25/2018 10:28:16 AM

Terry Walker Wasmund, Project Manager II  
(865)291-3000  
[terry.wasmund@testamericainc.com](mailto:terry.wasmund@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Definitions/Glossary . . . . .	3
Case Narrative . . . . .	4
Detection Summary . . . . .	6
Client Sample Results . . . . .	22
Default Detection Limits . . . . .	47
QC Sample Results . . . . .	52
QC Association Summary . . . . .	72
Lab Chronicle . . . . .	78
Method Summary . . . . .	91
Sample Summary . . . . .	92
Chain of Custody . . . . .	93

# Definitions/Glossary

Client: Sanborn Head & Associates Inc  
Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
*	LCS or LCSD is outside acceptance limits.
*	RPD of the LCS and LCSD exceeds the control limits
B	Compound was found in the blank and sample.
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL. The data are considered valid because the absolute difference is less than the RL.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Job ID: 140-11946-1**

**Laboratory: TestAmerica Knoxville**

## Narrative

### Job Narrative 140-11946-1

#### Receipt

The samples were received on 6/29/2018 at 9:00 AM. The samples arrived in good condition, properly preserved, and on ice. The temperature of the cooler at receipt was 2.7° C.

#### Metals - Method 6010B SEP

##### 7 Step Sequential Extraction Procedure

These soil samples were prepared and analyzed using TestAmerica Knoxville standard operating procedure KNOX-MT-0008, "7 Step Sequential Extraction Procedure". SW-846 Method 6010B as incorporated in TestAmerica Knoxville standard operating procedure KNOX-MT-0007 was used to perform the final instrument analyses.

An aliquot of each sample was sequentially extracted using the steps listed below:

- Step 1 - Exchangeable Fraction: A 5 gram aliquot of sample was extracted with 25 mL of 1M magnesium sulfate (MgSO<sub>4</sub>), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
- Step 2 - Carbonate Fraction: The sample residue from step 1 was extracted with 25 mL of 1M sodium acetate/acetic acid (NaOAc/HOAc) at pH 5, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
- Step 3 - Non-crystalline Materials Fraction: The sample residue from step 2 was extracted with 25 mL of 0.2M ammonium oxalate (pH 3), centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
- Step 4 - Metal Hydroxide Fraction: The sample residue from step 3 was extracted with 25 mL of 1M hydroxylamine hydrochloride solution in 25% v/v acetic acid, centrifuged and filtered. 5 mL of the resulting leachate was digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
- Step 5 - Organic-bound Fraction: The sample residue from step 4 was extracted three times with 25 mL of 5% sodium hypochlorite (NaClO) at pH 9.5, centrifuged and filtered. The resulting leachates were combined and 5 mL were digested using method 3010A and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
- Step 6 - Acid/Sulfide Fraction: The sample residue from step 5 was extracted with 25 mL of a 3:1:2 v/v solution of HCl-HNO<sub>3</sub>-H<sub>2</sub>O, centrifuged and filtered. 5 mL of the resulting leachate was diluted to 50 mL with reagent water and analyzed by method 6010B. Results are reported in mg/kg on a dry weight basis.
- Step 7 - Residual Fraction: A 1.0 g aliquot of the sample residue from step 6 was digested using HF, HNO<sub>3</sub>, HCl and H<sub>3</sub>BO<sub>3</sub>. The digestate was analyzed by ICP using method 6010B. Results are reported in mg/kg on a dry weight basis.

In addition, a 1.0 g aliquot of the original sample was digested using HF, HNO<sub>3</sub>, HCl and H<sub>3</sub>BO<sub>3</sub>. The digestate was analyzed by ICP using method 6010B. Total metal results are reported in mg/kg on a dry weight basis.

Results were calculated using the following equation:

$$\text{Result, } \mu\text{g/g or mg/Kg, dry weight} = (C \times V \times V1 \times D) / (W \times S \times V2)$$

Where:

- C = Concentration from instrument readout,  $\mu\text{g/mL}$
- V = Final volume of digestate, mL
- D = Instrument dilution factor
- V1 = Total volume of leachate, mL
- V2 = Volume of leachate digested, mL
- W = Wet weight of sample, g
- S = Percent solids/100

A method blank, laboratory control sample and laboratory control sample duplicate were prepared and analyzed with each SEP step in order to provide information about both the presence of elements of interest in the extraction solutions, and the recovery of elements of

# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Job ID: 140-11946-1 (Continued)

### Laboratory: TestAmerica Knoxville (Continued)

interest from the extraction solutions. Results outside of laboratory QC limits do not reflect out of control performance, but rather the effect of the extraction solution upon the analyte.

A laboratory sample duplicate was prepared and analyzed with each batch of samples in order to provide information regarding the reproducibility of the procedure.

#### SEP Report Notes:

The final report lists the results for each step, the result for the total digestion of the sample, and a sum of the results of steps 1 through 7 by element.

The digestates for steps 1, 2 and 5 were analyzed at a dilution due to instrument problems caused by the high solids content of the digestates. Step 7 and Totals were analyzed at 1:10 dilutions. The reporting limits were adjusted accordingly.

The sample duplicate (DUP) precision for preparation batch 140-21891, 140-21927, 140-21939, 140-22010 and 140-22011 and analytical batch 140-22073 was outside control limits. Sample non-homogeneity is suspected.

The serial dilution performed for sample (140-11946-A-3-AA SD ^5) associated with batch 140-22173 was outside control limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Comments

No additional comments.



# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Barium	1.1	J	12	0.57	mg/Kg	4		☼	6010B SEP	Step 1
Calcium	360	J	1200	9.1	mg/Kg	4		☼	6010B SEP	Step 1
Aluminum	16	J *	36	5.7	mg/Kg	3		☼	6010B SEP	Step 2
Barium	1.3	J *	9.0	0.43	mg/Kg	3		☼	6010B SEP	Step 2
Calcium	1500	*	900	7.9	mg/Kg	3		☼	6010B SEP	Step 2
Iron	15	J *	18	10	mg/Kg	3		☼	6010B SEP	Step 2
Manganese	13		2.7	1.0	mg/Kg	3		☼	6010B SEP	Step 2
Nickel	0.25	J	7.2	0.18	mg/Kg	3		☼	6010B SEP	Step 2
Selenium	0.66	J B	1.8	0.61	mg/Kg	3		☼	6010B SEP	Step 2
Zinc	2.4	J	3.6	0.72	mg/Kg	3		☼	6010B SEP	Step 2
Aluminum	70		12	2.5	mg/Kg	1		☼	6010B SEP	Step 3
Arsenic	0.50	J	0.60	0.16	mg/Kg	1		☼	6010B SEP	Step 3
Barium	2.7	J B	3.0	0.14	mg/Kg	1		☼	6010B SEP	Step 3
Beryllium	0.024	J	0.30	0.018	mg/Kg	1		☼	6010B SEP	Step 3
Cadmium	0.045	J B *	0.30	0.013	mg/Kg	1		☼	6010B SEP	Step 3
Calcium	6.5	J B *	300	1.8	mg/Kg	1		☼	6010B SEP	Step 3
Chromium	0.51	J	0.60	0.084	mg/Kg	1		☼	6010B SEP	Step 3
Cobalt	2.4	J	3.0	0.054	mg/Kg	1		☼	6010B SEP	Step 3
Copper	1.5		1.5	0.31	mg/Kg	1		☼	6010B SEP	Step 3
Iron	390		6.0	3.5	mg/Kg	1		☼	6010B SEP	Step 3
Lead	0.93	*	0.60	0.13	mg/Kg	1		☼	6010B SEP	Step 3
Manganese	110	B	0.90	0.032	mg/Kg	1		☼	6010B SEP	Step 3
Mo	0.11	J	2.4	0.098	mg/Kg	1		☼	6010B SEP	Step 3
Nickel	1.8	J	2.4	0.10	mg/Kg	1		☼	6010B SEP	Step 3
Phosphorus	32		18	1.7	mg/Kg	1		☼	6010B SEP	Step 3
Potassium	66	J B	300	31	mg/Kg	1		☼	6010B SEP	Step 3
Vanadium	0.46	J	3.0	0.090	mg/Kg	1		☼	6010B SEP	Step 3
Zinc	2.0	B	1.2	0.12	mg/Kg	1		☼	6010B SEP	Step 3
Aluminum	900		12	1.9	mg/Kg	1		☼	6010B SEP	Step 4
Arsenic	2.8	B	0.60	0.26	mg/Kg	1		☼	6010B SEP	Step 4
Barium	5.3		3.0	0.14	mg/Kg	1		☼	6010B SEP	Step 4
Beryllium	0.085	J	0.30	0.019	mg/Kg	1		☼	6010B SEP	Step 4
Cadmium	0.13	J	0.30	0.013	mg/Kg	1		☼	6010B SEP	Step 4
Calcium	520	B	300	2.6	mg/Kg	1		☼	6010B SEP	Step 4
Chromium	2.4		0.60	0.084	mg/Kg	1		☼	6010B SEP	Step 4
Cobalt	2.3	J	3.0	0.063	mg/Kg	1		☼	6010B SEP	Step 4
Copper	4.7		1.5	0.26	mg/Kg	1		☼	6010B SEP	Step 4
Iron	4700		6.0	3.5	mg/Kg	1		☼	6010B SEP	Step 4
Lead	3.2		0.60	0.13	mg/Kg	1		☼	6010B SEP	Step 4
Li	2.0	J	3.0	0.18	mg/Kg	1		☼	6010B SEP	Step 4
Manganese	41		0.90	0.16	mg/Kg	1		☼	6010B SEP	Step 4
Mo	0.39	J	2.4	0.098	mg/Kg	1		☼	6010B SEP	Step 4
Nickel	6.0		2.4	0.047	mg/Kg	1		☼	6010B SEP	Step 4
Phosphorus	74		18	8.5	mg/Kg	1		☼	6010B SEP	Step 4
Selenium	0.96	* B	0.60	0.56	mg/Kg	1		☼	6010B SEP	Step 4
Vanadium	3.0		3.0	0.13	mg/Kg	1		☼	6010B SEP	Step 4
Zinc	15	B	1.2	0.19	mg/Kg	1		☼	6010B SEP	Step 4
Aluminum	41	J *	180	28	mg/Kg	5		☼	6010B SEP	Step 5
Calcium	95	J *	4500	13	mg/Kg	5		☼	6010B SEP	Step 5
Li	8.8	J B *	45	2.6	mg/Kg	5		☼	6010B SEP	Step 5

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60') (Continued)**

**Lab Sample ID: 140-11946-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Phosphorus	39	J*	270	37	mg/Kg	5	☼	6010B SEP	Step 5
Potassium	680	J B	4500	510	mg/Kg	5	☼	6010B SEP	Step 5
Zinc	2.4	J	18	1.7	mg/Kg	5	☼	6010B SEP	Step 5
Aluminum	990		12	1.9	mg/Kg	1	☼	6010B SEP	Step 6
Arsenic	3.0		0.60	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Barium	2.5	J	3.0	0.14	mg/Kg	1	☼	6010B SEP	Step 6
Beryllium	0.070	J	0.30	0.014	mg/Kg	1	☼	6010B SEP	Step 6
Cadmium	0.064	J	0.30	0.013	mg/Kg	1	☼	6010B SEP	Step 6
Calcium	58	J	300	2.5	mg/Kg	1	☼	6010B SEP	Step 6
Chromium	1.9		0.60	0.084	mg/Kg	1	☼	6010B SEP	Step 6
Cobalt	1.2	J	3.0	0.055	mg/Kg	1	☼	6010B SEP	Step 6
Copper	1.7		1.5	0.096	mg/Kg	1	☼	6010B SEP	Step 6
Iron	5500		6.0	3.5	mg/Kg	1	☼	6010B SEP	Step 6
Lead	1.3		0.60	0.13	mg/Kg	1	☼	6010B SEP	Step 6
Li	1.7	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Manganese	34		0.90	0.30	mg/Kg	1	☼	6010B SEP	Step 6
Mo	0.26	J	2.4	0.12	mg/Kg	1	☼	6010B SEP	Step 6
Nickel	3.0		2.4	0.063	mg/Kg	1	☼	6010B SEP	Step 6
Phosphorus	38		18	0.73	mg/Kg	1	☼	6010B SEP	Step 6
Potassium	170	J	300	31	mg/Kg	1	☼	6010B SEP	Step 6
Vanadium	3.4		3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 6
Zinc	9.3		1.2	0.12	mg/Kg	1	☼	6010B SEP	Step 6
Aluminum	19000		120	19	mg/Kg	10	☼	6010B SEP	Step 7
Antimony	0.23	J	3.6	0.17	mg/Kg	1	☼	6010B SEP	Step 7
Barium	190		30	1.4	mg/Kg	10	☼	6010B SEP	Step 7
Beryllium	0.36		0.30	0.0090	mg/Kg	1	☼	6010B SEP	Step 7
Calcium	2600	J	3000	8.8	mg/Kg	10	☼	6010B SEP	Step 7
Chromium	7.3		0.60	0.084	mg/Kg	1	☼	6010B SEP	Step 7
Cobalt	0.36	J	3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Copper	0.84	J	1.5	0.096	mg/Kg	1	☼	6010B SEP	Step 7
Iron	2500		6.0	4.9	mg/Kg	1	☼	6010B SEP	Step 7
Lead	2.6		0.60	0.13	mg/Kg	1	☼	6010B SEP	Step 7
Li	6.3		3.0	0.18	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	35		0.90	0.062	mg/Kg	1	☼	6010B SEP	Step 7
Nickel	1.3	J	2.4	0.033	mg/Kg	1	☼	6010B SEP	Step 7
Phosphorus	23	B	18	0.16	mg/Kg	1	☼	6010B SEP	Step 7
Potassium	7100		300	31	mg/Kg	1	☼	6010B SEP	Step 7
Selenium	0.51	J	0.60	0.20	mg/Kg	1	☼	6010B SEP	Step 7
Silver	0.13	J	1.2	0.068	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.53	J	2.1	0.21	mg/Kg	1	☼	6010B SEP	Step 7
Vanadium	13		3.0	0.067	mg/Kg	1	☼	6010B SEP	Step 7
Zinc	4.6	J	12	1.2	mg/Kg	10	☼	6010B SEP	Step 7
Aluminum	21000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Antimony	0.23	J	3.0	0.14	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	6.3		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Barium	210		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.54		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60') (Continued)**

**Lab Sample ID: 140-11946-3**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Cadmium	0.23	J	0.25	0.011	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Calcium	5200		250	0.74	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Chromium	12		0.50	0.070	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Cobalt	6.2		2.5	0.023	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Copper	8.8		1.3	0.080	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Iron	13000		5.0	4.1	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Lead	8.0		0.50	0.11	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Li	19		2.5	0.15	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Manganese	230		0.75	0.052	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Mo	0.75	J	2.0	0.082	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Nickel	12		2.0	0.028	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Phosphorus	210		15	0.13	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Potassium	8000		250	26	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Selenium	2.1		0.50	0.17	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Silver	0.13	J	1.0	0.057	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Thallium	0.53	J	1.8	0.18	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Vanadium	20		2.5	0.056	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Zinc	36		1.0	0.10	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Aluminum	26000		120	19	mg/Kg	10	✳		6010B	Total/NA
Arsenic	6.8		0.60	0.16	mg/Kg	1	✳		6010B	Total/NA
Barium	260		30	1.4	mg/Kg	10	✳		6010B	Total/NA
Beryllium	0.54		0.30	0.0090	mg/Kg	1	✳		6010B	Total/NA
Cadmium	0.11	J	0.30	0.013	mg/Kg	1	✳		6010B	Total/NA
Calcium	5700		3000	8.8	mg/Kg	10	✳		6010B	Total/NA
Chromium	12		0.60	0.084	mg/Kg	1	✳		6010B	Total/NA
Cobalt	5.9		3.0	0.18	mg/Kg	1	✳		6010B	Total/NA
Copper	9.0		1.5	0.096	mg/Kg	1	✳		6010B	Total/NA
Iron	13000		6.0	4.9	mg/Kg	1	✳		6010B	Total/NA
Lead	8.0		0.60	0.13	mg/Kg	1	✳		6010B	Total/NA
Lithium	9.7		3.0	0.18	mg/Kg	1	✳		6010B	Total/NA
Manganese	210	B	0.90	0.062	mg/Kg	1	✳		6010B	Total/NA
Molybdenum	0.92	J	2.4	0.098	mg/Kg	1	✳		6010B	Total/NA
Nickel	12	B	2.4	0.033	mg/Kg	1	✳		6010B	Total/NA
Phosphorus	190	B	18	0.16	mg/Kg	1	✳		6010B	Total/NA
Potassium	8200		300	31	mg/Kg	1	✳		6010B	Total/NA
Silver	0.15	J*	1.2	0.068	mg/Kg	1	✳		6010B	Total/NA
Thallium	0.89	J	2.1	0.21	mg/Kg	1	✳		6010B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Client Sample ID: SB-1805 (50-60') (Continued)

## Lab Sample ID: 140-11946-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vanadium	20		3.0	0.067	mg/Kg	1	☼	6010B	Total/NA
Zinc	35		12	1.2	mg/Kg	10	☼	6010B	Total/NA

## Client Sample ID: SB-1805 (66-78')

## Lab Sample ID: 140-11946-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	360	J	1100	8.7	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	5.0		3.4	0.14	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	14	J *	34	5.5	mg/Kg	3	☼	6010B SEP	Step 2
Barium	0.53	J *	8.6	0.41	mg/Kg	3	☼	6010B SEP	Step 2
Calcium	9100	*	860	7.5	mg/Kg	3	☼	6010B SEP	Step 2
Copper	1.7	J	4.3	0.55	mg/Kg	3	☼	6010B SEP	Step 2
Iron	58	*	17	9.9	mg/Kg	3	☼	6010B SEP	Step 2
Lead	0.54	J	1.7	0.38	mg/Kg	3	☼	6010B SEP	Step 2
Manganese	140		2.6	0.96	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	28		11	2.4	mg/Kg	1	☼	6010B SEP	Step 3
Barium	0.85	J B	2.9	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Calcium	6.7	J B *	290	1.7	mg/Kg	1	☼	6010B SEP	Step 3
Chromium	0.58		0.57	0.080	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	0.23	J	2.9	0.051	mg/Kg	1	☼	6010B SEP	Step 3
Copper	1.3	J	1.4	0.30	mg/Kg	1	☼	6010B SEP	Step 3
Iron	170		5.7	3.3	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	32	B	0.86	0.031	mg/Kg	1	☼	6010B SEP	Step 3
Mo	0.099	J	2.3	0.094	mg/Kg	1	☼	6010B SEP	Step 3
Nickel	0.36	J	2.3	0.096	mg/Kg	1	☼	6010B SEP	Step 3
Phosphorus	24		17	1.6	mg/Kg	1	☼	6010B SEP	Step 3
Potassium	64	J B	290	30	mg/Kg	1	☼	6010B SEP	Step 3
Selenium	0.20	J	0.57	0.19	mg/Kg	1	☼	6010B SEP	Step 3
Vanadium	0.22	J	2.9	0.086	mg/Kg	1	☼	6010B SEP	Step 3
Zinc	0.51	J B	1.1	0.11	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	790		11	1.8	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	1.7	B	0.57	0.25	mg/Kg	1	☼	6010B SEP	Step 4
Barium	3.4		2.9	0.14	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.074	J	0.29	0.018	mg/Kg	1	☼	6010B SEP	Step 4
Cadmium	0.11	J	0.29	0.013	mg/Kg	1	☼	6010B SEP	Step 4
Calcium	3300	B	290	2.5	mg/Kg	1	☼	6010B SEP	Step 4
Chromium	2.0		0.57	0.080	mg/Kg	1	☼	6010B SEP	Step 4
Cobalt	4.7		2.9	0.060	mg/Kg	1	☼	6010B SEP	Step 4
Copper	2.5		1.4	0.25	mg/Kg	1	☼	6010B SEP	Step 4
Iron	3500		5.7	3.3	mg/Kg	1	☼	6010B SEP	Step 4
Lead	2.4		0.57	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Li	2.1	J	2.9	0.17	mg/Kg	1	☼	6010B SEP	Step 4
Manganese	100		0.86	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Mo	0.17	J	2.3	0.094	mg/Kg	1	☼	6010B SEP	Step 4
Nickel	7.1		2.3	0.045	mg/Kg	1	☼	6010B SEP	Step 4
Phosphorus	56		17	8.1	mg/Kg	1	☼	6010B SEP	Step 4
Selenium	1.3	* B	0.57	0.54	mg/Kg	1	☼	6010B SEP	Step 4
Vanadium	2.1	J	2.9	0.13	mg/Kg	1	☼	6010B SEP	Step 4
Zinc	9.1	B	1.1	0.18	mg/Kg	1	☼	6010B SEP	Step 4
Calcium	3100	J *	4300	13	mg/Kg	5	☼	6010B SEP	Step 5

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (66-78') (Continued)**

**Lab Sample ID: 140-11946-5**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Copper	1.4	J	21	1.4	mg/Kg	5	✳	6010B	SEP	Step 5
Li	8.7	J B *	43	2.5	mg/Kg	5	✳	6010B	SEP	Step 5
Manganese	7.4	J *	13	2.1	mg/Kg	5	✳	6010B	SEP	Step 5
Nickel	1.4	J	34	1.0	mg/Kg	5	✳	6010B	SEP	Step 5
Potassium	650	J B	4300	490	mg/Kg	5	✳	6010B	SEP	Step 5
Zinc	2.2	J	17	1.7	mg/Kg	5	✳	6010B	SEP	Step 5
Aluminum	1400		11	1.8	mg/Kg	1	✳	6010B	SEP	Step 6
Arsenic	3.7		0.57	0.17	mg/Kg	1	✳	6010B	SEP	Step 6
Barium	2.6	J	2.9	0.14	mg/Kg	1	✳	6010B	SEP	Step 6
Beryllium	0.12	J	0.29	0.014	mg/Kg	1	✳	6010B	SEP	Step 6
Cadmium	0.11	J	0.29	0.013	mg/Kg	1	✳	6010B	SEP	Step 6
Calcium	960		290	2.4	mg/Kg	1	✳	6010B	SEP	Step 6
Chromium	2.8		0.57	0.080	mg/Kg	1	✳	6010B	SEP	Step 6
Cobalt	2.6	J	2.9	0.052	mg/Kg	1	✳	6010B	SEP	Step 6
Copper	3.4		1.4	0.091	mg/Kg	1	✳	6010B	SEP	Step 6
Iron	8400		5.7	3.3	mg/Kg	1	✳	6010B	SEP	Step 6
Lead	2.4		0.57	0.13	mg/Kg	1	✳	6010B	SEP	Step 6
Li	3.0		2.9	0.17	mg/Kg	1	✳	6010B	SEP	Step 6
Manganese	62		0.86	0.29	mg/Kg	1	✳	6010B	SEP	Step 6
Mo	0.19	J	2.3	0.11	mg/Kg	1	✳	6010B	SEP	Step 6
Nickel	4.8		2.3	0.060	mg/Kg	1	✳	6010B	SEP	Step 6
Phosphorus	130		17	0.70	mg/Kg	1	✳	6010B	SEP	Step 6
Potassium	150	J	290	30	mg/Kg	1	✳	6010B	SEP	Step 6
Vanadium	3.8		2.9	0.17	mg/Kg	1	✳	6010B	SEP	Step 6
Zinc	12		1.1	0.11	mg/Kg	1	✳	6010B	SEP	Step 6
Aluminum	17000		110	18	mg/Kg	10	✳	6010B	SEP	Step 7
Arsenic	0.65	B	0.57	0.15	mg/Kg	1	✳	6010B	SEP	Step 7
Barium	170		29	1.4	mg/Kg	10	✳	6010B	SEP	Step 7
Beryllium	0.27	J	0.29	0.0086	mg/Kg	1	✳	6010B	SEP	Step 7
Calcium	1800	J	2900	8.4	mg/Kg	10	✳	6010B	SEP	Step 7
Chromium	7.5		0.57	0.080	mg/Kg	1	✳	6010B	SEP	Step 7
Cobalt	0.41	J	2.9	0.17	mg/Kg	1	✳	6010B	SEP	Step 7
Copper	1.1	J	1.4	0.091	mg/Kg	1	✳	6010B	SEP	Step 7
Iron	2800		5.7	4.7	mg/Kg	1	✳	6010B	SEP	Step 7
Lead	2.6		0.57	0.13	mg/Kg	1	✳	6010B	SEP	Step 7
Li	6.8		2.9	0.17	mg/Kg	1	✳	6010B	SEP	Step 7
Manganese	33		0.86	0.059	mg/Kg	1	✳	6010B	SEP	Step 7
Nickel	1.3	J	2.3	0.032	mg/Kg	1	✳	6010B	SEP	Step 7
Phosphorus	30	B	17	0.15	mg/Kg	1	✳	6010B	SEP	Step 7
Potassium	6800		290	30	mg/Kg	1	✳	6010B	SEP	Step 7
Silver	0.12	J	1.1	0.065	mg/Kg	1	✳	6010B	SEP	Step 7
Thallium	0.48	J	2.0	0.21	mg/Kg	1	✳	6010B	SEP	Step 7
Vanadium	11		2.9	0.064	mg/Kg	1	✳	6010B	SEP	Step 7
Zinc	4.0	J	11	1.1	mg/Kg	10	✳	6010B	SEP	Step 7
Aluminum	20000		10	1.6	mg/Kg	1		6010B	SEP	Sum of Steps 1-7
Arsenic	6.1		0.50	0.13	mg/Kg	1		6010B	SEP	Sum of Steps 1-7
Barium	180		2.5	0.12	mg/Kg	1		6010B	SEP	Sum of Steps 1-7

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (66-78') (Continued)**

**Lab Sample ID: 140-11946-5**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Beryllium	0.47		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cadmium	0.22	J	0.25	0.011	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Calcium	19000		250	0.74	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	13		0.50	0.070	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	7.9		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Copper	11		1.3	0.080	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	15000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	7.9		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	21		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	380		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.46	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Nickel	15		2.0	0.028	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Phosphorus	240		15	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Potassium	7700		250	26	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	1.5		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Silver	0.12	J	1.0	0.057	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.48	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Vanadium	18		2.5	0.056	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Zinc	27		1.0	0.10	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	30000		110	18	mg/Kg	10	✳	6010B	Total/NA
Arsenic	15		0.57	0.15	mg/Kg	1	✳	6010B	Total/NA
Barium	230		29	1.4	mg/Kg	10	✳	6010B	Total/NA
Beryllium	0.46		0.29	0.0086	mg/Kg	1	✳	6010B	Total/NA
Cadmium	0.20	J	0.29	0.013	mg/Kg	1	✳	6010B	Total/NA
Calcium	26000		2900	8.4	mg/Kg	10	✳	6010B	Total/NA
Chromium	13		0.57	0.080	mg/Kg	1	✳	6010B	Total/NA
Cobalt	8.5		2.9	0.17	mg/Kg	1	✳	6010B	Total/NA
Copper	12		1.4	0.091	mg/Kg	1	✳	6010B	Total/NA
Iron	14000		5.7	4.7	mg/Kg	1	✳	6010B	Total/NA
Lead	9.6		0.57	0.13	mg/Kg	1	✳	6010B	Total/NA
Lithium	12		2.9	0.17	mg/Kg	1	✳	6010B	Total/NA
Manganese	330	B	0.86	0.059	mg/Kg	1	✳	6010B	Total/NA
Molybdenum	1.0	J	2.3	0.094	mg/Kg	1	✳	6010B	Total/NA
Nickel	14	B	2.3	0.032	mg/Kg	1	✳	6010B	Total/NA
Phosphorus	280	B	17	0.15	mg/Kg	1	✳	6010B	Total/NA
Potassium	9100		290	30	mg/Kg	1	✳	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville



# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Client Sample ID: SB-1805 (66-78') (Continued)

## Lab Sample ID: 140-11946-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Selenium	0.23	J	0.57	0.19	mg/Kg	1		☼	6010B	Total/NA
Silver	0.18	J *	1.1	0.065	mg/Kg	1		☼	6010B	Total/NA
Thallium	0.84	J	2.0	0.21	mg/Kg	1		☼	6010B	Total/NA
Vanadium	18		2.9	0.064	mg/Kg	1		☼	6010B	Total/NA
Zinc	30		11	1.1	mg/Kg	10		☼	6010B	Total/NA

## Client Sample ID: SB-1806 (46-60')

## Lab Sample ID: 140-11946-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Barium	1.0	J	11	0.54	mg/Kg	4		☼	6010B SEP	Step 1
Calcium	430	J	1100	8.6	mg/Kg	4		☼	6010B SEP	Step 1
Manganese	0.16	J	3.4	0.14	mg/Kg	4		☼	6010B SEP	Step 1
Aluminum	10	J *	34	5.4	mg/Kg	3		☼	6010B SEP	Step 2
Barium	2.3	J *	8.5	0.41	mg/Kg	3		☼	6010B SEP	Step 2
Calcium	7000	*	850	7.4	mg/Kg	3		☼	6010B SEP	Step 2
Cobalt	0.21	J	8.5	0.21	mg/Kg	3		☼	6010B SEP	Step 2
Iron	31	*	17	9.8	mg/Kg	3		☼	6010B SEP	Step 2
Manganese	55		2.5	0.95	mg/Kg	3		☼	6010B SEP	Step 2
Nickel	0.35	J	6.8	0.17	mg/Kg	3		☼	6010B SEP	Step 2
Selenium	1.3	J B	1.7	0.58	mg/Kg	3		☼	6010B SEP	Step 2
Zinc	0.80	J	3.4	0.68	mg/Kg	3		☼	6010B SEP	Step 2
Aluminum	46		11	2.4	mg/Kg	1		☼	6010B SEP	Step 3
Arsenic	0.42	J	0.56	0.15	mg/Kg	1		☼	6010B SEP	Step 3
Barium	1.8	J B	2.8	0.14	mg/Kg	1		☼	6010B SEP	Step 3
Cadmium	0.019	J B *	0.28	0.012	mg/Kg	1		☼	6010B SEP	Step 3
Calcium	6.6	J B *	280	1.7	mg/Kg	1		☼	6010B SEP	Step 3
Chromium	0.46	J	0.56	0.079	mg/Kg	1		☼	6010B SEP	Step 3
Cobalt	2.0	J	2.8	0.051	mg/Kg	1		☼	6010B SEP	Step 3
Copper	1.2	J	1.4	0.29	mg/Kg	1		☼	6010B SEP	Step 3
Iron	250		5.6	3.3	mg/Kg	1		☼	6010B SEP	Step 3
Lead	0.27	J *	0.56	0.12	mg/Kg	1		☼	6010B SEP	Step 3
Manganese	170	B	0.85	0.030	mg/Kg	1		☼	6010B SEP	Step 3
Mo	0.33	J	2.3	0.093	mg/Kg	1		☼	6010B SEP	Step 3
Nickel	2.5		2.3	0.095	mg/Kg	1		☼	6010B SEP	Step 3
Phosphorus	27		17	1.6	mg/Kg	1		☼	6010B SEP	Step 3
Potassium	62	J B	280	29	mg/Kg	1		☼	6010B SEP	Step 3
Vanadium	0.32	J	2.8	0.085	mg/Kg	1		☼	6010B SEP	Step 3
Zinc	0.81	J B	1.1	0.11	mg/Kg	1		☼	6010B SEP	Step 3
Aluminum	870		11	1.8	mg/Kg	1		☼	6010B SEP	Step 4
Arsenic	2.9	B	0.56	0.25	mg/Kg	1		☼	6010B SEP	Step 4
Barium	5.8		2.8	0.14	mg/Kg	1		☼	6010B SEP	Step 4
Beryllium	0.077	J	0.28	0.018	mg/Kg	1		☼	6010B SEP	Step 4
Cadmium	0.13	J	0.28	0.012	mg/Kg	1		☼	6010B SEP	Step 4
Calcium	1900	B	280	2.5	mg/Kg	1		☼	6010B SEP	Step 4
Chromium	2.1		0.56	0.079	mg/Kg	1		☼	6010B SEP	Step 4
Cobalt	3.2		2.8	0.060	mg/Kg	1		☼	6010B SEP	Step 4
Copper	5.0		1.4	0.25	mg/Kg	1		☼	6010B SEP	Step 4
Iron	4200		5.6	3.3	mg/Kg	1		☼	6010B SEP	Step 4
Lead	2.8		0.56	0.12	mg/Kg	1		☼	6010B SEP	Step 4
Li	2.3	J	2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 4

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (46-60') (Continued)**

**Lab Sample ID: 140-11946-6**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Manganese	73		0.85	0.15	mg/Kg	1		☼	6010B SEP	Step 4
Mo	0.48	J	2.3	0.093	mg/Kg	1		☼	6010B SEP	Step 4
Nickel	6.8		2.3	0.044	mg/Kg	1		☼	6010B SEP	Step 4
Phosphorus	85		17	8.0	mg/Kg	1		☼	6010B SEP	Step 4
Selenium	1.5	* B	0.56	0.53	mg/Kg	1		☼	6010B SEP	Step 4
Vanadium	2.6	J	2.8	0.12	mg/Kg	1		☼	6010B SEP	Step 4
Zinc	12	B	1.1	0.18	mg/Kg	1		☼	6010B SEP	Step 4
Aluminum	38	J *	170	27	mg/Kg	5		☼	6010B SEP	Step 5
Calcium	1100	J *	4200	12	mg/Kg	5		☼	6010B SEP	Step 5
Li	7.5	J B *	42	2.5	mg/Kg	5		☼	6010B SEP	Step 5
Manganese	3.9	J *	13	2.1	mg/Kg	5		☼	6010B SEP	Step 5
Potassium	630	J B	4200	480	mg/Kg	5		☼	6010B SEP	Step 5
Zinc	2.1	J	17	1.6	mg/Kg	5		☼	6010B SEP	Step 5
Aluminum	1300		11	1.8	mg/Kg	1		☼	6010B SEP	Step 6
Arsenic	5.5		0.56	0.17	mg/Kg	1		☼	6010B SEP	Step 6
Barium	2.4	J	2.8	0.14	mg/Kg	1		☼	6010B SEP	Step 6
Beryllium	0.097	J	0.28	0.014	mg/Kg	1		☼	6010B SEP	Step 6
Cadmium	0.10	J	0.28	0.012	mg/Kg	1		☼	6010B SEP	Step 6
Calcium	320		280	2.4	mg/Kg	1		☼	6010B SEP	Step 6
Chromium	2.4		0.56	0.079	mg/Kg	1		☼	6010B SEP	Step 6
Cobalt	2.0	J	2.8	0.052	mg/Kg	1		☼	6010B SEP	Step 6
Copper	2.5		1.4	0.090	mg/Kg	1		☼	6010B SEP	Step 6
Iron	7700		5.6	3.3	mg/Kg	1		☼	6010B SEP	Step 6
Lead	1.9		0.56	0.12	mg/Kg	1		☼	6010B SEP	Step 6
Li	2.5	J	2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 6
Manganese	51		0.85	0.28	mg/Kg	1		☼	6010B SEP	Step 6
Mo	0.33	J	2.3	0.11	mg/Kg	1		☼	6010B SEP	Step 6
Nickel	4.4		2.3	0.060	mg/Kg	1		☼	6010B SEP	Step 6
Phosphorus	120		17	0.69	mg/Kg	1		☼	6010B SEP	Step 6
Potassium	150	J	280	29	mg/Kg	1		☼	6010B SEP	Step 6
Vanadium	4.3		2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 6
Zinc	13		1.1	0.11	mg/Kg	1		☼	6010B SEP	Step 6
Aluminum	27000		110	18	mg/Kg	10		☼	6010B SEP	Step 7
Antimony	0.20	J	3.4	0.16	mg/Kg	1		☼	6010B SEP	Step 7
Arsenic	0.61	B	0.56	0.15	mg/Kg	1		☼	6010B SEP	Step 7
Barium	290		28	1.4	mg/Kg	10		☼	6010B SEP	Step 7
Beryllium	0.49		0.28	0.0085	mg/Kg	1		☼	6010B SEP	Step 7
Calcium	3000		2800	8.4	mg/Kg	10		☼	6010B SEP	Step 7
Chromium	9.4		0.56	0.079	mg/Kg	1		☼	6010B SEP	Step 7
Cobalt	0.67	J	2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 7
Copper	1.1	J	1.4	0.090	mg/Kg	1		☼	6010B SEP	Step 7
Iron	3300		5.6	4.6	mg/Kg	1		☼	6010B SEP	Step 7
Lead	3.6		0.56	0.12	mg/Kg	1		☼	6010B SEP	Step 7
Li	6.9		2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 7
Manganese	45		0.85	0.059	mg/Kg	1		☼	6010B SEP	Step 7
Nickel	2.4		2.3	0.032	mg/Kg	1		☼	6010B SEP	Step 7
Phosphorus	41	B	17	0.15	mg/Kg	1		☼	6010B SEP	Step 7
Potassium	10000		280	29	mg/Kg	1		☼	6010B SEP	Step 7
Silver	0.17	J	1.1	0.064	mg/Kg	1		☼	6010B SEP	Step 7
Thallium	0.79	J	2.0	0.20	mg/Kg	1		☼	6010B SEP	Step 7

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville



# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (46-60') (Continued)**

**Lab Sample ID: 140-11946-6**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Vanadium	15		2.8	0.063	mg/Kg	1		☼	6010B SEP	Step 7
Zinc	5.6	J	11	1.1	mg/Kg	10		☼	6010B SEP	Step 7
Aluminum	29000		10	1.6	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Antimony	0.20	J	3.0	0.14	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Arsenic	9.5		0.50	0.13	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Barium	300		2.5	0.12	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Beryllium	0.66		0.25	0.0075	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Cadmium	0.25		0.25	0.011	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Calcium	14000		250	0.74	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Chromium	14		0.50	0.070	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Cobalt	8.1		2.5	0.023	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Copper	9.7		1.3	0.080	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Iron	16000		5.0	4.1	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Lead	8.6		0.50	0.11	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Li	19		2.5	0.15	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Manganese	390		0.75	0.052	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Mo	1.1	J	2.0	0.082	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Nickel	16		2.0	0.028	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Phosphorus	270		15	0.13	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Potassium	11000		250	26	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Selenium	2.8		0.50	0.17	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Silver	0.17	J	1.0	0.057	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Thallium	0.79	J	1.8	0.18	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Vanadium	23		2.5	0.056	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Zinc	34		1.0	0.10	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Aluminum	22000		110	18	mg/Kg	10		☼	6010B	Total/NA
Antimony	0.52	J	3.4	0.16	mg/Kg	1		☼	6010B	Total/NA
Arsenic	25		0.56	0.15	mg/Kg	1		☼	6010B	Total/NA
Barium	250		28	1.4	mg/Kg	10		☼	6010B	Total/NA
Beryllium	0.58		0.28	0.0085	mg/Kg	1		☼	6010B	Total/NA
Cadmium	1.0		0.28	0.012	mg/Kg	1		☼	6010B	Total/NA
Calcium	15000		2800	8.4	mg/Kg	10		☼	6010B	Total/NA
Chromium	11		0.56	0.079	mg/Kg	1		☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Client Sample ID: SB-1806 (46-60') (Continued)

## Lab Sample ID: 140-11946-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Cobalt	16		2.8	0.17	mg/Kg	1	☼	6010B	Total/NA
Copper	12		1.4	0.090	mg/Kg	1	☼	6010B	Total/NA
Iron	34000		5.6	4.6	mg/Kg	1	☼	6010B	Total/NA
Lead	9.1		0.56	0.12	mg/Kg	1	☼	6010B	Total/NA
Lithium	10		2.8	0.17	mg/Kg	1	☼	6010B	Total/NA
Manganese	760	B	0.85	0.059	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	7.0		2.3	0.093	mg/Kg	1	☼	6010B	Total/NA
Nickel	27	B	2.3	0.032	mg/Kg	1	☼	6010B	Total/NA
Phosphorus	430	B	17	0.15	mg/Kg	1	☼	6010B	Total/NA
Potassium	7600		280	29	mg/Kg	1	☼	6010B	Total/NA
Silver	0.18	J *	1.1	0.064	mg/Kg	1	☼	6010B	Total/NA
Thallium	0.86	J	2.0	0.20	mg/Kg	1	☼	6010B	Total/NA
Vanadium	24		2.8	0.063	mg/Kg	1	☼	6010B	Total/NA
Zinc	64		11	1.1	mg/Kg	10	☼	6010B	Total/NA

## Client Sample ID: SB-1806 (70-76')

## Lab Sample ID: 140-11946-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	360	J	1100	8.6	mg/Kg	4	☼	6010B SEP	Step 1
Manganese	4.7		3.4	0.14	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	11	J *	34	5.4	mg/Kg	3	☼	6010B SEP	Step 2
Barium	0.63	J *	8.5	0.41	mg/Kg	3	☼	6010B SEP	Step 2
Calcium	10000	*	850	7.5	mg/Kg	3	☼	6010B SEP	Step 2
Copper	0.83	J	4.3	0.54	mg/Kg	3	☼	6010B SEP	Step 2
Iron	63	*	17	9.9	mg/Kg	3	☼	6010B SEP	Step 2
Lead	0.46	J	1.7	0.37	mg/Kg	3	☼	6010B SEP	Step 2
Manganese	80		2.6	0.95	mg/Kg	3	☼	6010B SEP	Step 2
Selenium	0.65	J B	1.7	0.58	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	26		11	2.4	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.18	J	0.57	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Barium	0.34	J B	2.8	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Calcium	6.6	J B *	280	1.7	mg/Kg	1	☼	6010B SEP	Step 3
Chromium	0.62		0.57	0.079	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	0.28	J	2.8	0.051	mg/Kg	1	☼	6010B SEP	Step 3
Copper	1.2	J	1.4	0.29	mg/Kg	1	☼	6010B SEP	Step 3
Iron	220		5.7	3.3	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	20	B	0.85	0.031	mg/Kg	1	☼	6010B SEP	Step 3
Mo	0.14	J	2.3	0.093	mg/Kg	1	☼	6010B SEP	Step 3
Nickel	0.35	J	2.3	0.095	mg/Kg	1	☼	6010B SEP	Step 3
Phosphorus	23		17	1.6	mg/Kg	1	☼	6010B SEP	Step 3
Potassium	62	J B	280	29	mg/Kg	1	☼	6010B SEP	Step 3
Vanadium	0.18	J	2.8	0.085	mg/Kg	1	☼	6010B SEP	Step 3
Zinc	0.49	J B	1.1	0.11	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	750		11	1.8	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	1.6	B	0.57	0.25	mg/Kg	1	☼	6010B SEP	Step 4
Barium	2.7	J	2.8	0.14	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.061	J	0.28	0.018	mg/Kg	1	☼	6010B SEP	Step 4
Cadmium	0.11	J	0.28	0.012	mg/Kg	1	☼	6010B SEP	Step 4
Calcium	3400	B	280	2.5	mg/Kg	1	☼	6010B SEP	Step 4
Chromium	1.6		0.57	0.079	mg/Kg	1	☼	6010B SEP	Step 4

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (70-76') (Continued)**

**Lab Sample ID: 140-11946-8**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Cobalt	4.9		2.8	0.060	mg/Kg	1		☼	6010B SEP	Step 4
Copper	4.0		1.4	0.25	mg/Kg	1		☼	6010B SEP	Step 4
Iron	3400		5.7	3.3	mg/Kg	1		☼	6010B SEP	Step 4
Lead	2.5		0.57	0.12	mg/Kg	1		☼	6010B SEP	Step 4
Li	2.2	J	2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 4
Manganese	65		0.85	0.15	mg/Kg	1		☼	6010B SEP	Step 4
Mo	0.17	J	2.3	0.093	mg/Kg	1		☼	6010B SEP	Step 4
Nickel	6.8		2.3	0.044	mg/Kg	1		☼	6010B SEP	Step 4
Phosphorus	86		17	8.1	mg/Kg	1		☼	6010B SEP	Step 4
Selenium	0.83	* B	0.57	0.53	mg/Kg	1		☼	6010B SEP	Step 4
Vanadium	2.0	J	2.8	0.12	mg/Kg	1		☼	6010B SEP	Step 4
Zinc	9.0	B	1.1	0.18	mg/Kg	1		☼	6010B SEP	Step 4
Aluminum	39	J *	170	27	mg/Kg	5		☼	6010B SEP	Step 5
Calcium	2900	J *	4300	12	mg/Kg	5		☼	6010B SEP	Step 5
Li	7.0	J B *	43	2.5	mg/Kg	5		☼	6010B SEP	Step 5
Manganese	3.1	J *	13	2.1	mg/Kg	5		☼	6010B SEP	Step 5
Potassium	620	J B	4300	480	mg/Kg	5		☼	6010B SEP	Step 5
Zinc	1.9	J	17	1.6	mg/Kg	5		☼	6010B SEP	Step 5
Aluminum	1300		11	1.8	mg/Kg	1		☼	6010B SEP	Step 6
Arsenic	4.7		0.57	0.17	mg/Kg	1		☼	6010B SEP	Step 6
Barium	2.7	J	2.8	0.14	mg/Kg	1		☼	6010B SEP	Step 6
Beryllium	0.10	J	0.28	0.014	mg/Kg	1		☼	6010B SEP	Step 6
Cadmium	0.10	J	0.28	0.012	mg/Kg	1		☼	6010B SEP	Step 6
Calcium	960		280	2.4	mg/Kg	1		☼	6010B SEP	Step 6
Chromium	2.5		0.57	0.079	mg/Kg	1		☼	6010B SEP	Step 6
Cobalt	2.5	J	2.8	0.052	mg/Kg	1		☼	6010B SEP	Step 6
Copper	3.2		1.4	0.091	mg/Kg	1		☼	6010B SEP	Step 6
Iron	7400		5.7	3.3	mg/Kg	1		☼	6010B SEP	Step 6
Lead	2.5		0.57	0.12	mg/Kg	1		☼	6010B SEP	Step 6
Li	2.9		2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 6
Manganese	59		0.85	0.28	mg/Kg	1		☼	6010B SEP	Step 6
Mo	0.34	J	2.3	0.11	mg/Kg	1		☼	6010B SEP	Step 6
Nickel	4.6		2.3	0.060	mg/Kg	1		☼	6010B SEP	Step 6
Phosphorus	190		17	0.69	mg/Kg	1		☼	6010B SEP	Step 6
Potassium	140	J	280	29	mg/Kg	1		☼	6010B SEP	Step 6
Vanadium	3.9		2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 6
Zinc	11		1.1	0.11	mg/Kg	1		☼	6010B SEP	Step 6
Aluminum	17000		110	18	mg/Kg	10		☼	6010B SEP	Step 7
Arsenic	0.22	J B	0.57	0.15	mg/Kg	1		☼	6010B SEP	Step 7
Barium	200		28	1.4	mg/Kg	10		☼	6010B SEP	Step 7
Beryllium	0.25	J	0.28	0.0085	mg/Kg	1		☼	6010B SEP	Step 7
Calcium	3100		2800	8.4	mg/Kg	10		☼	6010B SEP	Step 7
Chromium	6.2		0.57	0.079	mg/Kg	1		☼	6010B SEP	Step 7
Cobalt	0.33	J	2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 7
Copper	0.87	J	1.4	0.091	mg/Kg	1		☼	6010B SEP	Step 7
Iron	1700		5.7	4.7	mg/Kg	1		☼	6010B SEP	Step 7
Lead	2.0		0.57	0.12	mg/Kg	1		☼	6010B SEP	Step 7
Li	6.7		2.8	0.17	mg/Kg	1		☼	6010B SEP	Step 7
Manganese	39		0.85	0.059	mg/Kg	1		☼	6010B SEP	Step 7
Nickel	1.2	J	2.3	0.032	mg/Kg	1		☼	6010B SEP	Step 7

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (70-76') (Continued)**

**Lab Sample ID: 140-11946-8**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Phosphorus	25	B	17	0.15	mg/Kg	1		☼	6010B SEP	Step 7
Potassium	7300		280	29	mg/Kg	1		☼	6010B SEP	Step 7
Selenium	0.35	J	0.57	0.19	mg/Kg	1		☼	6010B SEP	Step 7
Silver	0.11	J	1.1	0.065	mg/Kg	1		☼	6010B SEP	Step 7
Thallium	0.63	J	2.0	0.20	mg/Kg	1		☼	6010B SEP	Step 7
Vanadium	9.0		2.8	0.064	mg/Kg	1		☼	6010B SEP	Step 7
Zinc	3.5	J	11	1.1	mg/Kg	10		☼	6010B SEP	Step 7
Aluminum	19000		10	1.6	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Arsenic	6.7		0.50	0.13	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Barium	210		2.5	0.12	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Beryllium	0.41		0.25	0.0075	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Cadmium	0.22	J	0.25	0.011	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Calcium	21000		250	0.74	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Chromium	11		0.50	0.070	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Cobalt	7.9		2.5	0.023	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Copper	10		1.3	0.080	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Iron	13000		5.0	4.1	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Lead	7.5		0.50	0.11	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Li	19		2.5	0.15	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Manganese	270		0.75	0.052	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Mo	0.65	J	2.0	0.082	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Nickel	13		2.0	0.028	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Phosphorus	330		15	0.13	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Potassium	8100		250	26	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Selenium	1.8		0.50	0.17	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Silver	0.11	J	1.0	0.057	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Thallium	0.63	J	1.8	0.18	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Vanadium	15		2.5	0.056	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Zinc	26		1.0	0.10	mg/Kg	1			6010B SEP	Sum of Steps 1-7
Aluminum	29000		110	18	mg/Kg	10		☼	6010B	Total/NA
Arsenic	4.4		0.57	0.15	mg/Kg	1		☼	6010B	Total/NA
Barium	170		28	1.4	mg/Kg	10		☼	6010B	Total/NA
Beryllium	0.38		0.28	0.0085	mg/Kg	1		☼	6010B	Total/NA
Cadmium	0.16	J	0.28	0.012	mg/Kg	1		☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Client Sample ID: SB-1806 (70-76') (Continued)

## Lab Sample ID: 140-11946-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	46000		2800	8.4	mg/Kg	10	☼	6010B	Total/NA
Chromium	14		0.57	0.079	mg/Kg	1	☼	6010B	Total/NA
Cobalt	8.4		2.8	0.17	mg/Kg	1	☼	6010B	Total/NA
Copper	10		1.4	0.091	mg/Kg	1	☼	6010B	Total/NA
Iron	13000		5.7	4.7	mg/Kg	1	☼	6010B	Total/NA
Lead	6.0		0.57	0.12	mg/Kg	1	☼	6010B	Total/NA
Lithium	12		2.8	0.17	mg/Kg	1	☼	6010B	Total/NA
Manganese	670	B	0.85	0.059	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	0.69	J	2.3	0.093	mg/Kg	1	☼	6010B	Total/NA
Nickel	14	B	2.3	0.032	mg/Kg	1	☼	6010B	Total/NA
Phosphorus	240	B	17	0.15	mg/Kg	1	☼	6010B	Total/NA
Potassium	6500		280	29	mg/Kg	1	☼	6010B	Total/NA
Selenium	0.83		0.57	0.19	mg/Kg	1	☼	6010B	Total/NA
Silver	0.21	J*	1.1	0.065	mg/Kg	1	☼	6010B	Total/NA
Thallium	0.45	J	2.0	0.20	mg/Kg	1	☼	6010B	Total/NA
Vanadium	17		2.8	0.064	mg/Kg	1	☼	6010B	Total/NA
Zinc	36		11	1.1	mg/Kg	10	☼	6010B	Total/NA

## Client Sample ID: SB-1808 (45-57')

## Lab Sample ID: 140-11946-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	1.7	J	12	0.60	mg/Kg	4	☼	6010B SEP	Step 1
Calcium	540	J	1200	9.4	mg/Kg	4	☼	6010B SEP	Step 1
Aluminum	13	J*	37	6.0	mg/Kg	3	☼	6010B SEP	Step 2
Barium	2.5	J*	9.3	0.45	mg/Kg	3	☼	6010B SEP	Step 2
Calcium	2400	*	930	8.2	mg/Kg	3	☼	6010B SEP	Step 2
Iron	14	J*	19	11	mg/Kg	3	☼	6010B SEP	Step 2
Manganese	20		2.8	1.0	mg/Kg	3	☼	6010B SEP	Step 2
Aluminum	63		12	2.6	mg/Kg	1	☼	6010B SEP	Step 3
Arsenic	0.55	J	0.62	0.16	mg/Kg	1	☼	6010B SEP	Step 3
Barium	14	B	3.1	0.15	mg/Kg	1	☼	6010B SEP	Step 3
Beryllium	0.024	J	0.31	0.019	mg/Kg	1	☼	6010B SEP	Step 3
Cadmium	0.050	J B*	0.31	0.014	mg/Kg	1	☼	6010B SEP	Step 3
Calcium	7.4	J B*	310	1.9	mg/Kg	1	☼	6010B SEP	Step 3
Chromium	0.39	J	0.62	0.087	mg/Kg	1	☼	6010B SEP	Step 3
Cobalt	3.2		3.1	0.056	mg/Kg	1	☼	6010B SEP	Step 3
Copper	1.4	J	1.6	0.32	mg/Kg	1	☼	6010B SEP	Step 3
Iron	300		6.2	3.6	mg/Kg	1	☼	6010B SEP	Step 3
Lead	0.60	J*	0.62	0.14	mg/Kg	1	☼	6010B SEP	Step 3
Manganese	310	B	0.93	0.034	mg/Kg	1	☼	6010B SEP	Step 3
Mo	0.18	J	2.5	0.10	mg/Kg	1	☼	6010B SEP	Step 3
Nickel	2.9		2.5	0.10	mg/Kg	1	☼	6010B SEP	Step 3
Phosphorus	32		19	1.7	mg/Kg	1	☼	6010B SEP	Step 3
Potassium	66	J B	310	32	mg/Kg	1	☼	6010B SEP	Step 3
Vanadium	0.38	J	3.1	0.093	mg/Kg	1	☼	6010B SEP	Step 3
Zinc	1.1	J B	1.2	0.12	mg/Kg	1	☼	6010B SEP	Step 3
Aluminum	890		12	2.0	mg/Kg	1	☼	6010B SEP	Step 4
Arsenic	3.4	B	0.62	0.27	mg/Kg	1	☼	6010B SEP	Step 4
Barium	17		3.1	0.15	mg/Kg	1	☼	6010B SEP	Step 4
Beryllium	0.093	J	0.31	0.020	mg/Kg	1	☼	6010B SEP	Step 4

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57') (Continued)**

**Lab Sample ID: 140-11946-9**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Cadmium	0.12	J	0.31	0.014	mg/Kg	1		*	6010B SEP	Step 4
Calcium	960	B	310	2.7	mg/Kg	1		*	6010B SEP	Step 4
Chromium	2.3		0.62	0.087	mg/Kg	1		*	6010B SEP	Step 4
Cobalt	3.3		3.1	0.066	mg/Kg	1		*	6010B SEP	Step 4
Copper	4.8		1.6	0.27	mg/Kg	1		*	6010B SEP	Step 4
Iron	4600		6.2	3.6	mg/Kg	1		*	6010B SEP	Step 4
Lead	3.8		0.62	0.14	mg/Kg	1		*	6010B SEP	Step 4
Li	2.0	J	3.1	0.19	mg/Kg	1		*	6010B SEP	Step 4
Manganese	110		0.93	0.16	mg/Kg	1		*	6010B SEP	Step 4
Mo	0.31	J	2.5	0.10	mg/Kg	1		*	6010B SEP	Step 4
Nickel	6.7		2.5	0.048	mg/Kg	1		*	6010B SEP	Step 4
Phosphorus	84		19	8.8	mg/Kg	1		*	6010B SEP	Step 4
Selenium	0.95	* B	0.62	0.58	mg/Kg	1		*	6010B SEP	Step 4
Vanadium	2.9	J	3.1	0.14	mg/Kg	1		*	6010B SEP	Step 4
Zinc	13	B	1.2	0.20	mg/Kg	1		*	6010B SEP	Step 4
Calcium	180	J *	4700	14	mg/Kg	5		*	6010B SEP	Step 5
Li	7.5	J B *	47	2.7	mg/Kg	5		*	6010B SEP	Step 5
Manganese	2.9	J *	14	2.3	mg/Kg	5		*	6010B SEP	Step 5
Phosphorus	39	J *	280	39	mg/Kg	5		*	6010B SEP	Step 5
Potassium	640	J B	4700	530	mg/Kg	5		*	6010B SEP	Step 5
Selenium	3.2	J	9.3	3.2	mg/Kg	5		*	6010B SEP	Step 5
Zinc	2.3	J	19	1.8	mg/Kg	5		*	6010B SEP	Step 5
Aluminum	1000		12	2.0	mg/Kg	1		*	6010B SEP	Step 6
Arsenic	4.6		0.62	0.19	mg/Kg	1		*	6010B SEP	Step 6
Barium	2.1	J	3.1	0.15	mg/Kg	1		*	6010B SEP	Step 6
Beryllium	0.072	J	0.31	0.015	mg/Kg	1		*	6010B SEP	Step 6
Cadmium	0.064	J	0.31	0.014	mg/Kg	1		*	6010B SEP	Step 6
Calcium	94	J	310	2.6	mg/Kg	1		*	6010B SEP	Step 6
Chromium	2.4		0.62	0.087	mg/Kg	1		*	6010B SEP	Step 6
Cobalt	1.5	J	3.1	0.057	mg/Kg	1		*	6010B SEP	Step 6
Copper	2.3		1.6	0.099	mg/Kg	1		*	6010B SEP	Step 6
Iron	5500		6.2	3.6	mg/Kg	1		*	6010B SEP	Step 6
Lead	1.3		0.62	0.14	mg/Kg	1		*	6010B SEP	Step 6
Li	1.9	J	3.1	0.19	mg/Kg	1		*	6010B SEP	Step 6
Manganese	37		0.93	0.31	mg/Kg	1		*	6010B SEP	Step 6
Mo	0.26	J	2.5	0.12	mg/Kg	1		*	6010B SEP	Step 6
Nickel	3.4		2.5	0.066	mg/Kg	1		*	6010B SEP	Step 6
Phosphorus	45		19	0.76	mg/Kg	1		*	6010B SEP	Step 6
Potassium	140	J	310	32	mg/Kg	1		*	6010B SEP	Step 6
Vanadium	3.6		3.1	0.19	mg/Kg	1		*	6010B SEP	Step 6
Zinc	11		1.2	0.12	mg/Kg	1		*	6010B SEP	Step 6
Aluminum	19000		120	20	mg/Kg	10		*	6010B SEP	Step 7
Arsenic	0.85	B	0.62	0.16	mg/Kg	1		*	6010B SEP	Step 7
Barium	200		31	1.5	mg/Kg	10		*	6010B SEP	Step 7
Beryllium	0.36		0.31	0.0093	mg/Kg	1		*	6010B SEP	Step 7
Calcium	2500	J	3100	9.2	mg/Kg	10		*	6010B SEP	Step 7
Chromium	7.5		0.62	0.087	mg/Kg	1		*	6010B SEP	Step 7
Cobalt	0.44	J	3.1	0.19	mg/Kg	1		*	6010B SEP	Step 7
Copper	0.92	J	1.6	0.099	mg/Kg	1		*	6010B SEP	Step 7
Iron	2500		6.2	5.1	mg/Kg	1		*	6010B SEP	Step 7

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville



# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57') (Continued)**

**Lab Sample ID: 140-11946-9**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	2.9		0.62	0.14	mg/Kg	1	☼	6010B SEP	Step 7
Li	6.6		3.1	0.19	mg/Kg	1	☼	6010B SEP	Step 7
Manganese	34		0.93	0.065	mg/Kg	1	☼	6010B SEP	Step 7
Nickel	1.4	J	2.5	0.035	mg/Kg	1	☼	6010B SEP	Step 7
Phosphorus	25	B	19	0.16	mg/Kg	1	☼	6010B SEP	Step 7
Potassium	8000		310	32	mg/Kg	1	☼	6010B SEP	Step 7
Silver	0.15	J	1.2	0.071	mg/Kg	1	☼	6010B SEP	Step 7
Thallium	0.58	J	2.2	0.22	mg/Kg	1	☼	6010B SEP	Step 7
Vanadium	17		3.1	0.070	mg/Kg	1	☼	6010B SEP	Step 7
Zinc	4.5	J	12	1.2	mg/Kg	10	☼	6010B SEP	Step 7
Aluminum	21000		10	1.6	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Arsenic	9.4		0.50	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Barium	230		2.5	0.12	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Beryllium	0.55		0.25	0.0075	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cadmium	0.23	J	0.25	0.011	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Calcium	6700		250	0.74	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Chromium	13		0.50	0.070	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Cobalt	8.4		2.5	0.023	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Copper	9.4		1.3	0.080	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Iron	13000		5.0	4.1	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Lead	8.5		0.50	0.11	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Li	18		2.5	0.15	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Manganese	520		0.75	0.052	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Mo	0.75	J	2.0	0.082	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Nickel	14		2.0	0.028	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Phosphorus	220		15	0.13	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Potassium	8900		250	26	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Selenium	4.1		0.50	0.17	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Silver	0.15	J	1.0	0.057	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Thallium	0.58	J	1.8	0.18	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Vanadium	23		2.5	0.056	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Zinc	32		1.0	0.10	mg/Kg	1		6010B SEP	Sum of Steps 1-7
Aluminum	30000		120	20	mg/Kg	10	☼	6010B	Total/NA
Arsenic	8.3		0.62	0.16	mg/Kg	1	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville



# Detection Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57') (Continued)**

**Lab Sample ID: 140-11946-9**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	320		31	1.5	mg/Kg	10	☼	6010B	Total/NA
Beryllium	0.57		0.31	0.0093	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.20	J	0.31	0.014	mg/Kg	1	☼	6010B	Total/NA
Calcium	10000		3100	9.2	mg/Kg	10	☼	6010B	Total/NA
Chromium	14		0.62	0.087	mg/Kg	1	☼	6010B	Total/NA
Cobalt	9.0		3.1	0.19	mg/Kg	1	☼	6010B	Total/NA
Copper	10		1.6	0.099	mg/Kg	1	☼	6010B	Total/NA
Iron	14000		6.2	5.1	mg/Kg	1	☼	6010B	Total/NA
Lead	8.8		0.62	0.14	mg/Kg	1	☼	6010B	Total/NA
Lithium	12		3.1	0.19	mg/Kg	1	☼	6010B	Total/NA
Manganese	520	B	0.93	0.065	mg/Kg	1	☼	6010B	Total/NA
Molybdenum	1.1	J	2.5	0.10	mg/Kg	1	☼	6010B	Total/NA
Nickel	15	B	2.5	0.035	mg/Kg	1	☼	6010B	Total/NA
Phosphorus	260	B	19	0.16	mg/Kg	1	☼	6010B	Total/NA
Potassium	8800		310	32	mg/Kg	1	☼	6010B	Total/NA
Silver	0.20	J*	1.2	0.071	mg/Kg	1	☼	6010B	Total/NA
Thallium	0.77	J	2.2	0.22	mg/Kg	1	☼	6010B	Total/NA
Vanadium	21		3.1	0.070	mg/Kg	1	☼	6010B	Total/NA
Zinc	33		12	1.2	mg/Kg	10	☼	6010B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3**

**Date Collected: 06/19/18 16:00**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 83.7**

**Method: 6010B SEP - SEP Metals (ICP) - Step 1**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		48	7.6	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Antimony	ND		14	1.3	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Arsenic	ND		2.4	0.62	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
<b>Barium</b>	<b>1.1</b>	<b>J</b>	12	0.57	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Beryllium	ND		1.2	0.37	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Cadmium	ND		1.2	0.076	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
<b>Calcium</b>	<b>360</b>	<b>J</b>	1200	9.1	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Chromium	ND		2.4	0.33	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Cobalt	ND		12	0.21	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Copper	ND		6.0	0.38	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Iron	ND		24	14	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Lead	ND		2.4	0.53	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Li	ND		12	0.72	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Manganese	ND		3.6	0.15	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Mo	ND		9.6	0.39	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Nickel	ND		9.6	0.32	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Phosphorus	ND		72	30	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Potassium	ND		1200	120	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Selenium	ND		2.4	0.81	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Silver	ND		4.8	0.53	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Thallium	ND		8.4	1.0	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Vanadium	ND		12	0.23	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4
Zinc	ND		4.8	1.1	mg/Kg	☼	07/09/18 08:00	07/17/18 12:33	4

**Method: 6010B SEP - SEP Metals (ICP) - Step 2**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>16</b>	<b>J *</b>	36	5.7	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Antimony	ND		11	1.0	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Arsenic	ND	*	1.8	0.47	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
<b>Barium</b>	<b>1.3</b>	<b>J *</b>	9.0	0.43	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Beryllium	ND	*	0.90	0.057	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Cadmium	ND		0.90	0.039	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
<b>Calcium</b>	<b>1500</b>	<b>*</b>	900	7.9	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Chromium	ND		1.8	0.25	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Cobalt	ND		9.0	0.23	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Copper	ND		4.5	0.57	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
<b>Iron</b>	<b>15</b>	<b>J *</b>	18	10	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Lead	ND		1.8	0.39	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Li	ND		9.0	0.54	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
<b>Manganese</b>	<b>13</b>		2.7	1.0	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Mo	ND		7.2	0.29	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
<b>Nickel</b>	<b>0.25</b>	<b>J</b>	7.2	0.18	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Phosphorus	ND	*	54	11	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Potassium	ND		900	93	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
<b>Selenium</b>	<b>0.66</b>	<b>J B</b>	1.8	0.61	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Silver	ND		3.6	0.25	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Thallium	ND		6.3	0.75	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
Vanadium	ND		9.0	0.57	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3
<b>Zinc</b>	<b>2.4</b>	<b>J</b>	3.6	0.72	mg/Kg	☼	07/11/18 08:00	07/17/18 13:33	3

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3**

Date Collected: 06/19/18 16:00

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 83.7

**Method: 6010B SEP - SEP Metals (ICP) - Step 3**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	70		12	2.5	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Arsenic	0.50	J	0.60	0.16	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Barium	2.7	J B	3.0	0.14	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Beryllium	0.024	J	0.30	0.018	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Cadmium	0.045	J B *	0.30	0.013	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Calcium	6.5	J B *	300	1.8	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Chromium	0.51	J	0.60	0.084	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Cobalt	2.4	J	3.0	0.054	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Copper	1.5		1.5	0.31	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Iron	390		6.0	3.5	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Lead	0.93	*	0.60	0.13	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Li	ND		3.0	0.18	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Manganese	110	B	0.90	0.032	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Mo	0.11	J	2.4	0.098	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Nickel	1.8	J	2.4	0.10	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Phosphorus	32		18	1.7	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Potassium	66	J B	300	31	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Selenium	ND		0.60	0.20	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Silver	ND	*	1.2	0.13	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Vanadium	0.46	J	3.0	0.090	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1
Zinc	2.0	B	1.2	0.12	mg/Kg	☼	07/12/18 08:00	07/17/18 14:34	1

**Method: 6010B SEP - SEP Metals (ICP) - Step 4**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	900		12	1.9	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Antimony	ND		3.6	0.54	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Arsenic	2.8	B	0.60	0.26	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Barium	5.3		3.0	0.14	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Beryllium	0.085	J	0.30	0.019	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Cadmium	0.13	J	0.30	0.013	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Calcium	520	B	300	2.6	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Chromium	2.4		0.60	0.084	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Cobalt	2.3	J	3.0	0.063	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Copper	4.7		1.5	0.26	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Iron	4700		6.0	3.5	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Lead	3.2		0.60	0.13	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Li	2.0	J	3.0	0.18	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Manganese	41		0.90	0.16	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Mo	0.39	J	2.4	0.098	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Nickel	6.0		2.4	0.047	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Phosphorus	74		18	8.5	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Potassium	ND		300	31	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Selenium	0.96	* B	0.60	0.56	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Silver	ND		1.2	0.12	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Thallium	ND		2.1	0.35	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Vanadium	3.0		3.0	0.13	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1
Zinc	15	B	1.2	0.19	mg/Kg	☼	07/13/18 08:00	07/18/18 11:03	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3**

Date Collected: 06/19/18 16:00

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 83.7

**Method: 6010B SEP - SEP Metals (ICP) - Step 5**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>41</b>	<b>J *</b>	180	28	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Antimony	ND		54	5.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Arsenic	ND		9.0	2.3	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Barium	ND	*	45	2.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Beryllium	ND	*	4.5	0.38	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Cadmium	ND		4.5	0.19	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
<b>Calcium</b>	<b>95</b>	<b>J *</b>	4500	13	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Chromium	ND		9.0	1.3	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Cobalt	ND	*	45	0.72	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Copper	ND		22	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Iron	ND	*	90	53	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Lead	ND	*	9.0	2.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
<b>Li</b>	<b>8.8</b>	<b>J B *</b>	45	2.6	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Manganese	ND	*	13	2.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Mo	ND		36	1.5	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Nickel	ND		36	1.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
<b>Phosphorus</b>	<b>39</b>	<b>J *</b>	270	37	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
<b>Potassium</b>	<b>680</b>	<b>J B</b>	4500	510	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Selenium	ND		9.0	3.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Silver	ND		18	1.9	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Thallium	ND	*	31	4.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
Vanadium	ND		45	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5
<b>Zinc</b>	<b>2.4</b>	<b>J</b>	18	1.7	mg/Kg	☼	07/17/18 08:00	07/18/18 12:02	5

**Method: 6010B SEP - SEP Metals (ICP) - Step 6**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>990</b>		12	1.9	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
Antimony	ND		3.6	0.33	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Arsenic</b>	<b>3.0</b>		0.60	0.18	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Barium</b>	<b>2.5</b>	<b>J</b>	3.0	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Beryllium</b>	<b>0.070</b>	<b>J</b>	0.30	0.014	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Cadmium</b>	<b>0.064</b>	<b>J</b>	0.30	0.013	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Calcium</b>	<b>58</b>	<b>J</b>	300	2.5	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Chromium</b>	<b>1.9</b>		0.60	0.084	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Cobalt</b>	<b>1.2</b>	<b>J</b>	3.0	0.055	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Copper</b>	<b>1.7</b>		1.5	0.096	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Iron</b>	<b>5500</b>		6.0	3.5	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Lead</b>	<b>1.3</b>		0.60	0.13	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Li</b>	<b>1.7</b>	<b>J</b>	3.0	0.18	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Manganese</b>	<b>34</b>		0.90	0.30	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Mo</b>	<b>0.26</b>	<b>J</b>	2.4	0.12	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Nickel</b>	<b>3.0</b>		2.4	0.063	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Phosphorus</b>	<b>38</b>		18	0.73	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Potassium</b>	<b>170</b>	<b>J</b>	300	31	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
Selenium	ND		0.60	0.20	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
Silver	ND		1.2	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
Thallium	ND		2.1	0.25	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Vanadium</b>	<b>3.4</b>		3.0	0.18	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1
<b>Zinc</b>	<b>9.3</b>		1.2	0.12	mg/Kg	☼	07/17/18 08:00	07/18/18 13:04	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3**

Date Collected: 06/19/18 16:00

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 83.7

**Method: 6010B SEP - SEP Metals (ICP) - Step 7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	19000		120	19	mg/Kg	☼	07/18/18 08:00	07/23/18 12:03	10
Antimony	0.23	J	3.6	0.17	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Arsenic	ND		0.60	0.16	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Barium	190		30	1.4	mg/Kg	☼	07/18/18 08:00	07/23/18 12:03	10
Beryllium	0.36		0.30	0.0090	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Cadmium	ND		0.30	0.013	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Calcium	2600	J	3000	8.8	mg/Kg	☼	07/18/18 08:00	07/23/18 12:03	10
Chromium	7.3		0.60	0.084	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Cobalt	0.36	J	3.0	0.18	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Copper	0.84	J	1.5	0.096	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Iron	2500		6.0	4.9	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Lead	2.6		0.60	0.13	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Li	6.3		3.0	0.18	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Manganese	35		0.90	0.062	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Mo	ND		2.4	0.098	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Nickel	1.3	J	2.4	0.033	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Phosphorus	23	B	18	0.16	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Potassium	7100		300	31	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Selenium	0.51	J	0.60	0.20	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Silver	0.13	J	1.2	0.068	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Thallium	0.53	J	2.1	0.21	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Vanadium	13		3.0	0.067	mg/Kg	☼	07/18/18 08:00	07/23/18 11:13	1
Zinc	4.6	J	12	1.2	mg/Kg	☼	07/18/18 08:00	07/23/18 12:03	10

**Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	21000		10	1.6	mg/Kg			07/24/18 13:52	1
Antimony	0.23	J	3.0	0.14	mg/Kg			07/24/18 13:52	1
Arsenic	6.3		0.50	0.13	mg/Kg			07/24/18 13:52	1
Barium	210		2.5	0.12	mg/Kg			07/24/18 13:52	1
Beryllium	0.54		0.25	0.0075	mg/Kg			07/24/18 13:52	1
Cadmium	0.23	J	0.25	0.011	mg/Kg			07/24/18 13:52	1
Calcium	5200		250	0.74	mg/Kg			07/24/18 13:52	1
Chromium	12		0.50	0.070	mg/Kg			07/24/18 13:52	1
Cobalt	6.2		2.5	0.023	mg/Kg			07/24/18 13:52	1
Copper	8.8		1.3	0.080	mg/Kg			07/24/18 13:52	1
Iron	13000		5.0	4.1	mg/Kg			07/24/18 13:52	1
Lead	8.0		0.50	0.11	mg/Kg			07/24/18 13:52	1
Li	19		2.5	0.15	mg/Kg			07/24/18 13:52	1
Manganese	230		0.75	0.052	mg/Kg			07/24/18 13:52	1
Mo	0.75	J	2.0	0.082	mg/Kg			07/24/18 13:52	1
Nickel	12		2.0	0.028	mg/Kg			07/24/18 13:52	1
Phosphorus	210		15	0.13	mg/Kg			07/24/18 13:52	1
Potassium	8000		250	26	mg/Kg			07/24/18 13:52	1
Selenium	2.1		0.50	0.17	mg/Kg			07/24/18 13:52	1
Silver	0.13	J	1.0	0.057	mg/Kg			07/24/18 13:52	1
Thallium	0.53	J	1.8	0.18	mg/Kg			07/24/18 13:52	1
Vanadium	20		2.5	0.056	mg/Kg			07/24/18 13:52	1
Zinc	36		1.0	0.10	mg/Kg			07/24/18 13:52	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3**

**Date Collected: 06/19/18 16:00**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 83.7**

**Method: 6010B - SEP Metals (ICP) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	26000		120	19	mg/Kg	☼	07/06/18 08:00	07/23/18 13:55	10
Antimony	ND		3.6	0.17	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Arsenic	6.8		0.60	0.16	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Barium	260		30	1.4	mg/Kg	☼	07/06/18 08:00	07/23/18 13:55	10
Beryllium	0.54		0.30	0.0090	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Cadmium	0.11	J	0.30	0.013	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Calcium	5700		3000	8.8	mg/Kg	☼	07/06/18 08:00	07/23/18 13:55	10
Chromium	12		0.60	0.084	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Cobalt	5.9		3.0	0.18	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Copper	9.0		1.5	0.096	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Iron	13000		6.0	4.9	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Lead	8.0		0.60	0.13	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Lithium	9.7		3.0	0.18	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Manganese	210	B	0.90	0.062	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Molybdenum	0.92	J	2.4	0.098	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Nickel	12	B	2.4	0.033	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Phosphorus	190	B	18	0.16	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Potassium	8200		300	31	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Selenium	ND		0.60	0.20	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Silver	0.15	J *	1.2	0.068	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Thallium	0.89	J	2.1	0.21	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Vanadium	20		3.0	0.067	mg/Kg	☼	07/06/18 08:00	07/23/18 13:03	1
Zinc	35		12	1.2	mg/Kg	☼	07/06/18 08:00	07/23/18 13:55	10

**Method: 7470A - SEP Mercury (CVAA) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.12	0.048	mg/Kg	☼	07/06/18 08:00	07/10/18 12:13	1

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 140-11946-5**

**Date Collected: 06/19/18 19:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 87.6**

**Method: 6010B SEP - SEP Metals (ICP) - Step 1**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		46	7.3	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Antimony	ND		14	1.3	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Arsenic	ND		2.3	0.59	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Barium	ND		11	0.55	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Beryllium	ND		1.1	0.35	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Cadmium	ND		1.1	0.073	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
<b>Calcium</b>	<b>360</b>	<b>J</b>	1100	8.7	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Chromium	ND		2.3	0.32	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Cobalt	ND		11	0.21	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Copper	ND		5.7	0.37	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Iron	ND		23	13	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Lead	ND		2.3	0.50	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Li	ND		11	0.68	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
<b>Manganese</b>	<b>5.0</b>		3.4	0.14	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Mo	ND		9.1	0.37	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Nickel	ND		9.1	0.31	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Phosphorus	ND		68	28	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Potassium	ND		1100	120	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Selenium	ND		2.3	0.78	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Silver	ND		4.6	0.50	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Thallium	ND		8.0	0.96	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Vanadium	ND		11	0.22	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4
Zinc	ND		4.6	1.1	mg/Kg	☼	07/09/18 08:00	07/17/18 12:43	4

**Method: 6010B SEP - SEP Metals (ICP) - Step 2**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>14</b>	<b>J *</b>	34	5.5	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Antimony	ND		10	0.96	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Arsenic	ND	*	1.7	0.45	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
<b>Barium</b>	<b>0.53</b>	<b>J *</b>	8.6	0.41	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Beryllium	ND	*	0.86	0.055	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Cadmium	ND		0.86	0.038	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
<b>Calcium</b>	<b>9100</b>	<b>*</b>	860	7.5	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Chromium	ND		1.7	0.24	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Cobalt	ND		8.6	0.22	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
<b>Copper</b>	<b>1.7</b>	<b>J</b>	4.3	0.55	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
<b>Iron</b>	<b>58</b>	<b>*</b>	17	9.9	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
<b>Lead</b>	<b>0.54</b>	<b>J</b>	1.7	0.38	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Li	ND		8.6	0.51	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
<b>Manganese</b>	<b>140</b>		2.6	0.96	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Mo	ND		6.8	0.28	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Nickel	ND		6.8	0.17	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Phosphorus	ND	*	51	10	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Potassium	ND		860	89	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Selenium	ND		1.7	0.58	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Silver	ND		3.4	0.24	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Thallium	ND		6.0	0.72	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Vanadium	ND		8.6	0.55	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3
Zinc	ND		3.4	0.68	mg/Kg	☼	07/11/18 08:00	07/17/18 13:44	3

TestAmerica Knoxville



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 140-11946-5**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 87.6

**Method: 6010B SEP - SEP Metals (ICP) - Step 3**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28		11	2.4	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Antimony	ND		3.4	0.32	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Arsenic	ND		0.57	0.15	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Barium	0.85	J B	2.9	0.14	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Beryllium	ND		0.29	0.017	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Cadmium	ND	*	0.29	0.013	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Calcium	6.7	J B *	290	1.7	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Chromium	0.58		0.57	0.080	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Cobalt	0.23	J	2.9	0.051	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Copper	1.3	J	1.4	0.30	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Iron	170		5.7	3.3	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Lead	ND	*	0.57	0.13	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Li	ND		2.9	0.17	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Manganese	32	B	0.86	0.031	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Mo	0.099	J	2.3	0.094	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Nickel	0.36	J	2.3	0.096	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Phosphorus	24		17	1.6	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Potassium	64	J B	290	30	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Selenium	0.20	J	0.57	0.19	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Silver	ND	*	1.1	0.13	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Thallium	ND		2.0	0.24	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Vanadium	0.22	J	2.9	0.086	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1
Zinc	0.51	J B	1.1	0.11	mg/Kg	☼	07/12/18 08:00	07/17/18 14:44	1

**Method: 6010B SEP - SEP Metals (ICP) - Step 4**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	790		11	1.8	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Antimony	ND		3.4	0.51	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Arsenic	1.7	B	0.57	0.25	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Barium	3.4		2.9	0.14	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Beryllium	0.074	J	0.29	0.018	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Cadmium	0.11	J	0.29	0.013	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Calcium	3300	B	290	2.5	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Chromium	2.0		0.57	0.080	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Cobalt	4.7		2.9	0.060	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Copper	2.5		1.4	0.25	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Iron	3500		5.7	3.3	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Lead	2.4		0.57	0.13	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Li	2.1	J	2.9	0.17	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Manganese	100		0.86	0.15	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Mo	0.17	J	2.3	0.094	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Nickel	7.1		2.3	0.045	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Phosphorus	56		17	8.1	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Potassium	ND		290	30	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Selenium	1.3	* B	0.57	0.54	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Silver	ND		1.1	0.11	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Thallium	ND		2.0	0.33	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Vanadium	2.1	J	2.9	0.13	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1
Zinc	9.1	B	1.1	0.18	mg/Kg	☼	07/13/18 08:00	07/18/18 11:12	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 140-11946-5**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 87.6

**Method: 6010B SEP - SEP Metals (ICP) - Step 5**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	170	27	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Antimony	ND		51	4.8	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Arsenic	ND		8.6	2.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Barium	ND	*	43	2.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Beryllium	ND	*	4.3	0.36	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Cadmium	ND		4.3	0.18	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
<b>Calcium</b>	<b>3100</b>	<b>J *</b>	4300	13	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Chromium	ND		8.6	1.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Cobalt	ND	*	43	0.68	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
<b>Copper</b>	<b>1.4</b>	<b>J</b>	21	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Iron	ND	*	86	50	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Lead	ND	*	8.6	1.9	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
<b>Li</b>	<b>8.7</b>	<b>J B *</b>	43	2.5	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
<b>Manganese</b>	<b>7.4</b>	<b>J *</b>	13	2.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Mo	ND		34	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
<b>Nickel</b>	<b>1.4</b>	<b>J</b>	34	1.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Phosphorus	ND	*	260	35	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
<b>Potassium</b>	<b>650</b>	<b>J B</b>	4300	490	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Selenium	ND		8.6	3.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Silver	ND		17	1.8	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Thallium	ND	*	30	4.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
Vanadium	ND		43	1.3	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5
<b>Zinc</b>	<b>2.2</b>	<b>J</b>	17	1.7	mg/Kg	☼	07/17/18 08:00	07/18/18 12:13	5

**Method: 6010B SEP - SEP Metals (ICP) - Step 6**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>1400</b>		11	1.8	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
Antimony	ND		3.4	0.32	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Arsenic</b>	<b>3.7</b>		0.57	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Barium</b>	<b>2.6</b>	<b>J</b>	2.9	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Beryllium</b>	<b>0.12</b>	<b>J</b>	0.29	0.014	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Cadmium</b>	<b>0.11</b>	<b>J</b>	0.29	0.013	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Calcium</b>	<b>960</b>		290	2.4	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Chromium</b>	<b>2.8</b>		0.57	0.080	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Cobalt</b>	<b>2.6</b>	<b>J</b>	2.9	0.052	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Copper</b>	<b>3.4</b>		1.4	0.091	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Iron</b>	<b>8400</b>		5.7	3.3	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Lead</b>	<b>2.4</b>		0.57	0.13	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Li</b>	<b>3.0</b>		2.9	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Manganese</b>	<b>62</b>		0.86	0.29	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Mo</b>	<b>0.19</b>	<b>J</b>	2.3	0.11	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Nickel</b>	<b>4.8</b>		2.3	0.060	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Phosphorus</b>	<b>130</b>		17	0.70	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Potassium</b>	<b>150</b>	<b>J</b>	290	30	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
Selenium	ND		0.57	0.19	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
Silver	ND		1.1	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
Thallium	ND		2.0	0.24	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Vanadium</b>	<b>3.8</b>		2.9	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1
<b>Zinc</b>	<b>12</b>		1.1	0.11	mg/Kg	☼	07/17/18 08:00	07/18/18 13:14	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 140-11946-5**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 87.6

**Method: 6010B SEP - SEP Metals (ICP) - Step 7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	17000		110	18	mg/Kg	☼	07/18/18 08:00	07/23/18 12:13	10
Antimony	ND		3.4	0.16	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Arsenic	0.65	B	0.57	0.15	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Barium	170		29	1.4	mg/Kg	☼	07/18/18 08:00	07/23/18 12:13	10
Beryllium	0.27	J	0.29	0.0086	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Cadmium	ND		0.29	0.013	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Calcium	1800	J	2900	8.4	mg/Kg	☼	07/18/18 08:00	07/23/18 12:13	10
Chromium	7.5		0.57	0.080	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Cobalt	0.41	J	2.9	0.17	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Copper	1.1	J	1.4	0.091	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Iron	2800		5.7	4.7	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Lead	2.6		0.57	0.13	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Li	6.8		2.9	0.17	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Manganese	33		0.86	0.059	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Mo	ND		2.3	0.094	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Nickel	1.3	J	2.3	0.032	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Phosphorus	30	B	17	0.15	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Potassium	6800		290	30	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Selenium	ND		0.57	0.19	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Silver	0.12	J	1.1	0.065	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Thallium	0.48	J	2.0	0.21	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Vanadium	11		2.9	0.064	mg/Kg	☼	07/18/18 08:00	07/23/18 11:23	1
Zinc	4.0	J	11	1.1	mg/Kg	☼	07/18/18 08:00	07/23/18 12:13	10

**Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	20000		10	1.6	mg/Kg			07/24/18 13:52	1
Antimony	ND		3.0	0.14	mg/Kg			07/24/18 13:52	1
Arsenic	6.1		0.50	0.13	mg/Kg			07/24/18 13:52	1
Barium	180		2.5	0.12	mg/Kg			07/24/18 13:52	1
Beryllium	0.47		0.25	0.0075	mg/Kg			07/24/18 13:52	1
Cadmium	0.22	J	0.25	0.011	mg/Kg			07/24/18 13:52	1
Calcium	19000		250	0.74	mg/Kg			07/24/18 13:52	1
Chromium	13		0.50	0.070	mg/Kg			07/24/18 13:52	1
Cobalt	7.9		2.5	0.023	mg/Kg			07/24/18 13:52	1
Copper	11		1.3	0.080	mg/Kg			07/24/18 13:52	1
Iron	15000		5.0	4.1	mg/Kg			07/24/18 13:52	1
Lead	7.9		0.50	0.11	mg/Kg			07/24/18 13:52	1
Li	21		2.5	0.15	mg/Kg			07/24/18 13:52	1
Manganese	380		0.75	0.052	mg/Kg			07/24/18 13:52	1
Mo	0.46	J	2.0	0.082	mg/Kg			07/24/18 13:52	1
Nickel	15		2.0	0.028	mg/Kg			07/24/18 13:52	1
Phosphorus	240		15	0.13	mg/Kg			07/24/18 13:52	1
Potassium	7700		250	26	mg/Kg			07/24/18 13:52	1
Selenium	1.5		0.50	0.17	mg/Kg			07/24/18 13:52	1
Silver	0.12	J	1.0	0.057	mg/Kg			07/24/18 13:52	1
Thallium	0.48	J	1.8	0.18	mg/Kg			07/24/18 13:52	1
Vanadium	18		2.5	0.056	mg/Kg			07/24/18 13:52	1
Zinc	27		1.0	0.10	mg/Kg			07/24/18 13:52	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 140-11946-5**

**Date Collected: 06/19/18 19:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 87.6**

**Method: 6010B - SEP Metals (ICP) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		110	18	mg/Kg	☼	07/06/18 08:00	07/23/18 14:05	10
Antimony	ND		3.4	0.16	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Arsenic	15		0.57	0.15	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Barium	230		29	1.4	mg/Kg	☼	07/06/18 08:00	07/23/18 14:05	10
Beryllium	0.46		0.29	0.0086	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Cadmium	0.20	J	0.29	0.013	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Calcium	26000		2900	8.4	mg/Kg	☼	07/06/18 08:00	07/23/18 14:05	10
Chromium	13		0.57	0.080	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Cobalt	8.5		2.9	0.17	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Copper	12		1.4	0.091	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Iron	14000		5.7	4.7	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Lead	9.6		0.57	0.13	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Lithium	12		2.9	0.17	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Manganese	330	B	0.86	0.059	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Molybdenum	1.0	J	2.3	0.094	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Nickel	14	B	2.3	0.032	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Phosphorus	280	B	17	0.15	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Potassium	9100		290	30	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Selenium	0.23	J	0.57	0.19	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Silver	0.18	J*	1.1	0.065	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Thallium	0.84	J	2.0	0.21	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Vanadium	18		2.9	0.064	mg/Kg	☼	07/06/18 08:00	07/23/18 13:13	1
Zinc	30		11	1.1	mg/Kg	☼	07/06/18 08:00	07/23/18 14:05	10

**Method: 7470A - SEP Mercury (CVAA) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.11	0.046	mg/Kg	☼	07/06/18 08:00	07/10/18 12:18	1

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 140-11946-6**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 88.6**

**Method: 6010B SEP - SEP Metals (ICP) - Step 1**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		45	7.2	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Antimony	ND		14	1.3	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Arsenic	ND		2.3	0.59	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
<b>Barium</b>	<b>1.0</b>	<b>J</b>	11	0.54	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Beryllium	ND		1.1	0.35	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Cadmium	ND		1.1	0.072	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
<b>Calcium</b>	<b>430</b>	<b>J</b>	1100	8.6	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Chromium	ND		2.3	0.32	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Cobalt	ND		11	0.20	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Copper	ND		5.6	0.36	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Iron	ND		23	13	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Lead	ND		2.3	0.50	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Li	ND		11	0.68	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
<b>Manganese</b>	<b>0.16</b>	<b>J</b>	3.4	0.14	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Mo	ND		9.0	0.37	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Nickel	ND		9.0	0.31	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Phosphorus	ND		68	28	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Potassium	ND		1100	120	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Selenium	ND		2.3	0.77	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Silver	ND		4.5	0.50	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Thallium	ND		7.9	0.95	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Vanadium	ND		11	0.22	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4
Zinc	ND		4.5	1.1	mg/Kg	☼	07/09/18 08:00	07/17/18 12:48	4

**Method: 6010B SEP - SEP Metals (ICP) - Step 2**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>10</b>	<b>J *</b>	34	5.4	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Antimony	ND		10	0.95	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Arsenic	ND	*	1.7	0.44	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
<b>Barium</b>	<b>2.3</b>	<b>J *</b>	8.5	0.41	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Beryllium	ND	*	0.85	0.054	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Cadmium	ND		0.85	0.037	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
<b>Calcium</b>	<b>7000</b>	<b>*</b>	850	7.4	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Chromium	ND		1.7	0.24	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
<b>Cobalt</b>	<b>0.21</b>	<b>J</b>	8.5	0.21	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Copper	ND		4.2	0.54	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
<b>Iron</b>	<b>31</b>	<b>*</b>	17	9.8	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Lead	ND		1.7	0.37	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Li	ND		8.5	0.51	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
<b>Manganese</b>	<b>55</b>		2.5	0.95	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Mo	ND		6.8	0.28	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
<b>Nickel</b>	<b>0.35</b>	<b>J</b>	6.8	0.17	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Phosphorus	ND	*	51	10	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Potassium	ND		850	88	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
<b>Selenium</b>	<b>1.3</b>	<b>J B</b>	1.7	0.58	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Silver	ND		3.4	0.24	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Thallium	ND		5.9	0.71	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
Vanadium	ND		8.5	0.54	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3
<b>Zinc</b>	<b>0.80</b>	<b>J</b>	3.4	0.68	mg/Kg	☼	07/11/18 08:00	07/17/18 13:49	3

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 140-11946-6**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 88.6

**Method: 6010B SEP - SEP Metals (ICP) - Step 3**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	46		11	2.4	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Antimony	ND		3.4	0.32	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Arsenic	0.42	J	0.56	0.15	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Barium	1.8	J B	2.8	0.14	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Beryllium	ND		0.28	0.017	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Cadmium	0.019	J B *	0.28	0.012	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Calcium	6.6	J B *	280	1.7	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Chromium	0.46	J	0.56	0.079	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Cobalt	2.0	J	2.8	0.051	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Copper	1.2	J	1.4	0.29	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Iron	250		5.6	3.3	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Lead	0.27	J *	0.56	0.12	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Li	ND		2.8	0.17	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Manganese	170	B	0.85	0.030	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Mo	0.33	J	2.3	0.093	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Nickel	2.5		2.3	0.095	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Phosphorus	27		17	1.6	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Potassium	62	J B	280	29	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Selenium	ND		0.56	0.19	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Silver	ND *		1.1	0.12	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Thallium	ND		2.0	0.24	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Vanadium	0.32	J	2.8	0.085	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1
Zinc	0.81	J B	1.1	0.11	mg/Kg	☼	07/12/18 08:00	07/17/18 14:49	1

**Method: 6010B SEP - SEP Metals (ICP) - Step 4**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	870		11	1.8	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Antimony	ND		3.4	0.51	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Arsenic	2.9	B	0.56	0.25	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Barium	5.8		2.8	0.14	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Beryllium	0.077	J	0.28	0.018	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Cadmium	0.13	J	0.28	0.012	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Calcium	1900	B	280	2.5	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Chromium	2.1		0.56	0.079	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Cobalt	3.2		2.8	0.060	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Copper	5.0		1.4	0.25	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Iron	4200		5.6	3.3	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Lead	2.8		0.56	0.12	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Li	2.3	J	2.8	0.17	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Manganese	73		0.85	0.15	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Mo	0.48	J	2.3	0.093	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Nickel	6.8		2.3	0.044	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Phosphorus	85		17	8.0	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Potassium	ND		280	29	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Selenium	1.5	* B	0.56	0.53	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Silver	ND		1.1	0.11	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Thallium	ND		2.0	0.33	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Vanadium	2.6	J	2.8	0.12	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1
Zinc	12	B	1.1	0.18	mg/Kg	☼	07/13/18 08:00	07/18/18 11:17	1

TestAmerica Knoxville



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 140-11946-6**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 88.6

**Method: 6010B SEP - SEP Metals (ICP) - Step 5**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>38</b>	<b>J *</b>	170	27	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Antimony	ND		51	4.7	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Arsenic	ND		8.5	2.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Barium	ND	*	42	2.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Beryllium	ND	*	4.2	0.36	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Cadmium	ND		4.2	0.18	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
<b>Calcium</b>	<b>1100</b>	<b>J *</b>	4200	12	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Chromium	ND		8.5	1.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Cobalt	ND	*	42	0.68	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Copper	ND		21	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Iron	ND	*	85	50	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Lead	ND	*	8.5	1.9	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
<b>Li</b>	<b>7.5</b>	<b>J B *</b>	42	2.5	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
<b>Manganese</b>	<b>3.9</b>	<b>J *</b>	13	2.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Mo	ND		34	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Nickel	ND		34	1.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Phosphorus	ND	*	250	35	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
<b>Potassium</b>	<b>630</b>	<b>J B</b>	4200	480	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Selenium	ND		8.5	2.9	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Silver	ND		17	1.8	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Thallium	ND	*	30	4.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
Vanadium	ND		42	1.3	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5
<b>Zinc</b>	<b>2.1</b>	<b>J</b>	17	1.6	mg/Kg	☼	07/17/18 08:00	07/18/18 12:18	5

**Method: 6010B SEP - SEP Metals (ICP) - Step 6**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>1300</b>		11	1.8	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
Antimony	ND		3.4	0.32	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Arsenic</b>	<b>5.5</b>		0.56	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Barium</b>	<b>2.4</b>	<b>J</b>	2.8	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Beryllium</b>	<b>0.097</b>	<b>J</b>	0.28	0.014	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Cadmium</b>	<b>0.10</b>	<b>J</b>	0.28	0.012	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Calcium</b>	<b>320</b>		280	2.4	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Chromium</b>	<b>2.4</b>		0.56	0.079	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Cobalt</b>	<b>2.0</b>	<b>J</b>	2.8	0.052	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Copper</b>	<b>2.5</b>		1.4	0.090	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Iron</b>	<b>7700</b>		5.6	3.3	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Lead</b>	<b>1.9</b>		0.56	0.12	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Li</b>	<b>2.5</b>	<b>J</b>	2.8	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Manganese</b>	<b>51</b>		0.85	0.28	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Mo</b>	<b>0.33</b>	<b>J</b>	2.3	0.11	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Nickel</b>	<b>4.4</b>		2.3	0.060	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Phosphorus</b>	<b>120</b>		17	0.69	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Potassium</b>	<b>150</b>	<b>J</b>	280	29	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
Selenium	ND		0.56	0.19	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
Silver	ND		1.1	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
Thallium	ND		2.0	0.24	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Vanadium</b>	<b>4.3</b>		2.8	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1
<b>Zinc</b>	<b>13</b>		1.1	0.11	mg/Kg	☼	07/17/18 08:00	07/18/18 13:19	1

TestAmerica Knoxville



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 140-11946-6**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 88.6

**Method: 6010B SEP - SEP Metals (ICP) - Step 7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	27000		110	18	mg/Kg	☼	07/18/18 08:00	07/23/18 12:18	10
Antimony	0.20	J	3.4	0.16	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Arsenic	0.61	B	0.56	0.15	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Barium	290		28	1.4	mg/Kg	☼	07/18/18 08:00	07/23/18 12:18	10
Beryllium	0.49		0.28	0.0085	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Cadmium	ND		0.28	0.012	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Calcium	3000		2800	8.4	mg/Kg	☼	07/18/18 08:00	07/23/18 12:18	10
Chromium	9.4		0.56	0.079	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Cobalt	0.67	J	2.8	0.17	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Copper	1.1	J	1.4	0.090	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Iron	3300		5.6	4.6	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Lead	3.6		0.56	0.12	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Li	6.9		2.8	0.17	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Manganese	45		0.85	0.059	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Mo	ND		2.3	0.093	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Nickel	2.4		2.3	0.032	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Phosphorus	41	B	17	0.15	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Potassium	10000		280	29	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Selenium	ND		0.56	0.19	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Silver	0.17	J	1.1	0.064	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Thallium	0.79	J	2.0	0.20	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Vanadium	15		2.8	0.063	mg/Kg	☼	07/18/18 08:00	07/23/18 11:28	1
Zinc	5.6	J	11	1.1	mg/Kg	☼	07/18/18 08:00	07/23/18 12:18	10

**Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	29000		10	1.6	mg/Kg			07/24/18 13:52	1
Antimony	0.20	J	3.0	0.14	mg/Kg			07/24/18 13:52	1
Arsenic	9.5		0.50	0.13	mg/Kg			07/24/18 13:52	1
Barium	300		2.5	0.12	mg/Kg			07/24/18 13:52	1
Beryllium	0.66		0.25	0.0075	mg/Kg			07/24/18 13:52	1
Cadmium	0.25		0.25	0.011	mg/Kg			07/24/18 13:52	1
Calcium	14000		250	0.74	mg/Kg			07/24/18 13:52	1
Chromium	14		0.50	0.070	mg/Kg			07/24/18 13:52	1
Cobalt	8.1		2.5	0.023	mg/Kg			07/24/18 13:52	1
Copper	9.7		1.3	0.080	mg/Kg			07/24/18 13:52	1
Iron	16000		5.0	4.1	mg/Kg			07/24/18 13:52	1
Lead	8.6		0.50	0.11	mg/Kg			07/24/18 13:52	1
Li	19		2.5	0.15	mg/Kg			07/24/18 13:52	1
Manganese	390		0.75	0.052	mg/Kg			07/24/18 13:52	1
Mo	1.1	J	2.0	0.082	mg/Kg			07/24/18 13:52	1
Nickel	16		2.0	0.028	mg/Kg			07/24/18 13:52	1
Phosphorus	270		15	0.13	mg/Kg			07/24/18 13:52	1
Potassium	11000		250	26	mg/Kg			07/24/18 13:52	1
Selenium	2.8		0.50	0.17	mg/Kg			07/24/18 13:52	1
Silver	0.17	J	1.0	0.057	mg/Kg			07/24/18 13:52	1
Thallium	0.79	J	1.8	0.18	mg/Kg			07/24/18 13:52	1
Vanadium	23		2.5	0.056	mg/Kg			07/24/18 13:52	1
Zinc	34		1.0	0.10	mg/Kg			07/24/18 13:52	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 140-11946-6**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 88.6

**Method: 6010B - SEP Metals (ICP) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	22000		110	18	mg/Kg	☼	07/06/18 08:00	07/23/18 14:10	10
Antimony	0.52	J	3.4	0.16	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Arsenic	25		0.56	0.15	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Barium	250		28	1.4	mg/Kg	☼	07/06/18 08:00	07/23/18 14:10	10
Beryllium	0.58		0.28	0.0085	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Cadmium	1.0		0.28	0.012	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Calcium	15000		2800	8.4	mg/Kg	☼	07/06/18 08:00	07/23/18 14:10	10
Chromium	11		0.56	0.079	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Cobalt	16		2.8	0.17	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Copper	12		1.4	0.090	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Iron	34000		5.6	4.6	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Lead	9.1		0.56	0.12	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Lithium	10		2.8	0.17	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Manganese	760	B	0.85	0.059	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Molybdenum	7.0		2.3	0.093	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Nickel	27	B	2.3	0.032	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Phosphorus	430	B	17	0.15	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Potassium	7600		280	29	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Selenium	ND		0.56	0.19	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Silver	0.18	J*	1.1	0.064	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Thallium	0.86	J	2.0	0.20	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Vanadium	24		2.8	0.063	mg/Kg	☼	07/06/18 08:00	07/23/18 13:19	1
Zinc	64		11	1.1	mg/Kg	☼	07/06/18 08:00	07/23/18 14:10	10

**Method: 7470A - SEP Mercury (CVAA) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.11	0.045	mg/Kg	☼	07/06/18 08:00	07/10/18 12:25	1

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 140-11946-8**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 88.1**

**Method: 6010B SEP - SEP Metals (ICP) - Step 1**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		45	7.3	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Antimony	ND		14	1.3	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Arsenic	ND		2.3	0.59	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Barium	ND		11	0.54	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Beryllium	ND		1.1	0.35	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Cadmium	ND		1.1	0.073	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
<b>Calcium</b>	<b>360</b>	<b>J</b>	1100	8.6	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Chromium	ND		2.3	0.32	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Cobalt	ND		11	0.20	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Copper	ND		5.7	0.36	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Iron	ND		23	13	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Lead	ND		2.3	0.50	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Li	ND		11	0.68	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
<b>Manganese</b>	<b>4.7</b>		3.4	0.14	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Mo	ND		9.1	0.37	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Nickel	ND		9.1	0.31	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Phosphorus	ND		68	28	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Potassium	ND		1100	120	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Selenium	ND		2.3	0.77	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Silver	ND		4.5	0.50	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Thallium	ND		7.9	0.95	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Vanadium	ND		11	0.22	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4
Zinc	ND		4.5	1.1	mg/Kg	☼	07/09/18 08:00	07/17/18 12:53	4

**Method: 6010B SEP - SEP Metals (ICP) - Step 2**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>11</b>	<b>J *</b>	34	5.4	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Antimony	ND		10	0.95	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Arsenic	ND	*	1.7	0.44	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
<b>Barium</b>	<b>0.63</b>	<b>J *</b>	8.5	0.41	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Beryllium	ND	*	0.85	0.054	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Cadmium	ND		0.85	0.037	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
<b>Calcium</b>	<b>10000</b>	<b>*</b>	850	7.5	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Chromium	ND		1.7	0.24	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Cobalt	ND		8.5	0.21	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
<b>Copper</b>	<b>0.83</b>	<b>J</b>	4.3	0.54	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
<b>Iron</b>	<b>63</b>	<b>*</b>	17	9.9	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
<b>Lead</b>	<b>0.46</b>	<b>J</b>	1.7	0.37	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Li	ND		8.5	0.51	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
<b>Manganese</b>	<b>80</b>		2.6	0.95	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Mo	ND		6.8	0.28	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Nickel	ND		6.8	0.17	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Phosphorus	ND	*	51	10	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Potassium	ND		850	88	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
<b>Selenium</b>	<b>0.65</b>	<b>J B</b>	1.7	0.58	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Silver	ND		3.4	0.24	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Thallium	ND		6.0	0.71	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Vanadium	ND		8.5	0.54	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3
Zinc	ND		3.4	0.68	mg/Kg	☼	07/11/18 08:00	07/17/18 13:54	3

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 140-11946-8**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 88.1

**Method: 6010B SEP - SEP Metals (ICP) - Step 3**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	26		11	2.4	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Antimony	ND		3.4	0.32	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Arsenic	0.18	J	0.57	0.15	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Barium	0.34	J B	2.8	0.14	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Beryllium	ND		0.28	0.017	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Cadmium	ND	*	0.28	0.012	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Calcium	6.6	J B *	280	1.7	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Chromium	0.62		0.57	0.079	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Cobalt	0.28	J	2.8	0.051	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Copper	1.2	J	1.4	0.29	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Iron	220		5.7	3.3	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Lead	ND	*	0.57	0.12	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Li	ND		2.8	0.17	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Manganese	20	B	0.85	0.031	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Mo	0.14	J	2.3	0.093	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Nickel	0.35	J	2.3	0.095	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Phosphorus	23		17	1.6	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Potassium	62	J B	280	29	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Selenium	ND		0.57	0.19	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Silver	ND	*	1.1	0.12	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Thallium	ND		2.0	0.24	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Vanadium	0.18	J	2.8	0.085	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1
Zinc	0.49	J B	1.1	0.11	mg/Kg	☼	07/12/18 08:00	07/17/18 14:55	1

**Method: 6010B SEP - SEP Metals (ICP) - Step 4**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	750		11	1.8	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Antimony	ND		3.4	0.51	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Arsenic	1.6	B	0.57	0.25	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Barium	2.7	J	2.8	0.14	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Beryllium	0.061	J	0.28	0.018	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Cadmium	0.11	J	0.28	0.012	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Calcium	3400	B	280	2.5	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Chromium	1.6		0.57	0.079	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Cobalt	4.9		2.8	0.060	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Copper	4.0		1.4	0.25	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Iron	3400		5.7	3.3	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Lead	2.5		0.57	0.12	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Li	2.2	J	2.8	0.17	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Manganese	65		0.85	0.15	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Mo	0.17	J	2.3	0.093	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Nickel	6.8		2.3	0.044	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Phosphorus	86		17	8.1	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Potassium	ND		280	29	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Selenium	0.83	* B	0.57	0.53	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Silver	ND		1.1	0.11	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Thallium	ND		2.0	0.33	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Vanadium	2.0	J	2.8	0.12	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1
Zinc	9.0	B	1.1	0.18	mg/Kg	☼	07/13/18 08:00	07/18/18 11:22	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 140-11946-8**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 88.1

**Method: 6010B SEP - SEP Metals (ICP) - Step 5**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>39</b>	<b>J *</b>	170	27	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Antimony	ND		51	4.8	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Arsenic	ND		8.5	2.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Barium	ND *		43	2.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Beryllium	ND *		4.3	0.36	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Cadmium	ND		4.3	0.18	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
<b>Calcium</b>	<b>2900</b>	<b>J *</b>	4300	12	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Chromium	ND		8.5	1.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Cobalt	ND *		43	0.68	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Copper	ND		21	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Iron	ND *		85	50	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Lead	ND *		8.5	1.9	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
<b>Li</b>	<b>7.0</b>	<b>J B *</b>	43	2.5	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
<b>Manganese</b>	<b>3.1</b>	<b>J *</b>	13	2.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Mo	ND		34	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Nickel	ND		34	1.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Phosphorus	ND *		260	35	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
<b>Potassium</b>	<b>620</b>	<b>J B</b>	4300	480	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Selenium	ND		8.5	2.9	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Silver	ND		17	1.8	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Thallium	ND *		30	4.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
Vanadium	ND		43	1.3	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5
<b>Zinc</b>	<b>1.9</b>	<b>J</b>	17	1.6	mg/Kg	☼	07/17/18 08:00	07/18/18 12:23	5

**Method: 6010B SEP - SEP Metals (ICP) - Step 6**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>1300</b>		11	1.8	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
Antimony	ND		3.4	0.32	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Arsenic</b>	<b>4.7</b>		0.57	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Barium</b>	<b>2.7</b>	<b>J</b>	2.8	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Beryllium</b>	<b>0.10</b>	<b>J</b>	0.28	0.014	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Cadmium</b>	<b>0.10</b>	<b>J</b>	0.28	0.012	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Calcium</b>	<b>960</b>		280	2.4	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Chromium</b>	<b>2.5</b>		0.57	0.079	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Cobalt</b>	<b>2.5</b>	<b>J</b>	2.8	0.052	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Copper</b>	<b>3.2</b>		1.4	0.091	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Iron</b>	<b>7400</b>		5.7	3.3	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Lead</b>	<b>2.5</b>		0.57	0.12	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Li</b>	<b>2.9</b>		2.8	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Manganese</b>	<b>59</b>		0.85	0.28	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Mo</b>	<b>0.34</b>	<b>J</b>	2.3	0.11	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Nickel</b>	<b>4.6</b>		2.3	0.060	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Phosphorus</b>	<b>190</b>		17	0.69	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Potassium</b>	<b>140</b>	<b>J</b>	280	29	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
Selenium	ND		0.57	0.19	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
Silver	ND		1.1	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
Thallium	ND		2.0	0.24	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Vanadium</b>	<b>3.9</b>		2.8	0.17	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1
<b>Zinc</b>	<b>11</b>		1.1	0.11	mg/Kg	☼	07/17/18 08:00	07/18/18 13:24	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 140-11946-8**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 88.1

**Method: 6010B SEP - SEP Metals (ICP) - Step 7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	17000		110	18	mg/Kg	☼	07/18/18 08:00	07/23/18 12:23	10
Antimony	ND		3.4	0.16	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Arsenic	0.22	J B	0.57	0.15	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Barium	200		28	1.4	mg/Kg	☼	07/18/18 08:00	07/23/18 12:23	10
Beryllium	0.25	J	0.28	0.0085	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Cadmium	ND		0.28	0.012	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Calcium	3100		2800	8.4	mg/Kg	☼	07/18/18 08:00	07/23/18 12:23	10
Chromium	6.2		0.57	0.079	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Cobalt	0.33	J	2.8	0.17	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Copper	0.87	J	1.4	0.091	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Iron	1700		5.7	4.7	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Lead	2.0		0.57	0.12	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Li	6.7		2.8	0.17	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Manganese	39		0.85	0.059	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Mo	ND		2.3	0.093	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Nickel	1.2	J	2.3	0.032	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Phosphorus	25	B	17	0.15	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Potassium	7300		280	29	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Selenium	0.35	J	0.57	0.19	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Silver	0.11	J	1.1	0.065	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Thallium	0.63	J	2.0	0.20	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Vanadium	9.0		2.8	0.064	mg/Kg	☼	07/18/18 08:00	07/23/18 11:48	1
Zinc	3.5	J	11	1.1	mg/Kg	☼	07/18/18 08:00	07/23/18 12:23	10

**Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	19000		10	1.6	mg/Kg			07/24/18 13:52	1
Antimony	ND		3.0	0.14	mg/Kg			07/24/18 13:52	1
Arsenic	6.7		0.50	0.13	mg/Kg			07/24/18 13:52	1
Barium	210		2.5	0.12	mg/Kg			07/24/18 13:52	1
Beryllium	0.41		0.25	0.0075	mg/Kg			07/24/18 13:52	1
Cadmium	0.22	J	0.25	0.011	mg/Kg			07/24/18 13:52	1
Calcium	21000		250	0.74	mg/Kg			07/24/18 13:52	1
Chromium	11		0.50	0.070	mg/Kg			07/24/18 13:52	1
Cobalt	7.9		2.5	0.023	mg/Kg			07/24/18 13:52	1
Copper	10		1.3	0.080	mg/Kg			07/24/18 13:52	1
Iron	13000		5.0	4.1	mg/Kg			07/24/18 13:52	1
Lead	7.5		0.50	0.11	mg/Kg			07/24/18 13:52	1
Li	19		2.5	0.15	mg/Kg			07/24/18 13:52	1
Manganese	270		0.75	0.052	mg/Kg			07/24/18 13:52	1
Mo	0.65	J	2.0	0.082	mg/Kg			07/24/18 13:52	1
Nickel	13		2.0	0.028	mg/Kg			07/24/18 13:52	1
Phosphorus	330		15	0.13	mg/Kg			07/24/18 13:52	1
Potassium	8100		250	26	mg/Kg			07/24/18 13:52	1
Selenium	1.8		0.50	0.17	mg/Kg			07/24/18 13:52	1
Silver	0.11	J	1.0	0.057	mg/Kg			07/24/18 13:52	1
Thallium	0.63	J	1.8	0.18	mg/Kg			07/24/18 13:52	1
Vanadium	15		2.5	0.056	mg/Kg			07/24/18 13:52	1
Zinc	26		1.0	0.10	mg/Kg			07/24/18 13:52	1

TestAmerica Knoxville



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 140-11946-8**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 88.1**

**Method: 6010B - SEP Metals (ICP) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	29000		110	18	mg/Kg	☼	07/06/18 08:00	07/23/18 14:15	10
Antimony	ND		3.4	0.16	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Arsenic	4.4		0.57	0.15	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Barium	170		28	1.4	mg/Kg	☼	07/06/18 08:00	07/23/18 14:15	10
Beryllium	0.38		0.28	0.0085	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Cadmium	0.16	J	0.28	0.012	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Calcium	46000		2800	8.4	mg/Kg	☼	07/06/18 08:00	07/23/18 14:15	10
Chromium	14		0.57	0.079	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Cobalt	8.4		2.8	0.17	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Copper	10		1.4	0.091	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Iron	13000		5.7	4.7	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Lead	6.0		0.57	0.12	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Lithium	12		2.8	0.17	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Manganese	670	B	0.85	0.059	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Molybdenum	0.69	J	2.3	0.093	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Nickel	14	B	2.3	0.032	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Phosphorus	240	B	17	0.15	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Potassium	6500		280	29	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Selenium	0.83		0.57	0.19	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Silver	0.21	J*	1.1	0.065	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Thallium	0.45	J	2.0	0.20	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Vanadium	17		2.8	0.064	mg/Kg	☼	07/06/18 08:00	07/23/18 13:24	1
Zinc	36		11	1.1	mg/Kg	☼	07/06/18 08:00	07/23/18 14:15	10

**Method: 7470A - SEP Mercury (CVAA) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.11	0.045	mg/Kg	☼	07/06/18 08:00	07/10/18 12:29	1



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 140-11946-9**

**Date Collected: 06/25/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 80.4**

**Method: 6010B SEP - SEP Metals (ICP) - Step 1**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		50	8.0	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Antimony	ND		15	1.4	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Arsenic	ND		2.5	0.65	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
<b>Barium</b>	<b>1.7</b>	<b>J</b>	12	0.60	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Beryllium	ND		1.2	0.38	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Cadmium	ND		1.2	0.080	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
<b>Calcium</b>	<b>540</b>	<b>J</b>	1200	9.4	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Chromium	ND		2.5	0.35	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Cobalt	ND		12	0.22	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Copper	ND		6.2	0.40	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Iron	ND		25	14	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Lead	ND		2.5	0.55	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Li	ND		12	0.75	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Manganese	ND		3.7	0.15	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Mo	ND		9.9	0.41	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Nickel	ND		9.9	0.34	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Phosphorus	ND		75	31	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Potassium	ND		1200	130	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Selenium	ND		2.5	0.85	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Silver	ND		5.0	0.55	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Thallium	ND		8.7	1.0	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Vanadium	ND		12	0.24	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4
Zinc	ND		5.0	1.2	mg/Kg	☼	07/09/18 08:00	07/17/18 12:58	4

**Method: 6010B SEP - SEP Metals (ICP) - Step 2**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>13</b>	<b>J *</b>	37	6.0	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Antimony	ND		11	1.0	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Arsenic	ND	*	1.9	0.48	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
<b>Barium</b>	<b>2.5</b>	<b>J *</b>	9.3	0.45	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Beryllium	ND	*	0.93	0.060	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Cadmium	ND		0.93	0.041	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
<b>Calcium</b>	<b>2400</b>	<b>*</b>	930	8.2	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Chromium	ND		1.9	0.26	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Cobalt	ND		9.3	0.23	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Copper	ND		4.7	0.60	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
<b>Iron</b>	<b>14</b>	<b>J *</b>	19	11	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Lead	ND		1.9	0.41	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Li	ND		9.3	0.56	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
<b>Manganese</b>	<b>20</b>		2.8	1.0	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Mo	ND		7.5	0.31	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Nickel	ND		7.5	0.19	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Phosphorus	ND	*	56	11	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Potassium	ND		930	97	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Selenium	ND		1.9	0.63	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Silver	ND		3.7	0.26	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Thallium	ND		6.5	0.78	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Vanadium	ND		9.3	0.60	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3
Zinc	ND		3.7	0.75	mg/Kg	☼	07/11/18 08:00	07/17/18 13:59	3

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 140-11946-9**

Date Collected: 06/25/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 80.4

**Method: 6010B SEP - SEP Metals (ICP) - Step 3**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	63		12	2.6	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Antimony	ND		3.7	0.35	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Arsenic	0.55	J	0.62	0.16	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Barium	14	B	3.1	0.15	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Beryllium	0.024	J	0.31	0.019	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Cadmium	0.050	J B *	0.31	0.014	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Calcium	7.4	J B *	310	1.9	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Chromium	0.39	J	0.62	0.087	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Cobalt	3.2		3.1	0.056	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Copper	1.4	J	1.6	0.32	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Iron	300		6.2	3.6	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Lead	0.60	J *	0.62	0.14	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Li	ND		3.1	0.19	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Manganese	310	B	0.93	0.034	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Mo	0.18	J	2.5	0.10	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Nickel	2.9		2.5	0.10	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Phosphorus	32		19	1.7	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Potassium	66	J B	310	32	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Silver	ND *		1.2	0.14	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Thallium	ND		2.2	0.26	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Vanadium	0.38	J	3.1	0.093	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1
Zinc	1.1	J B	1.2	0.12	mg/Kg	☼	07/12/18 08:00	07/17/18 15:00	1

**Method: 6010B SEP - SEP Metals (ICP) - Step 4**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	890		12	2.0	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Antimony	ND		3.7	0.56	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Arsenic	3.4	B	0.62	0.27	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Barium	17		3.1	0.15	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Beryllium	0.093	J	0.31	0.020	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Cadmium	0.12	J	0.31	0.014	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Calcium	960	B	310	2.7	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Chromium	2.3		0.62	0.087	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Cobalt	3.3		3.1	0.066	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Copper	4.8		1.6	0.27	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Iron	4600		6.2	3.6	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Lead	3.8		0.62	0.14	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Li	2.0	J	3.1	0.19	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Manganese	110		0.93	0.16	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Mo	0.31	J	2.5	0.10	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Nickel	6.7		2.5	0.048	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Phosphorus	84		19	8.8	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Potassium	ND		310	32	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Selenium	0.95	* B	0.62	0.58	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Silver	ND		1.2	0.12	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Thallium	ND		2.2	0.36	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Vanadium	2.9	J	3.1	0.14	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1
Zinc	13	B	1.2	0.20	mg/Kg	☼	07/13/18 08:00	07/18/18 11:27	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 140-11946-9**

Date Collected: 06/25/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 80.4

**Method: 6010B SEP - SEP Metals (ICP) - Step 5**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND	*	190	29	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Antimony	ND		56	5.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Arsenic	ND		9.3	2.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Barium	ND	*	47	2.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Beryllium	ND	*	4.7	0.39	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Cadmium	ND		4.7	0.20	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
<b>Calcium</b>	<b>180</b>	<b>J *</b>	4700	14	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Chromium	ND		9.3	1.3	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Cobalt	ND	*	47	0.75	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Copper	ND		23	1.5	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Iron	ND	*	93	55	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Lead	ND	*	9.3	2.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
<b>Li</b>	<b>7.5</b>	<b>J B *</b>	47	2.7	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
<b>Manganese</b>	<b>2.9</b>	<b>J *</b>	14	2.3	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Mo	ND		37	1.6	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Nickel	ND		37	1.1	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
<b>Phosphorus</b>	<b>39</b>	<b>J *</b>	280	39	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
<b>Potassium</b>	<b>640</b>	<b>J B</b>	4700	530	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
<b>Selenium</b>	<b>3.2</b>	<b>J</b>	9.3	3.2	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Silver	ND		19	2.0	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Thallium	ND	*	33	4.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
Vanadium	ND		47	1.4	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5
<b>Zinc</b>	<b>2.3</b>	<b>J</b>	19	1.8	mg/Kg	☼	07/17/18 08:00	07/18/18 12:28	5

**Method: 6010B SEP - SEP Metals (ICP) - Step 6**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Aluminum</b>	<b>1000</b>		12	2.0	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
Antimony	ND		3.7	0.35	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Arsenic</b>	<b>4.6</b>		0.62	0.19	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Barium</b>	<b>2.1</b>	<b>J</b>	3.1	0.15	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Beryllium</b>	<b>0.072</b>	<b>J</b>	0.31	0.015	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Cadmium</b>	<b>0.064</b>	<b>J</b>	0.31	0.014	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Calcium</b>	<b>94</b>	<b>J</b>	310	2.6	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Chromium</b>	<b>2.4</b>		0.62	0.087	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Cobalt</b>	<b>1.5</b>	<b>J</b>	3.1	0.057	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Copper</b>	<b>2.3</b>		1.6	0.099	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Iron</b>	<b>5500</b>		6.2	3.6	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Lead</b>	<b>1.3</b>		0.62	0.14	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Li</b>	<b>1.9</b>	<b>J</b>	3.1	0.19	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Manganese</b>	<b>37</b>		0.93	0.31	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Mo</b>	<b>0.26</b>	<b>J</b>	2.5	0.12	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Nickel</b>	<b>3.4</b>		2.5	0.066	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Phosphorus</b>	<b>45</b>		19	0.76	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Potassium</b>	<b>140</b>	<b>J</b>	310	32	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
Silver	ND		1.2	0.15	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
Thallium	ND		2.2	0.26	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Vanadium</b>	<b>3.6</b>		3.1	0.19	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1
<b>Zinc</b>	<b>11</b>		1.2	0.12	mg/Kg	☼	07/17/18 08:00	07/18/18 13:29	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 140-11946-9**

Date Collected: 06/25/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 80.4

**Method: 6010B SEP - SEP Metals (ICP) - Step 7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	19000		120	20	mg/Kg	☼	07/18/18 08:00	07/23/18 12:28	10
Antimony	ND		3.7	0.17	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Arsenic	0.85	B	0.62	0.16	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Barium	200		31	1.5	mg/Kg	☼	07/18/18 08:00	07/23/18 12:28	10
Beryllium	0.36		0.31	0.0093	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Cadmium	ND		0.31	0.014	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Calcium	2500	J	3100	9.2	mg/Kg	☼	07/18/18 08:00	07/23/18 12:28	10
Chromium	7.5		0.62	0.087	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Cobalt	0.44	J	3.1	0.19	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Copper	0.92	J	1.6	0.099	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Iron	2500		6.2	5.1	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Lead	2.9		0.62	0.14	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Li	6.6		3.1	0.19	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Manganese	34		0.93	0.065	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Mo	ND		2.5	0.10	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Nickel	1.4	J	2.5	0.035	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Phosphorus	25	B	19	0.16	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Potassium	8000		310	32	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Silver	0.15	J	1.2	0.071	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Thallium	0.58	J	2.2	0.22	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Vanadium	17		3.1	0.070	mg/Kg	☼	07/18/18 08:00	07/23/18 11:53	1
Zinc	4.5	J	12	1.2	mg/Kg	☼	07/18/18 08:00	07/23/18 12:28	10

**Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	21000		10	1.6	mg/Kg			07/24/18 13:52	1
Antimony	ND		3.0	0.14	mg/Kg			07/24/18 13:52	1
Arsenic	9.4		0.50	0.13	mg/Kg			07/24/18 13:52	1
Barium	230		2.5	0.12	mg/Kg			07/24/18 13:52	1
Beryllium	0.55		0.25	0.0075	mg/Kg			07/24/18 13:52	1
Cadmium	0.23	J	0.25	0.011	mg/Kg			07/24/18 13:52	1
Calcium	6700		250	0.74	mg/Kg			07/24/18 13:52	1
Chromium	13		0.50	0.070	mg/Kg			07/24/18 13:52	1
Cobalt	8.4		2.5	0.023	mg/Kg			07/24/18 13:52	1
Copper	9.4		1.3	0.080	mg/Kg			07/24/18 13:52	1
Iron	13000		5.0	4.1	mg/Kg			07/24/18 13:52	1
Lead	8.5		0.50	0.11	mg/Kg			07/24/18 13:52	1
Li	18		2.5	0.15	mg/Kg			07/24/18 13:52	1
Manganese	520		0.75	0.052	mg/Kg			07/24/18 13:52	1
Mo	0.75	J	2.0	0.082	mg/Kg			07/24/18 13:52	1
Nickel	14		2.0	0.028	mg/Kg			07/24/18 13:52	1
Phosphorus	220		15	0.13	mg/Kg			07/24/18 13:52	1
Potassium	8900		250	26	mg/Kg			07/24/18 13:52	1
Selenium	4.1		0.50	0.17	mg/Kg			07/24/18 13:52	1
Silver	0.15	J	1.0	0.057	mg/Kg			07/24/18 13:52	1
Thallium	0.58	J	1.8	0.18	mg/Kg			07/24/18 13:52	1
Vanadium	23		2.5	0.056	mg/Kg			07/24/18 13:52	1
Zinc	32		1.0	0.10	mg/Kg			07/24/18 13:52	1

TestAmerica Knoxville

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 140-11946-9**

**Date Collected: 06/25/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 80.4**

**Method: 6010B - SEP Metals (ICP) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	30000		120	20	mg/Kg	☼	07/06/18 08:00	07/23/18 14:20	10
Antimony	ND		3.7	0.17	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Arsenic	8.3		0.62	0.16	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Barium	320		31	1.5	mg/Kg	☼	07/06/18 08:00	07/23/18 14:20	10
Beryllium	0.57		0.31	0.0093	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Cadmium	0.20	J	0.31	0.014	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Calcium	10000		3100	9.2	mg/Kg	☼	07/06/18 08:00	07/23/18 14:20	10
Chromium	14		0.62	0.087	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Cobalt	9.0		3.1	0.19	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Copper	10		1.6	0.099	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Iron	14000		6.2	5.1	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Lead	8.8		0.62	0.14	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Lithium	12		3.1	0.19	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Manganese	520	B	0.93	0.065	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Molybdenum	1.1	J	2.5	0.10	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Nickel	15	B	2.5	0.035	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Phosphorus	260	B	19	0.16	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Potassium	8800		310	32	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Selenium	ND		0.62	0.21	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Silver	0.20	J *	1.2	0.071	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Thallium	0.77	J	2.2	0.22	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Vanadium	21		3.1	0.070	mg/Kg	☼	07/06/18 08:00	07/23/18 13:29	1
Zinc	33		12	1.2	mg/Kg	☼	07/06/18 08:00	07/23/18 14:20	10

**Method: 7470A - SEP Mercury (CVAA) - Total**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Hg	ND		0.12	0.050	mg/Kg	☼	07/06/18 08:00	07/10/18 12:31	1

## Default Detection Limits

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

### Method: 6010B SEP - SEP Metals (ICP) - Step 1

Prep: 3010A

SEP: Exchangeable

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Antimony	3.0	0.28	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Barium	2.5	0.12	mg/Kg	6010B SEP
Beryllium	0.25	0.077	mg/Kg	6010B SEP
Cadmium	0.25	0.016	mg/Kg	6010B SEP
Calcium	250	1.9	mg/Kg	6010B SEP
Chromium	0.50	0.070	mg/Kg	6010B SEP
Cobalt	2.5	0.045	mg/Kg	6010B SEP
Copper	1.3	0.080	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Manganese	0.75	0.031	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP
Nickel	2.0	0.068	mg/Kg	6010B SEP
Phosphorus	15	6.2	mg/Kg	6010B SEP
Potassium	250	26	mg/Kg	6010B SEP
Selenium	0.50	0.17	mg/Kg	6010B SEP
Silver	1.0	0.11	mg/Kg	6010B SEP
Thallium	1.8	0.21	mg/Kg	6010B SEP
Vanadium	2.5	0.049	mg/Kg	6010B SEP
Zinc	1.0	0.24	mg/Kg	6010B SEP

### Method: 6010B SEP - SEP Metals (ICP) - Step 2

Prep: 3010A

SEP: Carbonate

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Antimony	3.0	0.28	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Barium	2.5	0.12	mg/Kg	6010B SEP
Beryllium	0.25	0.016	mg/Kg	6010B SEP
Cadmium	0.25	0.011	mg/Kg	6010B SEP
Calcium	250	2.2	mg/Kg	6010B SEP
Chromium	0.50	0.070	mg/Kg	6010B SEP
Cobalt	2.5	0.063	mg/Kg	6010B SEP
Copper	1.3	0.16	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Manganese	0.75	0.28	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP
Nickel	2.0	0.050	mg/Kg	6010B SEP
Phosphorus	15	3.0	mg/Kg	6010B SEP
Potassium	250	26	mg/Kg	6010B SEP
Selenium	0.50	0.17	mg/Kg	6010B SEP
Silver	1.0	0.070	mg/Kg	6010B SEP
Thallium	1.8	0.21	mg/Kg	6010B SEP

TestAmerica Knoxville

## Default Detection Limits

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

### Method: 6010B SEP - SEP Metals (ICP) - Step 2 (Continued)

Prep: 3010A

SEP: Carbonate

Analyte	RL	MDL	Units	Method
Vanadium	2.5	0.16	mg/Kg	6010B SEP
Zinc	1.0	0.20	mg/Kg	6010B SEP

### Method: 6010B SEP - SEP Metals (ICP) - Step 3

Prep: 3010A

SEP: Non-Crystalline

Analyte	RL	MDL	Units	Method
Aluminum	10	2.1	mg/Kg	6010B SEP
Antimony	3.0	0.28	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Barium	2.5	0.12	mg/Kg	6010B SEP
Beryllium	0.25	0.015	mg/Kg	6010B SEP
Cadmium	0.25	0.011	mg/Kg	6010B SEP
Calcium	250	1.5	mg/Kg	6010B SEP
Chromium	0.50	0.070	mg/Kg	6010B SEP
Cobalt	2.5	0.045	mg/Kg	6010B SEP
Copper	1.3	0.26	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Manganese	0.75	0.027	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP
Nickel	2.0	0.084	mg/Kg	6010B SEP
Phosphorus	15	1.4	mg/Kg	6010B SEP
Potassium	250	26	mg/Kg	6010B SEP
Selenium	0.50	0.17	mg/Kg	6010B SEP
Silver	1.0	0.11	mg/Kg	6010B SEP
Thallium	1.8	0.21	mg/Kg	6010B SEP
Vanadium	2.5	0.075	mg/Kg	6010B SEP
Zinc	1.0	0.10	mg/Kg	6010B SEP

### Method: 6010B SEP - SEP Metals (ICP) - Step 4

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Antimony	3.0	0.45	mg/Kg	6010B SEP
Arsenic	0.50	0.22	mg/Kg	6010B SEP
Barium	2.5	0.12	mg/Kg	6010B SEP
Beryllium	0.25	0.016	mg/Kg	6010B SEP
Cadmium	0.25	0.011	mg/Kg	6010B SEP
Calcium	250	2.2	mg/Kg	6010B SEP
Chromium	0.50	0.070	mg/Kg	6010B SEP
Cobalt	2.5	0.053	mg/Kg	6010B SEP
Copper	1.3	0.22	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Manganese	0.75	0.13	mg/Kg	6010B SEP

TestAmerica Knoxville



## Default Detection Limits

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

### Method: 6010B SEP - SEP Metals (ICP) - Step 4 (Continued)

Prep: 3010A

SEP: Metal Hydroxide

Analyte	RL	MDL	Units	Method
Mo	2.0	0.082	mg/Kg	6010B SEP
Nickel	2.0	0.039	mg/Kg	6010B SEP
Phosphorus	15	7.1	mg/Kg	6010B SEP
Potassium	250	26	mg/Kg	6010B SEP
Selenium	0.50	0.47	mg/Kg	6010B SEP
Silver	1.0	0.10	mg/Kg	6010B SEP
Thallium	1.8	0.29	mg/Kg	6010B SEP
Vanadium	2.5	0.11	mg/Kg	6010B SEP
Zinc	1.0	0.16	mg/Kg	6010B SEP

### Method: 6010B SEP - SEP Metals (ICP) - Step 5

Prep: 3010A

SEP: Organic-Bound

Analyte	RL	MDL	Units	Method
Aluminum	30	4.7	mg/Kg	6010B SEP
Antimony	9.0	0.84	mg/Kg	6010B SEP
Arsenic	1.5	0.38	mg/Kg	6010B SEP
Barium	7.5	0.36	mg/Kg	6010B SEP
Beryllium	0.75	0.063	mg/Kg	6010B SEP
Cadmium	0.75	0.032	mg/Kg	6010B SEP
Calcium	750	2.2	mg/Kg	6010B SEP
Chromium	1.5	0.21	mg/Kg	6010B SEP
Cobalt	7.5	0.12	mg/Kg	6010B SEP
Copper	3.8	0.24	mg/Kg	6010B SEP
Iron	15	8.8	mg/Kg	6010B SEP
Lead	1.5	0.33	mg/Kg	6010B SEP
Li	7.5	0.44	mg/Kg	6010B SEP
Manganese	2.3	0.37	mg/Kg	6010B SEP
Mo	6.0	0.25	mg/Kg	6010B SEP
Nickel	6.0	0.18	mg/Kg	6010B SEP
Phosphorus	45	6.2	mg/Kg	6010B SEP
Potassium	750	85	mg/Kg	6010B SEP
Selenium	1.5	0.52	mg/Kg	6010B SEP
Silver	3.0	0.32	mg/Kg	6010B SEP
Thallium	5.3	0.70	mg/Kg	6010B SEP
Vanadium	7.5	0.23	mg/Kg	6010B SEP
Zinc	3.0	0.29	mg/Kg	6010B SEP

### Method: 6010B SEP - SEP Metals (ICP) - Step 6

SEP: Acid/Sulfide

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Antimony	3.0	0.28	mg/Kg	6010B SEP
Arsenic	0.50	0.15	mg/Kg	6010B SEP
Barium	2.5	0.12	mg/Kg	6010B SEP
Beryllium	0.25	0.012	mg/Kg	6010B SEP
Cadmium	0.25	0.011	mg/Kg	6010B SEP
Calcium	250	2.1	mg/Kg	6010B SEP
Chromium	0.50	0.070	mg/Kg	6010B SEP

TestAmerica Knoxville

## Default Detection Limits

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

### Method: 6010B SEP - SEP Metals (ICP) - Step 6 (Continued)

#### SEP: Acid/Sulfide

Analyte	RL	MDL	Units	Method
Cobalt	2.5	0.046	mg/Kg	6010B SEP
Copper	1.3	0.080	mg/Kg	6010B SEP
Iron	5.0	2.9	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Manganese	0.75	0.25	mg/Kg	6010B SEP
Mo	2.0	0.099	mg/Kg	6010B SEP
Nickel	2.0	0.053	mg/Kg	6010B SEP
Phosphorus	15	0.61	mg/Kg	6010B SEP
Potassium	250	26	mg/Kg	6010B SEP
Selenium	0.50	0.17	mg/Kg	6010B SEP
Silver	1.0	0.12	mg/Kg	6010B SEP
Thallium	1.8	0.21	mg/Kg	6010B SEP
Vanadium	2.5	0.15	mg/Kg	6010B SEP
Zinc	1.0	0.10	mg/Kg	6010B SEP

### Method: 6010B SEP - SEP Metals (ICP) - Step 7

#### Prep: Residual

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Antimony	3.0	0.14	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Barium	2.5	0.12	mg/Kg	6010B SEP
Beryllium	0.25	0.0075	mg/Kg	6010B SEP
Cadmium	0.25	0.011	mg/Kg	6010B SEP
Calcium	250	0.74	mg/Kg	6010B SEP
Chromium	0.50	0.070	mg/Kg	6010B SEP
Cobalt	2.5	0.15	mg/Kg	6010B SEP
Copper	1.3	0.080	mg/Kg	6010B SEP
Iron	5.0	4.1	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Manganese	0.75	0.052	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP
Nickel	2.0	0.028	mg/Kg	6010B SEP
Phosphorus	15	0.13	mg/Kg	6010B SEP
Potassium	250	26	mg/Kg	6010B SEP
Selenium	0.50	0.17	mg/Kg	6010B SEP
Silver	1.0	0.057	mg/Kg	6010B SEP
Thallium	1.8	0.18	mg/Kg	6010B SEP
Vanadium	2.5	0.056	mg/Kg	6010B SEP
Zinc	1.0	0.10	mg/Kg	6010B SEP

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B SEP
Antimony	3.0	0.14	mg/Kg	6010B SEP
Arsenic	0.50	0.13	mg/Kg	6010B SEP
Barium	2.5	0.12	mg/Kg	6010B SEP
Beryllium	0.25	0.0075	mg/Kg	6010B SEP

TestAmerica Knoxville

## Default Detection Limits

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

### Method: 6010B SEP - SEP Metals (ICP) - Sum of Steps 1-7 (Continued)

Analyte	RL	MDL	Units	Method
Cadmium	0.25	0.011	mg/Kg	6010B SEP
Calcium	250	0.74	mg/Kg	6010B SEP
Chromium	0.50	0.070	mg/Kg	6010B SEP
Cobalt	2.5	0.023	mg/Kg	6010B SEP
Copper	1.3	0.080	mg/Kg	6010B SEP
Iron	5.0	4.1	mg/Kg	6010B SEP
Lead	0.50	0.11	mg/Kg	6010B SEP
Li	2.5	0.15	mg/Kg	6010B SEP
Manganese	0.75	0.052	mg/Kg	6010B SEP
Mo	2.0	0.082	mg/Kg	6010B SEP
Nickel	2.0	0.028	mg/Kg	6010B SEP
Phosphorus	15	0.13	mg/Kg	6010B SEP
Potassium	250	26	mg/Kg	6010B SEP
Selenium	0.50	0.17	mg/Kg	6010B SEP
Silver	1.0	0.057	mg/Kg	6010B SEP
Thallium	1.8	0.18	mg/Kg	6010B SEP
Vanadium	2.5	0.056	mg/Kg	6010B SEP
Zinc	1.0	0.10	mg/Kg	6010B SEP

### Method: 6010B - SEP Metals (ICP) - Total

Prep: Total

Analyte	RL	MDL	Units	Method
Aluminum	10	1.6	mg/Kg	6010B
Antimony	3.0	0.14	mg/Kg	6010B
Arsenic	0.50	0.13	mg/Kg	6010B
Barium	2.5	0.12	mg/Kg	6010B
Beryllium	0.25	0.0075	mg/Kg	6010B
Cadmium	0.25	0.011	mg/Kg	6010B
Calcium	250	0.74	mg/Kg	6010B
Chromium	0.50	0.070	mg/Kg	6010B
Cobalt	2.5	0.15	mg/Kg	6010B
Copper	1.3	0.080	mg/Kg	6010B
Iron	5.0	4.1	mg/Kg	6010B
Lead	0.50	0.11	mg/Kg	6010B
Lithium	2.5	0.15	mg/Kg	6010B
Manganese	0.75	0.052	mg/Kg	6010B
Molybdenum	2.0	0.082	mg/Kg	6010B
Nickel	2.0	0.028	mg/Kg	6010B
Phosphorus	15	0.13	mg/Kg	6010B
Potassium	250	26	mg/Kg	6010B
Selenium	0.50	0.17	mg/Kg	6010B
Silver	1.0	0.057	mg/Kg	6010B
Thallium	1.8	0.18	mg/Kg	6010B
Vanadium	2.5	0.056	mg/Kg	6010B
Zinc	1.0	0.10	mg/Kg	6010B

### Method: 7470A - SEP Mercury (CVAA) - Total

Prep: Total

Analyte	RL	MDL	Units	Method
Hg	0.10	0.040	mg/Kg	7470A

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B - SEP Metals (ICP) - Total

**Lab Sample ID: MB 140-21745/7-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Antimony	ND		3.0	0.14	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Arsenic	ND		0.50	0.13	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Barium	ND		2.5	0.12	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Beryllium	ND		0.25	0.0075	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Cadmium	ND		0.25	0.011	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Calcium	2.04	J	250	0.74	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Chromium	ND		0.50	0.070	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Cobalt	ND		2.5	0.15	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Copper	ND		1.3	0.080	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Iron	ND		5.0	4.1	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Lead	ND		0.50	0.11	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Lithium	ND		2.5	0.15	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Manganese	0.0595	J	0.75	0.052	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Molybdenum	ND		2.0	0.082	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Nickel	0.0315	J	2.0	0.028	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Phosphorus	1.41	J	15	0.13	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Potassium	ND		250	26	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Selenium	ND		0.50	0.17	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Silver	ND		1.0	0.057	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Thallium	ND		1.8	0.18	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Vanadium	ND		2.5	0.056	mg/Kg		07/06/18 08:00	07/23/18 12:48	1
Zinc	ND		1.0	0.10	mg/Kg		07/06/18 08:00	07/23/18 12:48	1

**Lab Sample ID: LCS 140-21745/8-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	101		mg/Kg		101	75 - 125
Antimony	25.0	25.2		mg/Kg		101	75 - 125
Arsenic	5.00	5.07		mg/Kg		101	75 - 125
Barium	5.00	5.40		mg/Kg		108	75 - 125
Beryllium	2.50	2.56		mg/Kg		102	75 - 125
Cadmium	2.50	2.58		mg/Kg		103	75 - 125
Calcium	2500	2520		mg/Kg		101	75 - 125
Chromium	10.0	10.9		mg/Kg		109	75 - 125
Cobalt	5.00	5.41		mg/Kg		108	75 - 125
Copper	12.5	12.8		mg/Kg		103	75 - 125
Iron	50.0	55.7		mg/Kg		111	75 - 125
Lead	5.00	4.98		mg/Kg		100	75 - 125
Lithium	5.00	5.18		mg/Kg		104	75 - 125
Manganese	5.00	5.22		mg/Kg		104	75 - 125
Molybdenum	25.0	27.4		mg/Kg		109	75 - 125
Nickel	25.0	26.3		mg/Kg		105	75 - 125
Phosphorus	250	262		mg/Kg		105	75 - 125
Potassium	2500	2580		mg/Kg		103	75 - 125
Selenium	7.50	7.65		mg/Kg		102	75 - 125

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B - SEP Metals (ICP) - Total (Continued)

**Lab Sample ID: LCS 140-21745/8-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	2.50	2.33		mg/Kg		93	75 - 125
Thallium	20.0	19.9		mg/Kg		99	75 - 125
Vanadium	10.0	10.2		mg/Kg		102	75 - 125
Zinc	25.0	27.3		mg/Kg		109	75 - 125

**Lab Sample ID: LCSD 140-21745/9-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	100		mg/Kg		100	75 - 125	1	30
Antimony	25.0	25.3		mg/Kg		101	75 - 125	1	30
Arsenic	5.00	5.06		mg/Kg		101	75 - 125	0	30
Barium	5.00	5.45		mg/Kg		109	75 - 125	1	30
Beryllium	2.50	2.56		mg/Kg		103	75 - 125	0	30
Cadmium	2.50	2.56		mg/Kg		103	75 - 125	1	30
Calcium	2500	2480		mg/Kg		99	75 - 125	2	30
Chromium	10.0	10.8		mg/Kg		108	75 - 125	1	30
Cobalt	5.00	5.40		mg/Kg		108	75 - 125	0	30
Copper	12.5	12.9		mg/Kg		103	75 - 125	0	30
Iron	50.0	55.8		mg/Kg		112	75 - 125	0	30
Lead	5.00	4.97		mg/Kg		99	75 - 125	0	30
Lithium	5.00	5.23		mg/Kg		105	75 - 125	1	30
Manganese	5.00	5.18		mg/Kg		104	75 - 125	1	30
Molybdenum	25.0	27.5		mg/Kg		110	75 - 125	1	30
Nickel	25.0	26.3		mg/Kg		105	75 - 125	0	30
Phosphorus	250	264		mg/Kg		106	75 - 125	1	30
Potassium	2500	2580		mg/Kg		103	75 - 125	0	30
Selenium	7.50	7.86		mg/Kg		105	75 - 125	3	30
Silver	2.50	2.33		mg/Kg		93	75 - 125	0	30
Thallium	20.0	19.8		mg/Kg		99	75 - 125	0	30
Vanadium	10.0	10.1		mg/Kg		101	75 - 125	1	30
Zinc	25.0	27.4		mg/Kg		110	75 - 125	0	30

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	ND		ND		mg/Kg	✖	NC	30
Arsenic	6.8		6.09		mg/Kg	✖	10	30
Beryllium	0.54		0.492		mg/Kg	✖	9	30
Cadmium	0.11	J	0.128	J	mg/Kg	✖	13	30
Chromium	12		13.0		mg/Kg	✖	5	30
Cobalt	5.9		6.16		mg/Kg	✖	4	30
Copper	9.0		10.2		mg/Kg	✖	12	30
Iron	13000		12300		mg/Kg	✖	3	30
Lead	8.0		7.30		mg/Kg	✖	9	30
Lithium	9.7		10.1		mg/Kg	✖	3	30

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B - SEP Metals (ICP) - Total (Continued)

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Manganese	210	B	210		mg/Kg	☼	0.4	30
Molybdenum	0.92	J	0.956	J	mg/Kg	☼	3	30
Nickel	12	B	12.0		mg/Kg	☼	3	30
Phosphorus	190	B	187		mg/Kg	☼	3	30
Potassium	8200		7580		mg/Kg	☼	7	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Silver	0.15	J*	0.118	J*	mg/Kg	☼	21	30
Thallium	0.89	J	0.924	J	mg/Kg	☼	4	30
Vanadium	20		19.9		mg/Kg	☼	2	30

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Aluminum	26000		25200		mg/Kg	☼	2	30
Barium	260		232		mg/Kg	☼	10	30
Calcium	5700		5800		mg/Kg	☼	2	30
Zinc	35		34.7		mg/Kg	☼	0.8	30

## Method: 6010B SEP - SEP Metals (ICP)

**Lab Sample ID: MB 140-21746/7-B ^4**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Method Blank**  
**Prep Type: Step 1**  
**Prep Batch: 21773**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil	Fac
	Result	Qualifier								
Aluminum	ND		40	6.4	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Antimony	ND		12	1.1	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Arsenic	ND		2.0	0.52	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Barium	ND		10	0.48	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Beryllium	ND		1.0	0.31	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Cadmium	ND		1.0	0.064	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Calcium	ND		1000	7.6	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Chromium	ND		2.0	0.28	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Cobalt	ND		10	0.18	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Copper	ND		5.0	0.32	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Iron	ND		20	12	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Lead	ND		2.0	0.44	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Li	ND		10	0.60	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Manganese	ND		3.0	0.12	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Mo	ND		8.0	0.33	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Nickel	ND		8.0	0.27	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Phosphorus	ND		60	25	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Potassium	ND		1000	100	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Selenium	ND		2.0	0.68	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Silver	ND		4.0	0.44	mg/Kg		07/09/18 08:00	07/17/18 12:18		4
Thallium	ND		7.0	0.84	mg/Kg		07/09/18 08:00	07/17/18 12:18		4

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-21746/7-B ^4**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Method Blank**  
**Prep Type: Step 1**  
**Prep Batch: 21773**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vanadium	ND		10	0.20	mg/Kg		07/09/18 08:00	07/17/18 12:18	4
Zinc	ND		4.0	0.96	mg/Kg		07/09/18 08:00	07/17/18 12:18	4

**Lab Sample ID: LCS 140-21746/8-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 1**  
**Prep Batch: 21773**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	100		mg/Kg		100	75 - 125
Antimony	25.0	23.6		mg/Kg		94	75 - 125
Arsenic	5.00	4.65		mg/Kg		93	75 - 125
Barium	5.00	4.78	J	mg/Kg		96	75 - 125
Beryllium	2.50	2.50		mg/Kg		100	75 - 125
Cadmium	2.50	2.43		mg/Kg		97	75 - 125
Calcium	2500	2390		mg/Kg		95	75 - 125
Chromium	10.0	9.78		mg/Kg		98	75 - 125
Cobalt	5.00	4.97	J	mg/Kg		99	75 - 125
Copper	12.5	12.6		mg/Kg		101	75 - 125
Iron	50.0	49.5		mg/Kg		99	75 - 125
Lead	5.00	4.74		mg/Kg		95	75 - 125
Li	5.00	4.98	J	mg/Kg		100	75 - 125
Manganese	5.00	4.33		mg/Kg		87	75 - 125
Mo	25.0	24.5		mg/Kg		98	75 - 125
Nickel	25.0	24.0		mg/Kg		96	75 - 125
Phosphorus	250	237		mg/Kg		95	75 - 125
Potassium	2500	2640		mg/Kg		105	75 - 125
Selenium	7.50	7.35		mg/Kg		98	75 - 125
Silver	2.50	2.40	J	mg/Kg		96	75 - 125
Thallium	20.0	20.6		mg/Kg		103	75 - 125
Vanadium	10.0	9.90	J	mg/Kg		99	75 - 125
Zinc	25.0	24.8		mg/Kg		99	75 - 125

**Lab Sample ID: LCSD 140-21746/9-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 1**  
**Prep Batch: 21773**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	104		mg/Kg		104	75 - 125	4	30
Antimony	25.0	24.2		mg/Kg		97	75 - 125	2	30
Arsenic	5.00	4.54		mg/Kg		91	75 - 125	3	30
Barium	5.00	4.77	J	mg/Kg		95	75 - 125	0	30
Beryllium	2.50	2.55		mg/Kg		102	75 - 125	2	30
Cadmium	2.50	2.47		mg/Kg		99	75 - 125	2	30
Calcium	2500	2320		mg/Kg		93	75 - 125	3	30
Chromium	10.0	9.97		mg/Kg		100	75 - 125	2	30
Cobalt	5.00	5.04	J	mg/Kg		101	75 - 125	1	30
Copper	12.5	12.6		mg/Kg		101	75 - 125	0	30
Iron	50.0	49.7		mg/Kg		99	75 - 125	0	30
Lead	5.00	4.92		mg/Kg		98	75 - 125	4	30

TestAmerica Knoxville



# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCSD 140-21746/9-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 1**  
**Prep Batch: 21773**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Li	5.00	5.00	J	mg/Kg		100	75 - 125	1	30
Manganese	5.00	4.47		mg/Kg		89	75 - 125	3	30
Mo	25.0	25.0		mg/Kg		100	75 - 125	2	30
Nickel	25.0	24.5		mg/Kg		98	75 - 125	2	30
Phosphorus	250	242		mg/Kg		97	75 - 125	2	30
Potassium	2500	2580		mg/Kg		103	75 - 125	2	30
Selenium	7.50	7.44		mg/Kg		99	75 - 125	1	30
Silver	2.50	2.48	J	mg/Kg		99	75 - 125	3	30
Thallium	20.0	20.5		mg/Kg		103	75 - 125	1	30
Vanadium	10.0	10.1	J	mg/Kg		101	75 - 125	1	30
Zinc	25.0	25.2		mg/Kg		101	75 - 125	2	30

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 1**  
**Prep Batch: 21773**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	ND		ND		mg/Kg	☼	NC	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Barium	1.1	J	1.08	J	mg/Kg	☼	2	30
Beryllium	ND		ND		mg/Kg	☼	NC	30
Cadmium	ND		ND		mg/Kg	☼	NC	30
Calcium	360	J	360	J	mg/Kg	☼	0.9	30
Chromium	ND		ND		mg/Kg	☼	NC	30
Cobalt	ND		ND		mg/Kg	☼	NC	30
Copper	ND		ND		mg/Kg	☼	NC	30
Iron	ND		ND		mg/Kg	☼	NC	30
Lead	ND		ND		mg/Kg	☼	NC	30
Li	ND		ND		mg/Kg	☼	NC	30
Manganese	ND		ND		mg/Kg	☼	NC	30
Mo	ND		ND		mg/Kg	☼	NC	30
Nickel	ND		ND		mg/Kg	☼	NC	30
Phosphorus	ND		ND		mg/Kg	☼	NC	30
Potassium	ND		ND		mg/Kg	☼	NC	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Silver	ND		ND		mg/Kg	☼	NC	30
Thallium	ND		ND		mg/Kg	☼	NC	30
Vanadium	ND		ND		mg/Kg	☼	NC	30
Zinc	ND		3.67	J	mg/Kg	☼	NC	30

**Lab Sample ID: MB 140-21838/7-B ^3**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Method Blank**  
**Prep Type: Step 2**  
**Prep Batch: 21848**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		30	4.8	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Antimony	ND		9.0	0.84	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Arsenic	ND		1.5	0.39	mg/Kg		07/11/18 08:00	07/17/18 13:18	3

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-21838/7-B ^3**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Method Blank**  
**Prep Type: Step 2**  
**Prep Batch: 21848**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	ND		7.5	0.36	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Beryllium	ND		0.75	0.048	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Cadmium	ND		0.75	0.033	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Calcium	ND		750	6.6	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Chromium	ND		1.5	0.21	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Cobalt	ND		7.5	0.19	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Copper	ND		3.8	0.48	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Iron	ND		15	8.7	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Lead	ND		1.5	0.33	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Li	ND		7.5	0.45	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Manganese	ND		2.3	0.84	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Mo	ND		6.0	0.25	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Nickel	ND		6.0	0.15	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Phosphorus	ND		45	9.0	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Potassium	ND		750	78	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Selenium	0.635	J	1.5	0.51	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Silver	ND		3.0	0.21	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Thallium	ND		5.3	0.63	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Vanadium	ND		7.5	0.48	mg/Kg		07/11/18 08:00	07/17/18 13:18	3
Zinc	ND		3.0	0.60	mg/Kg		07/11/18 08:00	07/17/18 13:18	3

**Lab Sample ID: LCS 140-21838/8-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 2**  
**Prep Batch: 21848**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	ND	*	mg/Kg		5	75 - 125
Antimony	25.0	20.3		mg/Kg		81	75 - 125
Arsenic	5.00	3.48	*	mg/Kg		70	75 - 125
Barium	5.00	2.90	J *	mg/Kg		58	75 - 125
Beryllium	2.50	1.59	*	mg/Kg		64	75 - 125
Cadmium	2.50	2.35		mg/Kg		94	75 - 125
Calcium	2500	1160	J *	mg/Kg		46	75 - 125
Chromium	10.0	7.72		mg/Kg		77	75 - 125
Cobalt	5.00	4.65	J	mg/Kg		93	75 - 125
Copper	12.5	11.6		mg/Kg		93	75 - 125
Iron	50.0	ND	*	mg/Kg		2	75 - 125
Lead	5.00	4.62		mg/Kg		92	75 - 125
Li	5.00	4.64	J	mg/Kg		93	75 - 125
Manganese	5.00	4.85		mg/Kg		97	75 - 125
Mo	25.0	21.4		mg/Kg		86	75 - 125
Nickel	25.0	23.2		mg/Kg		93	75 - 125
Phosphorus	250	136	*	mg/Kg		54	75 - 125
Potassium	2500	2580		mg/Kg		103	75 - 125
Selenium	7.50	6.83		mg/Kg		91	75 - 125
Silver	2.50	2.28	J	mg/Kg		91	75 - 125
Thallium	20.0	19.0		mg/Kg		95	75 - 125
Vanadium	10.0	7.81	J	mg/Kg		78	75 - 125

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCS 140-21838/8-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 2**  
**Prep Batch: 21848**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Zinc	25.0	23.4		mg/Kg		94	75 - 125

**Lab Sample ID: LCSD 140-21838/9-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 2**  
**Prep Batch: 21848**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	8.55	J *	mg/Kg		9	75 - 125	53	30
Antimony	25.0	20.2		mg/Kg		81	75 - 125	1	30
Arsenic	5.00	3.74		mg/Kg		75	75 - 125	7	30
Barium	5.00	2.88	J *	mg/Kg		58	75 - 125	1	30
Beryllium	2.50	1.60	*	mg/Kg		64	75 - 125	1	30
Cadmium	2.50	2.37		mg/Kg		95	75 - 125	1	30
Calcium	2500	1110	J *	mg/Kg		45	75 - 125	4	30
Chromium	10.0	7.74		mg/Kg		77	75 - 125	0	30
Cobalt	5.00	4.71	J	mg/Kg		94	75 - 125	1	30
Copper	12.5	11.7		mg/Kg		94	75 - 125	1	30
Iron	50.0	ND	*	mg/Kg		2	75 - 125	20	30
Lead	5.00	4.40		mg/Kg		88	75 - 125	5	30
Li	5.00	4.88	J	mg/Kg		98	75 - 125	5	30
Manganese	5.00	4.92		mg/Kg		98	75 - 125	1	30
Mo	25.0	21.7		mg/Kg		87	75 - 125	1	30
Nickel	25.0	23.3		mg/Kg		93	75 - 125	1	30
Phosphorus	250	138	*	mg/Kg		55	75 - 125	1	30
Potassium	2500	2550		mg/Kg		102	75 - 125	1	30
Selenium	7.50	6.62		mg/Kg		88	75 - 125	3	30
Silver	2.50	2.27	J	mg/Kg		91	75 - 125	1	30
Thallium	20.0	18.6		mg/Kg		93	75 - 125	2	30
Vanadium	10.0	7.93	J	mg/Kg		79	75 - 125	1	30
Zinc	25.0	23.8		mg/Kg		95	75 - 125	2	30

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 2**  
**Prep Batch: 21848**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	16	J *	13.1	J *	mg/Kg	☼	20	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND	*	ND	*	mg/Kg	☼	NC	30
Barium	1.3	J *	1.23	J *	mg/Kg	☼	7	30
Beryllium	ND	*	ND	*	mg/Kg	☼	NC	30
Cadmium	ND		ND		mg/Kg	☼	NC	30
Calcium	1500	*	1590	*	mg/Kg	☼	5	30
Chromium	ND		ND		mg/Kg	☼	NC	30
Cobalt	ND		ND		mg/Kg	☼	NC	30
Copper	ND		ND		mg/Kg	☼	NC	30
Iron	15	J *	14.7	J *	mg/Kg	☼	5	30
Lead	ND		ND		mg/Kg	☼	NC	30
Li	ND		ND		mg/Kg	☼	NC	30

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 2**  
**Prep Batch: 21848**

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	RPD	Limit
	Result	Qualifier	Result	Qualifier					
Manganese	13		13.5		mg/Kg	☼	4	4	30
Mo	ND		ND		mg/Kg	☼	NC	NC	30
Nickel	0.25	J	0.238	J	mg/Kg	☼	6	6	30
Phosphorus	ND	*	ND	*	mg/Kg	☼	NC	NC	30
Potassium	ND		ND		mg/Kg	☼	NC	NC	30
Selenium	0.66	J B	ND		mg/Kg	☼	NC	NC	30
Silver	ND		ND		mg/Kg	☼	NC	NC	30
Thallium	ND		ND		mg/Kg	☼	NC	NC	30
Vanadium	ND		ND		mg/Kg	☼	NC	NC	30
Zinc	2.4	J	2.04	J	mg/Kg	☼	16	16	30

**Lab Sample ID: MB 140-21855/7-B**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Method Blank**  
**Prep Type: Step 3**  
**Prep Batch: 21890**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Aluminum	ND		10	2.1	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Antimony	ND		3.0	0.28	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Arsenic	ND		0.50	0.13	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Barium	0.158	J	2.5	0.12	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Beryllium	ND		0.25	0.015	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Cadmium	0.0655	J	0.25	0.011	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Calcium	2.67	J	250	1.5	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Chromium	ND		0.50	0.070	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Cobalt	ND		2.5	0.045	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Copper	ND		1.3	0.26	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Iron	ND		5.0	2.9	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Lead	ND		0.50	0.11	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Li	ND		2.5	0.15	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Manganese	0.0480	J	0.75	0.027	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Mo	ND		2.0	0.082	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Nickel	ND		2.0	0.084	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Phosphorus	ND		15	1.4	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Potassium	52.1	J	250	26	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Selenium	ND		0.50	0.17	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Silver	ND		1.0	0.11	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Thallium	ND		1.8	0.21	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Vanadium	ND		2.5	0.075	mg/Kg		07/12/18 08:00	07/17/18 14:19	1
Zinc	0.149	J	1.0	0.10	mg/Kg		07/12/18 08:00	07/17/18 14:19	1

**Lab Sample ID: LCS 140-21855/8-B**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 3**  
**Prep Batch: 21890**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				
Aluminum	100	97.5		mg/Kg		97	75 - 125
Antimony	25.0	24.1		mg/Kg		96	75 - 125
Arsenic	5.00	4.85		mg/Kg		97	75 - 125
Barium	5.00	5.14		mg/Kg		103	75 - 125

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCS 140-21855/8-B**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 3**  
**Prep Batch: 21890**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Beryllium	2.50	2.61		mg/Kg		104	75 - 125
Cadmium	2.50	1.58	*	mg/Kg		63	75 - 125
Calcium	2500	60.6	J *	mg/Kg		2	75 - 125
Chromium	10.0	10.3		mg/Kg		103	75 - 125
Cobalt	5.00	5.20		mg/Kg		104	75 - 125
Copper	12.5	12.6		mg/Kg		101	75 - 125
Iron	50.0	50.9		mg/Kg		102	75 - 125
Lead	5.00	0.226	J *	mg/Kg		5	75 - 125
Li	5.00	5.00		mg/Kg		100	75 - 125
Manganese	5.00	5.41		mg/Kg		108	75 - 125
Mo	25.0	25.8		mg/Kg		103	75 - 125
Nickel	25.0	25.3		mg/Kg		101	75 - 125
Phosphorus	250	246		mg/Kg		98	75 - 125
Potassium	2500	2600		mg/Kg		104	75 - 125
Selenium	7.50	7.74		mg/Kg		103	75 - 125
Silver	2.50	1.25	*	mg/Kg		50	75 - 125
Thallium	20.0	21.1		mg/Kg		105	75 - 125
Vanadium	10.0	10.4		mg/Kg		104	75 - 125
Zinc	25.0	25.4		mg/Kg		102	75 - 125

**Lab Sample ID: LCSD 140-21855/9-B**  
**Matrix: Solid**  
**Analysis Batch: 22042**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 3**  
**Prep Batch: 21890**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Aluminum	100	96.8		mg/Kg		97	75 - 125	1	30
Antimony	25.0	23.9		mg/Kg		96	75 - 125	0	30
Arsenic	5.00	4.91		mg/Kg		98	75 - 125	1	30
Barium	5.00	5.28		mg/Kg		106	75 - 125	3	30
Beryllium	2.50	2.59		mg/Kg		103	75 - 125	1	30
Cadmium	2.50	1.63	*	mg/Kg		65	75 - 125	3	30
Calcium	2500	63.1	J *	mg/Kg		3	75 - 125	4	30
Chromium	10.0	10.3		mg/Kg		103	75 - 125	0	30
Cobalt	5.00	5.20		mg/Kg		104	75 - 125	0	30
Copper	12.5	12.5		mg/Kg		100	75 - 125	1	30
Iron	50.0	51.5		mg/Kg		103	75 - 125	1	30
Lead	5.00	0.261	J *	mg/Kg		5	75 - 125	14	30
Li	5.00	5.01		mg/Kg		100	75 - 125	0	30
Manganese	5.00	5.44		mg/Kg		109	75 - 125	0	30
Mo	25.0	25.6		mg/Kg		102	75 - 125	1	30
Nickel	25.0	25.4		mg/Kg		102	75 - 125	0	30
Phosphorus	250	246		mg/Kg		98	75 - 125	0	30
Potassium	2500	2580		mg/Kg		103	75 - 125	1	30
Selenium	7.50	7.88		mg/Kg		105	75 - 125	2	30
Silver	2.50	1.24	*	mg/Kg		49	75 - 125	1	30
Thallium	20.0	21.1		mg/Kg		105	75 - 125	0	30
Vanadium	10.0	10.3		mg/Kg		103	75 - 125	1	30
Zinc	25.0	25.5		mg/Kg		102	75 - 125	0	30

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: 140-11946-3 DU**

**Matrix: Solid**

**Analysis Batch: 22042**

**Client Sample ID: SB-1805 (50-60')**

**Prep Type: Step 3**

**Prep Batch: 21890**

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	RPD	Limit
	Result	Qualifier	Result	Qualifier					
Aluminum	70		68.8		mg/Kg	☼	2	30	
Antimony	ND		ND		mg/Kg	☼	NC	30	
Arsenic	0.50	J	0.477	J	mg/Kg	☼	4	30	
Barium	2.7	J B	2.66	J	mg/Kg	☼	2	30	
Beryllium	0.024	J	0.0251	J	mg/Kg	☼	2	30	
Cadmium	0.045	J B *	0.0496	J *	mg/Kg	☼	10	30	
Calcium	6.5	J B *	6.63	J *	mg/Kg	☼	3	30	
Chromium	0.51	J	0.492	J	mg/Kg	☼	5	30	
Cobalt	2.4	J	2.08	J	mg/Kg	☼	13	30	
Copper	1.5		1.34	J	mg/Kg	☼	11	30	
Iron	390		389		mg/Kg	☼	0.7	30	
Lead	0.93	*	0.798	*	mg/Kg	☼	15	30	
Li	ND		ND		mg/Kg	☼	NC	30	
Manganese	110	B	108		mg/Kg	☼	3	30	
Mo	0.11	J	0.112	J	mg/Kg	☼	5	30	
Nickel	1.8	J	1.96	J	mg/Kg	☼	8	30	
Phosphorus	32		31.5		mg/Kg	☼	2	30	
Potassium	66	J B	65.7	J	mg/Kg	☼	0.6	30	
Selenium	ND		ND		mg/Kg	☼	NC	30	
Silver	ND	*	ND	*	mg/Kg	☼	NC	30	
Thallium	ND		ND		mg/Kg	☼	NC	30	
Vanadium	0.46	J	0.424	J	mg/Kg	☼	9	30	
Zinc	2.0	B	1.95		mg/Kg	☼	4	30	

**Lab Sample ID: MB 140-21891/7-B**

**Matrix: Solid**

**Analysis Batch: 22073**

**Client Sample ID: Method Blank**

**Prep Type: Step 4**

**Prep Batch: 21927**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Aluminum	ND		10	1.6	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Antimony	ND		3.0	0.45	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Arsenic	0.607		0.50	0.22	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Barium	ND		2.5	0.12	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Beryllium	ND		0.25	0.016	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Cadmium	ND		0.25	0.011	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Calcium	3.52	J	250	2.2	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Chromium	ND		0.50	0.070	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Cobalt	ND		2.5	0.053	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Copper	ND		1.3	0.22	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Iron	ND		5.0	2.9	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Lead	ND		0.50	0.11	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Li	ND		2.5	0.15	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Manganese	ND		0.75	0.13	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Mo	ND		2.0	0.082	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Nickel	ND		2.0	0.039	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Phosphorus	ND		15	7.1	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Potassium	ND		250	26	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Selenium	1.20		0.50	0.47	mg/Kg		07/13/18 08:00	07/18/18 10:48	1

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-21891/7-B**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Method Blank**  
**Prep Type: Step 4**  
**Prep Batch: 21927**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	ND		1.0	0.10	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Thallium	ND		1.8	0.29	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Vanadium	ND		2.5	0.11	mg/Kg		07/13/18 08:00	07/18/18 10:48	1
Zinc	0.165	J	1.0	0.16	mg/Kg		07/13/18 08:00	07/18/18 10:48	1

**Lab Sample ID: LCS 140-21891/8-B**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 4**  
**Prep Batch: 21927**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	96.1		mg/Kg		96	75 - 125
Antimony	25.0	24.3		mg/Kg		97	75 - 125
Arsenic	5.00	5.66		mg/Kg		113	75 - 125
Barium	5.00	5.03		mg/Kg		101	75 - 125
Beryllium	2.50	2.61		mg/Kg		104	75 - 125
Cadmium	2.50	2.53		mg/Kg		101	75 - 125
Calcium	2500	2480		mg/Kg		99	75 - 125
Chromium	10.0	10.0		mg/Kg		100	75 - 125
Cobalt	5.00	5.03		mg/Kg		101	75 - 125
Copper	12.5	12.3		mg/Kg		98	75 - 125
Iron	50.0	50.2		mg/Kg		100	75 - 125
Lead	5.00	4.93		mg/Kg		99	75 - 125
Li	5.00	5.01		mg/Kg		100	75 - 125
Manganese	5.00	5.02		mg/Kg		100	75 - 125
Mo	25.0	25.9		mg/Kg		103	75 - 125
Nickel	25.0	25.0		mg/Kg		100	75 - 125
Phosphorus	250	255		mg/Kg		102	75 - 125
Potassium	2500	2480		mg/Kg		99	75 - 125
Selenium	7.50	1.13	*	mg/Kg		15	75 - 125
Silver	2.50	2.36		mg/Kg		94	75 - 125
Thallium	20.0	18.1		mg/Kg		90	75 - 125
Vanadium	10.0	10.1		mg/Kg		101	75 - 125
Zinc	25.0	24.8		mg/Kg		99	75 - 125

**Lab Sample ID: LCSD 140-21891/9-B**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 4**  
**Prep Batch: 21927**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	98.5		mg/Kg		98	75 - 125	2	30
Antimony	25.0	24.9		mg/Kg		100	75 - 125	2	30
Arsenic	5.00	5.71		mg/Kg		114	75 - 125	1	30
Barium	5.00	5.17		mg/Kg		103	75 - 125	3	30
Beryllium	2.50	2.70		mg/Kg		108	75 - 125	3	30
Cadmium	2.50	2.59		mg/Kg		104	75 - 125	2	30
Calcium	2500	2450		mg/Kg		98	75 - 125	1	30
Chromium	10.0	10.4		mg/Kg		104	75 - 125	4	30
Cobalt	5.00	5.17		mg/Kg		103	75 - 125	3	30
Copper	12.5	12.6		mg/Kg		101	75 - 125	2	30

TestAmerica Knoxville



# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCSD 140-21891/9-B**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 4**  
**Prep Batch: 21927**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Iron	50.0	51.5		mg/Kg		103	75 - 125	3	30
Lead	5.00	4.98		mg/Kg		100	75 - 125	1	30
Li	5.00	5.17		mg/Kg		103	75 - 125	3	30
Manganese	5.00	5.19		mg/Kg		104	75 - 125	3	30
Mo	25.0	26.6		mg/Kg		106	75 - 125	3	30
Nickel	25.0	25.7		mg/Kg		103	75 - 125	3	30
Phosphorus	250	261		mg/Kg		104	75 - 125	2	30
Potassium	2500	2460		mg/Kg		98	75 - 125	1	30
Selenium	7.50	0.979	*	mg/Kg		13	75 - 125	14	30
Silver	2.50	2.44		mg/Kg		97	75 - 125	3	30
Thallium	20.0	18.7		mg/Kg		94	75 - 125	3	30
Vanadium	10.0	10.4		mg/Kg		104	75 - 125	3	30
Zinc	25.0	25.5		mg/Kg		102	75 - 125	3	30

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 4**  
**Prep Batch: 21927**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	900		933		mg/Kg	☼	4	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	2.8	B	2.83		mg/Kg	☼	0.6	30
Barium	5.3		4.84		mg/Kg	☼	9	30
Beryllium	0.085	J	0.0854	J	mg/Kg	☼	0	30
Cadmium	0.13	J	0.124	J	mg/Kg	☼	1	30
Calcium	520	B	558		mg/Kg	☼	7	30
Chromium	2.4		2.55		mg/Kg	☼	8	30
Cobalt	2.3	J	2.24	J	mg/Kg	☼	2	30
Copper	4.7		4.37		mg/Kg	☼	8	30
Iron	4700		4840		mg/Kg	☼	2	30
Lead	3.2		2.92		mg/Kg	☼	9	30
Li	2.0	J	2.07	J	mg/Kg	☼	2	30
Manganese	41		40.4		mg/Kg	☼	2	30
Mo	0.39	J	0.388	J	mg/Kg	☼	0.5	30
Nickel	6.0		6.07		mg/Kg	☼	2	30
Phosphorus	74		78.7		mg/Kg	☼	6	30
Potassium	ND		ND		mg/Kg	☼	NC	30
Selenium	0.96	* B	0.679	F5 *	mg/Kg	☼	35	30
Silver	ND		ND		mg/Kg	☼	NC	30
Thallium	ND		ND		mg/Kg	☼	NC	30
Vanadium	3.0		2.95	J	mg/Kg	☼	1	30
Zinc	15	B	15.0		mg/Kg	☼	1	30

**Lab Sample ID: MB 140-21939/7-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Method Blank**  
**Prep Type: Step 5**  
**Prep Batch: 22010**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		150	24	mg/Kg		07/17/18 08:00	07/18/18 11:47	5

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-21939/7-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Method Blank**  
**Prep Type: Step 5**  
**Prep Batch: 22010**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		45	4.2	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Arsenic	ND		7.5	1.9	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Barium	ND		38	1.8	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Beryllium	ND		3.8	0.32	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Cadmium	ND		3.8	0.16	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Calcium	ND		3800	11	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Chromium	ND		7.5	1.1	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Cobalt	ND		38	0.60	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Copper	ND		19	1.2	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Iron	ND		75	44	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Lead	ND		7.5	1.7	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Li	7.06	J	38	2.2	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Manganese	ND		11	1.9	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Mo	ND		30	1.3	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Nickel	ND		30	0.90	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Phosphorus	ND		230	31	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Potassium	633	J	3800	430	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Selenium	ND		7.5	2.6	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Silver	ND		15	1.6	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Thallium	ND		26	3.5	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Vanadium	ND		38	1.2	mg/Kg		07/17/18 08:00	07/18/18 11:47	5
Zinc	ND		15	1.5	mg/Kg		07/17/18 08:00	07/18/18 11:47	5

**Lab Sample ID: LCS 140-21939/8-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 5**  
**Prep Batch: 22010**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	300	24.2	J *	mg/Kg		8	75 - 125
Antimony	75.0	77.7		mg/Kg		104	75 - 125
Arsenic	15.0	12.9		mg/Kg		86	75 - 125
Barium	15.0	9.94	J *	mg/Kg		66	75 - 125
Beryllium	7.50	5.42	*	mg/Kg		72	75 - 125
Cadmium	7.50	8.40		mg/Kg		112	75 - 125
Calcium	7500	4200	*	mg/Kg		56	75 - 125
Chromium	30.0	33.6		mg/Kg		112	75 - 125
Cobalt	15.0	6.54	J *	mg/Kg		44	75 - 125
Copper	37.5	34.8		mg/Kg		93	75 - 125
Iron	150	ND	*	mg/Kg		0.9	75 - 125
Lead	15.0	4.81	J *	mg/Kg		32	75 - 125
Li	15.0	23.3	J *	mg/Kg		155	75 - 125
Manganese	15.0	2.99	J *	mg/Kg		20	75 - 125
Mo	75.0	67.6		mg/Kg		90	75 - 125
Nickel	75.0	79.7		mg/Kg		106	75 - 125
Phosphorus	750	477	*	mg/Kg		64	75 - 125
Potassium	7500	9180		mg/Kg		122	75 - 125
Selenium	22.5	24.8		mg/Kg		110	75 - 125
Silver	7.50	8.33	J	mg/Kg		111	75 - 125

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCS 140-21939/8-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 5**  
**Prep Batch: 22010**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Thallium	60.0	3.74	J *	mg/Kg		6	75 - 125
Vanadium	30.0	24.5	J	mg/Kg		82	75 - 125
Zinc	75.0	82.1		mg/Kg		109	75 - 125

**Lab Sample ID: LCSD 140-21939/9-B ^5**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 5**  
**Prep Batch: 22010**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Aluminum	300	24.0	J *	mg/Kg		8	75 - 125	1	30
Antimony	75.0	78.8		mg/Kg		105	75 - 125	1	30
Arsenic	15.0	11.4		mg/Kg		76	75 - 125	12	30
Barium	15.0	9.53	J *	mg/Kg		64	75 - 125	4	30
Beryllium	7.50	5.12	*	mg/Kg		68	75 - 125	6	30
Cadmium	7.50	8.06		mg/Kg		108	75 - 125	4	30
Calcium	7500	4060	*	mg/Kg		54	75 - 125	3	30
Chromium	30.0	32.7		mg/Kg		109	75 - 125	3	30
Cobalt	15.0	6.29	J *	mg/Kg		42	75 - 125	4	30
Copper	37.5	34.1		mg/Kg		91	75 - 125	2	30
Iron	150	ND	*	mg/Kg		0.8	75 - 125	19	30
Lead	15.0	5.24	J *	mg/Kg		35	75 - 125	9	30
Li	15.0	22.3	J *	mg/Kg		149	75 - 125	4	30
Manganese	15.0	3.94	J *	mg/Kg		26	75 - 125	28	30
Mo	75.0	69.2		mg/Kg		92	75 - 125	2	30
Nickel	75.0	77.2		mg/Kg		103	75 - 125	3	30
Phosphorus	750	480	*	mg/Kg		64	75 - 125	1	30
Potassium	7500	9250		mg/Kg		123	75 - 125	1	30
Selenium	22.5	25.3		mg/Kg		112	75 - 125	2	30
Silver	7.50	7.85	J	mg/Kg		105	75 - 125	6	30
Thallium	60.0	ND	*	mg/Kg		1	75 - 125	137	30
Vanadium	30.0	23.5	J	mg/Kg		78	75 - 125	5	30
Zinc	75.0	79.3		mg/Kg		106	75 - 125	3	30

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 5**  
**Prep Batch: 22010**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Aluminum	41	J *	32.5	J *	mg/Kg	☼	24	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Barium	ND	*	ND	*	mg/Kg	☼	NC	30
Beryllium	ND	*	ND	*	mg/Kg	☼	NC	30
Cadmium	ND		ND		mg/Kg	☼	NC	30
Calcium	95	J *	147	J * F5	mg/Kg	☼	43	30
Chromium	ND		ND		mg/Kg	☼	NC	30
Cobalt	ND	*	ND	*	mg/Kg	☼	NC	30
Copper	ND		ND		mg/Kg	☼	NC	30
Iron	ND	*	ND	*	mg/Kg	☼	NC	30

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 5**  
**Prep Batch: 22010**

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Lead	ND	*	ND	*	mg/Kg	☼	NC	30
Li	8.8	J B *	8.91	J *	mg/Kg	☼	2	30
Manganese	ND	*	ND	*	mg/Kg	☼	NC	30
Mo	ND		ND		mg/Kg	☼	NC	30
Nickel	ND		ND		mg/Kg	☼	NC	30
Phosphorus	39	J *	ND	*	mg/Kg	☼	NC	30
Potassium	680	J B	669	J	mg/Kg	☼	0.9	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Silver	ND		ND		mg/Kg	☼	NC	30
Thallium	ND	*	ND	*	mg/Kg	☼	NC	30
Vanadium	ND		ND		mg/Kg	☼	NC	30
Zinc	2.4	J	2.66	J	mg/Kg	☼	9	30

**Lab Sample ID: MB 140-22011/7-A**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Method Blank**  
**Prep Type: Step 6**  
**Prep Batch: 22011**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Aluminum	ND		10	1.6	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Antimony	ND		3.0	0.28	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Arsenic	ND		0.50	0.15	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Barium	ND		2.5	0.12	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Beryllium	ND		0.25	0.012	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Cadmium	ND		0.25	0.011	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Calcium	ND		250	2.1	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Chromium	ND		0.50	0.070	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Cobalt	ND		2.5	0.046	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Copper	ND		1.3	0.080	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Iron	ND		5.0	2.9	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Lead	ND		0.50	0.11	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Li	ND		2.5	0.15	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Manganese	ND		0.75	0.25	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Mo	ND		2.0	0.099	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Nickel	ND		2.0	0.053	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Phosphorus	ND		15	0.61	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Potassium	ND		250	26	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Selenium	ND		0.50	0.17	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Silver	ND		1.0	0.12	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Thallium	ND		1.8	0.21	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Vanadium	ND		2.5	0.15	mg/Kg		07/17/18 08:00	07/18/18 12:49	1
Zinc	ND		1.0	0.10	mg/Kg		07/17/18 08:00	07/18/18 12:49	1

**Lab Sample ID: LCS 140-22011/8-A**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 6**  
**Prep Batch: 22011**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Aluminum	100	92.7		mg/Kg		93	75 - 125
Antimony	25.0	23.8		mg/Kg		95	75 - 125

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCS 140-22011/8-A**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 6**  
**Prep Batch: 22011**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	5.00	4.85		mg/Kg		97	75 - 125
Barium	5.00	4.86		mg/Kg		97	75 - 125
Beryllium	2.50	2.51		mg/Kg		100	75 - 125
Cadmium	2.50	2.49		mg/Kg		99	75 - 125
Calcium	2500	2460		mg/Kg		98	75 - 125
Chromium	10.0	9.87		mg/Kg		99	75 - 125
Cobalt	5.00	4.89		mg/Kg		98	75 - 125
Copper	12.5	11.8		mg/Kg		95	75 - 125
Iron	50.0	47.8		mg/Kg		96	75 - 125
Lead	5.00	4.84		mg/Kg		97	75 - 125
Li	5.00	4.74		mg/Kg		95	75 - 125
Manganese	5.00	4.85		mg/Kg		97	75 - 125
Mo	25.0	24.6		mg/Kg		98	75 - 125
Nickel	25.0	24.2		mg/Kg		97	75 - 125
Phosphorus	250	247		mg/Kg		99	75 - 125
Potassium	2500	2490		mg/Kg		100	75 - 125
Selenium	7.50	7.51		mg/Kg		100	75 - 125
Silver	2.50	2.35		mg/Kg		94	75 - 125
Thallium	20.0	19.9		mg/Kg		100	75 - 125
Vanadium	10.0	9.83		mg/Kg		98	75 - 125
Zinc	25.0	24.7		mg/Kg		99	75 - 125

**Lab Sample ID: LCSD 140-22011/9-A**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 6**  
**Prep Batch: 22011**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	100	96.3		mg/Kg		96	75 - 125	4	30
Antimony	25.0	24.7		mg/Kg		99	75 - 125	4	30
Arsenic	5.00	4.99		mg/Kg		100	75 - 125	3	30
Barium	5.00	4.99		mg/Kg		100	75 - 125	3	30
Beryllium	2.50	2.54		mg/Kg		102	75 - 125	1	30
Cadmium	2.50	2.56		mg/Kg		102	75 - 125	3	30
Calcium	2500	2430		mg/Kg		97	75 - 125	1	30
Chromium	10.0	10.1		mg/Kg		101	75 - 125	2	30
Cobalt	5.00	5.04		mg/Kg		101	75 - 125	3	30
Copper	12.5	12.2		mg/Kg		98	75 - 125	3	30
Iron	50.0	48.9		mg/Kg		98	75 - 125	2	30
Lead	5.00	5.06		mg/Kg		101	75 - 125	5	30
Li	5.00	4.87		mg/Kg		97	75 - 125	3	30
Manganese	5.00	4.96		mg/Kg		99	75 - 125	2	30
Mo	25.0	25.5		mg/Kg		102	75 - 125	4	30
Nickel	25.0	25.0		mg/Kg		100	75 - 125	3	30
Phosphorus	250	256		mg/Kg		103	75 - 125	4	30
Potassium	2500	2490		mg/Kg		99	75 - 125	0	30
Selenium	7.50	7.57		mg/Kg		101	75 - 125	1	30
Silver	2.50	2.42		mg/Kg		97	75 - 125	3	30
Thallium	20.0	20.7		mg/Kg		104	75 - 125	4	30

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCSD 140-22011/9-A**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 6**  
**Prep Batch: 22011**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Vanadium	10.0	10.1		mg/Kg		101	75 - 125	3	30
Zinc	25.0	25.4		mg/Kg		102	75 - 125	3	30

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22073**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 6**  
**Prep Batch: 22011**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	990		960		mg/Kg	☼	3	30
Antimony	ND		ND		mg/Kg	☼	NC	30
Arsenic	3.0		3.06		mg/Kg	☼	2	30
Barium	2.5 J		2.29 J		mg/Kg	☼	10	30
Beryllium	0.070 J		0.0633 J		mg/Kg	☼	11	30
Cadmium	0.064 J		0.0585 J		mg/Kg	☼	9	30
Calcium	58 J		86.4 J F5		mg/Kg	☼	39	30
Chromium	1.9		2.18		mg/Kg	☼	16	30
Cobalt	1.2 J		1.09 J		mg/Kg	☼	9	30
Copper	1.7		1.64		mg/Kg	☼	5	30
Iron	5500		5000		mg/Kg	☼	10	30
Lead	1.3		1.16		mg/Kg	☼	14	30
Li	1.7 J		1.66 J		mg/Kg	☼	2	30
Manganese	34		30.9		mg/Kg	☼	8	30
Mo	0.26 J		0.201 J		mg/Kg	☼	24	30
Nickel	3.0		2.85		mg/Kg	☼	5	30
Phosphorus	38		36.0		mg/Kg	☼	4	30
Potassium	170 J		160 J		mg/Kg	☼	5	30
Selenium	ND		ND		mg/Kg	☼	NC	30
Silver	ND		ND		mg/Kg	☼	NC	30
Thallium	ND		0.299 J		mg/Kg	☼	NC	30
Vanadium	3.4		3.33		mg/Kg	☼	1	30
Zinc	9.3		8.10		mg/Kg	☼	14	30

**Lab Sample ID: MB 140-22041/7-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Method Blank**  
**Prep Type: Step 7**  
**Prep Batch: 22041**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		10	1.6	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Antimony	ND		3.0	0.14	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Arsenic	0.154 J		0.50	0.13	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Barium	ND		2.5	0.12	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Beryllium	ND		0.25	0.0075	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Cadmium	ND		0.25	0.011	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Calcium	1.43 J		250	0.74	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Chromium	ND		0.50	0.070	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Cobalt	ND		2.5	0.15	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Copper	ND		1.3	0.080	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Iron	ND		5.0	4.1	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Lead	ND		0.50	0.11	mg/Kg		07/18/18 08:00	07/23/18 10:58	1

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: MB 140-22041/7-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Method Blank**  
**Prep Type: Step 7**  
**Prep Batch: 22041**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Li	ND		2.5	0.15	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Manganese	ND		0.75	0.052	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Mo	ND		2.0	0.082	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Nickel	ND		2.0	0.028	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Phosphorus	1.45	J	15	0.13	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Potassium	ND		250	26	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Selenium	ND		0.50	0.17	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Silver	ND		1.0	0.057	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Thallium	ND		1.8	0.18	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Vanadium	ND		2.5	0.056	mg/Kg		07/18/18 08:00	07/23/18 10:58	1
Zinc	ND		1.0	0.10	mg/Kg		07/18/18 08:00	07/23/18 10:58	1

**Lab Sample ID: LCS 140-22041/8-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Step 7**  
**Prep Batch: 22041**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	100	102		mg/Kg		102	75 - 125
Antimony	25.0	25.2		mg/Kg		101	75 - 125
Arsenic	5.00	5.02		mg/Kg		100	75 - 125
Barium	5.00	5.29		mg/Kg		106	75 - 125
Beryllium	2.50	2.55		mg/Kg		102	75 - 125
Cadmium	2.50	2.54		mg/Kg		102	75 - 125
Calcium	2500	2540		mg/Kg		102	75 - 125
Chromium	10.0	10.7		mg/Kg		107	75 - 125
Cobalt	5.00	5.30		mg/Kg		106	75 - 125
Copper	12.5	13.0		mg/Kg		104	75 - 125
Iron	50.0	54.5		mg/Kg		109	75 - 125
Lead	5.00	4.88		mg/Kg		98	75 - 125
Li	5.00	5.22		mg/Kg		104	75 - 125
Manganese	5.00	5.32		mg/Kg		106	75 - 125
Mo	25.0	26.8		mg/Kg		107	75 - 125
Nickel	25.0	26.4		mg/Kg		106	75 - 125
Phosphorus	250	262		mg/Kg		105	75 - 125
Potassium	2500	2600		mg/Kg		104	75 - 125
Selenium	7.50	7.46		mg/Kg		99	75 - 125
Silver	2.50	2.44		mg/Kg		97	75 - 125
Thallium	20.0	20.2		mg/Kg		101	75 - 125
Vanadium	10.0	10.4		mg/Kg		104	75 - 125
Zinc	25.0	26.6		mg/Kg		106	75 - 125

**Lab Sample ID: LCSD 140-22041/9-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 7**  
**Prep Batch: 22041**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Aluminum	100	101		mg/Kg		101	75 - 125	1	30
Antimony	25.0	25.2		mg/Kg		101	75 - 125	0	30
Arsenic	5.00	5.02		mg/Kg		100	75 - 125	0	30

TestAmerica Knoxville



# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: LCSD 140-22041/9-A**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Step 7**  
**Prep Batch: 22041**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Barium	5.00	5.27		mg/Kg		105	75 - 125	0	30
Beryllium	2.50	2.54		mg/Kg		101	75 - 125	1	30
Cadmium	2.50	2.55		mg/Kg		102	75 - 125	0	30
Calcium	2500	2530		mg/Kg		101	75 - 125	1	30
Chromium	10.0	10.7		mg/Kg		107	75 - 125	0	30
Cobalt	5.00	5.28		mg/Kg		106	75 - 125	0	30
Copper	12.5	13.0		mg/Kg		104	75 - 125	0	30
Iron	50.0	53.6		mg/Kg		107	75 - 125	2	30
Lead	5.00	4.97		mg/Kg		99	75 - 125	2	30
Li	5.00	5.19		mg/Kg		104	75 - 125	1	30
Manganese	5.00	5.29		mg/Kg		106	75 - 125	1	30
Mo	25.0	26.8		mg/Kg		107	75 - 125	0	30
Nickel	25.0	26.4		mg/Kg		105	75 - 125	0	30
Phosphorus	250	262		mg/Kg		105	75 - 125	0	30
Potassium	2500	2600		mg/Kg		104	75 - 125	0	30
Selenium	7.50	7.48		mg/Kg		100	75 - 125	0	30
Silver	2.50	2.43		mg/Kg		97	75 - 125	0	30
Thallium	20.0	20.0		mg/Kg		100	75 - 125	1	30
Vanadium	10.0	10.4		mg/Kg		104	75 - 125	1	30
Zinc	25.0	26.6		mg/Kg		106	75 - 125	0	30

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 7**  
**Prep Batch: 22041**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	0.23	J	ND		mg/Kg	☼	NC	30
Arsenic	ND		ND		mg/Kg	☼	NC	30
Beryllium	0.36		0.331		mg/Kg	☼	9	30
Cadmium	ND		ND		mg/Kg	☼	NC	30
Chromium	7.3		8.90		mg/Kg	☼	19	30
Cobalt	0.36	J	0.664	J F5	mg/Kg	☼	59	30
Copper	0.84	J	0.773	J	mg/Kg	☼	9	30
Iron	2500		3130		mg/Kg	☼	22	30
Lead	2.6		2.33		mg/Kg	☼	10	30
Li	6.3		7.06		mg/Kg	☼	12	30
Manganese	35		41.0		mg/Kg	☼	15	30
Mo	ND		ND		mg/Kg	☼	NC	30
Nickel	1.3	J	2.17	J F5	mg/Kg	☼	47	30
Phosphorus	23	B	28.6		mg/Kg	☼	22	30
Potassium	7100		6720		mg/Kg	☼	6	30
Selenium	0.51	J	0.207	J F5	mg/Kg	☼	85	30
Silver	0.13	J	0.0794	J F5	mg/Kg	☼	49	30
Thallium	0.53	J	0.604	J	mg/Kg	☼	13	30
Vanadium	13		13.5		mg/Kg	☼	3	30

TestAmerica Knoxville

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Method: 6010B SEP - SEP Metals (ICP) (Continued)

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 22173**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Step 7**  
**Prep Batch: 22041**

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	Limit
			Result	Qualifier				
Aluminum	19000		17800		mg/Kg	☼	8	30
Barium	190		196		mg/Kg	☼	1	30
Calcium	2600	J	2470	J	mg/Kg	☼	5	30
Zinc	4.6	J	5.86	J	mg/Kg	☼	24	30

## Method: 7470A - SEP Mercury (CVAA) - Total

**Lab Sample ID: MB 140-21745/7-B**  
**Matrix: Solid**  
**Analysis Batch: 21840**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Hg	ND		0.10	0.040	mg/Kg		07/06/18 08:00	07/10/18 12:05	1

**Lab Sample ID: LCS 140-21745/8-B**  
**Matrix: Solid**  
**Analysis Batch: 21840**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits	
							Limit	RPD
Hg	2.50	2.63		mg/Kg		105	75 - 125	

**Lab Sample ID: LCSD 140-21745/9-B**  
**Matrix: Solid**  
**Analysis Batch: 21840**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits		RPD	Limit
							Limit	RPD		
Hg	2.50	2.53		mg/Kg		101	75 - 125	4	30	

**Lab Sample ID: 140-11946-3 DU**  
**Matrix: Solid**  
**Analysis Batch: 21840**

**Client Sample ID: SB-1805 (50-60')**  
**Prep Type: Total/NA**  
**Prep Batch: 21745**

Analyte	Sample Result	Sample Qualifier	DU		Unit	D	RPD	Limit
			Result	Qualifier				
Hg	ND		ND		mg/Kg	☼	NC	30

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Metals

### Prep Batch: 21745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Total/NA	Solid	Total	
140-11946-5	SB-1805 (66-78')	Total/NA	Solid	Total	
140-11946-6	SB-1806 (46-60')	Total/NA	Solid	Total	
140-11946-8	SB-1806 (70-76')	Total/NA	Solid	Total	
140-11946-9	SB-1808 (45-57')	Total/NA	Solid	Total	
MB 140-21745/7-A	Method Blank	Total/NA	Solid	Total	
MB 140-21745/7-B	Method Blank	Total/NA	Solid	Total	
LCS 140-21745/8-A	Lab Control Sample	Total/NA	Solid	Total	
LCS 140-21745/8-B	Lab Control Sample	Total/NA	Solid	Total	
LCSD 140-21745/9-A	Lab Control Sample Dup	Total/NA	Solid	Total	
LCSD 140-21745/9-B	Lab Control Sample Dup	Total/NA	Solid	Total	
140-11946-3 DU	SB-1805 (50-60')	Total/NA	Solid	Total	

### SEP Batch: 21746

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 1	Solid	Exchangeable	
140-11946-5	SB-1805 (66-78')	Step 1	Solid	Exchangeable	
140-11946-6	SB-1806 (46-60')	Step 1	Solid	Exchangeable	
140-11946-8	SB-1806 (70-76')	Step 1	Solid	Exchangeable	
140-11946-9	SB-1808 (45-57')	Step 1	Solid	Exchangeable	
MB 140-21746/7-B ^4	Method Blank	Step 1	Solid	Exchangeable	
LCS 140-21746/8-B ^5	Lab Control Sample	Step 1	Solid	Exchangeable	
LCSD 140-21746/9-B ^5	Lab Control Sample Dup	Step 1	Solid	Exchangeable	
140-11946-3 DU	SB-1805 (50-60')	Step 1	Solid	Exchangeable	

### Prep Batch: 21773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 1	Solid	3010A	21746
140-11946-5	SB-1805 (66-78')	Step 1	Solid	3010A	21746
140-11946-6	SB-1806 (46-60')	Step 1	Solid	3010A	21746
140-11946-8	SB-1806 (70-76')	Step 1	Solid	3010A	21746
140-11946-9	SB-1808 (45-57')	Step 1	Solid	3010A	21746
MB 140-21746/7-B ^4	Method Blank	Step 1	Solid	3010A	21746
LCS 140-21746/8-B ^5	Lab Control Sample	Step 1	Solid	3010A	21746
LCSD 140-21746/9-B ^5	Lab Control Sample Dup	Step 1	Solid	3010A	21746
140-11946-3 DU	SB-1805 (50-60')	Step 1	Solid	3010A	21746

### Prep Batch: 21798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Total/NA	Solid	7470A	21745
140-11946-5	SB-1805 (66-78')	Total/NA	Solid	7470A	21745
140-11946-6	SB-1806 (46-60')	Total/NA	Solid	7470A	21745
140-11946-8	SB-1806 (70-76')	Total/NA	Solid	7470A	21745
140-11946-9	SB-1808 (45-57')	Total/NA	Solid	7470A	21745
MB 140-21745/7-B	Method Blank	Total/NA	Solid	7470A	21745
LCS 140-21745/8-B	Lab Control Sample	Total/NA	Solid	7470A	21745
LCSD 140-21745/9-B	Lab Control Sample Dup	Total/NA	Solid	7470A	21745
140-11946-3 DU	SB-1805 (50-60')	Total/NA	Solid	7470A	21745

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Metals (Continued)

### SEP Batch: 21838

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 2	Solid	Carbonate	
140-11946-5	SB-1805 (66-78')	Step 2	Solid	Carbonate	
140-11946-6	SB-1806 (46-60')	Step 2	Solid	Carbonate	
140-11946-8	SB-1806 (70-76')	Step 2	Solid	Carbonate	
140-11946-9	SB-1808 (45-57')	Step 2	Solid	Carbonate	
MB 140-21838/7-B ^3	Method Blank	Step 2	Solid	Carbonate	
LCS 140-21838/8-B ^5	Lab Control Sample	Step 2	Solid	Carbonate	
LCSD 140-21838/9-B ^5	Lab Control Sample Dup	Step 2	Solid	Carbonate	
140-11946-3 DU	SB-1805 (50-60')	Step 2	Solid	Carbonate	

### Analysis Batch: 21840

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Total/NA	Solid	7470A	21798
140-11946-5	SB-1805 (66-78')	Total/NA	Solid	7470A	21798
140-11946-6	SB-1806 (46-60')	Total/NA	Solid	7470A	21798
140-11946-8	SB-1806 (70-76')	Total/NA	Solid	7470A	21798
140-11946-9	SB-1808 (45-57')	Total/NA	Solid	7470A	21798
MB 140-21745/7-B	Method Blank	Total/NA	Solid	7470A	21798
LCS 140-21745/8-B	Lab Control Sample	Total/NA	Solid	7470A	21798
LCSD 140-21745/9-B	Lab Control Sample Dup	Total/NA	Solid	7470A	21798
140-11946-3 DU	SB-1805 (50-60')	Total/NA	Solid	7470A	21798

### Prep Batch: 21848

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 2	Solid	3010A	21838
140-11946-5	SB-1805 (66-78')	Step 2	Solid	3010A	21838
140-11946-6	SB-1806 (46-60')	Step 2	Solid	3010A	21838
140-11946-8	SB-1806 (70-76')	Step 2	Solid	3010A	21838
140-11946-9	SB-1808 (45-57')	Step 2	Solid	3010A	21838
MB 140-21838/7-B ^3	Method Blank	Step 2	Solid	3010A	21838
LCS 140-21838/8-B ^5	Lab Control Sample	Step 2	Solid	3010A	21838
LCSD 140-21838/9-B ^5	Lab Control Sample Dup	Step 2	Solid	3010A	21838
140-11946-3 DU	SB-1805 (50-60')	Step 2	Solid	3010A	21838

### SEP Batch: 21855

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 3	Solid	Non-Crystalline	
140-11946-5	SB-1805 (66-78')	Step 3	Solid	Non-Crystalline	
140-11946-6	SB-1806 (46-60')	Step 3	Solid	Non-Crystalline	
140-11946-8	SB-1806 (70-76')	Step 3	Solid	Non-Crystalline	
140-11946-9	SB-1808 (45-57')	Step 3	Solid	Non-Crystalline	
MB 140-21855/7-B	Method Blank	Step 3	Solid	Non-Crystalline	
LCS 140-21855/8-B	Lab Control Sample	Step 3	Solid	Non-Crystalline	
LCSD 140-21855/9-B	Lab Control Sample Dup	Step 3	Solid	Non-Crystalline	
140-11946-3 DU	SB-1805 (50-60')	Step 3	Solid	Non-Crystalline	

### Prep Batch: 21890

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 3	Solid	3010A	21855
140-11946-5	SB-1805 (66-78')	Step 3	Solid	3010A	21855
140-11946-6	SB-1806 (46-60')	Step 3	Solid	3010A	21855

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Metals (Continued)

### Prep Batch: 21890 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-8	SB-1806 (70-76')	Step 3	Solid	3010A	21855
140-11946-9	SB-1808 (45-57')	Step 3	Solid	3010A	21855
MB 140-21855/7-B	Method Blank	Step 3	Solid	3010A	21855
LCS 140-21855/8-B	Lab Control Sample	Step 3	Solid	3010A	21855
LCSD 140-21855/9-B	Lab Control Sample Dup	Step 3	Solid	3010A	21855
140-11946-3 DU	SB-1805 (50-60')	Step 3	Solid	3010A	21855

### SEP Batch: 21891

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 4	Solid	Metal Hydroxide	
140-11946-5	SB-1805 (66-78')	Step 4	Solid	Metal Hydroxide	
140-11946-6	SB-1806 (46-60')	Step 4	Solid	Metal Hydroxide	
140-11946-8	SB-1806 (70-76')	Step 4	Solid	Metal Hydroxide	
140-11946-9	SB-1808 (45-57')	Step 4	Solid	Metal Hydroxide	
MB 140-21891/7-B	Method Blank	Step 4	Solid	Metal Hydroxide	
LCS 140-21891/8-B	Lab Control Sample	Step 4	Solid	Metal Hydroxide	
LCSD 140-21891/9-B	Lab Control Sample Dup	Step 4	Solid	Metal Hydroxide	
140-11946-3 DU	SB-1805 (50-60')	Step 4	Solid	Metal Hydroxide	

### Prep Batch: 21927

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 4	Solid	3010A	21891
140-11946-5	SB-1805 (66-78')	Step 4	Solid	3010A	21891
140-11946-6	SB-1806 (46-60')	Step 4	Solid	3010A	21891
140-11946-8	SB-1806 (70-76')	Step 4	Solid	3010A	21891
140-11946-9	SB-1808 (45-57')	Step 4	Solid	3010A	21891
MB 140-21891/7-B	Method Blank	Step 4	Solid	3010A	21891
LCS 140-21891/8-B	Lab Control Sample	Step 4	Solid	3010A	21891
LCSD 140-21891/9-B	Lab Control Sample Dup	Step 4	Solid	3010A	21891
140-11946-3 DU	SB-1805 (50-60')	Step 4	Solid	3010A	21891

### SEP Batch: 21939

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 5	Solid	Organic-Bound	
140-11946-5	SB-1805 (66-78')	Step 5	Solid	Organic-Bound	
140-11946-6	SB-1806 (46-60')	Step 5	Solid	Organic-Bound	
140-11946-8	SB-1806 (70-76')	Step 5	Solid	Organic-Bound	
140-11946-9	SB-1808 (45-57')	Step 5	Solid	Organic-Bound	
MB 140-21939/7-B ^5	Method Blank	Step 5	Solid	Organic-Bound	
LCS 140-21939/8-B ^5	Lab Control Sample	Step 5	Solid	Organic-Bound	
LCSD 140-21939/9-B ^5	Lab Control Sample Dup	Step 5	Solid	Organic-Bound	
140-11946-3 DU	SB-1805 (50-60')	Step 5	Solid	Organic-Bound	

### Prep Batch: 22010

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 5	Solid	3010A	21939
140-11946-5	SB-1805 (66-78')	Step 5	Solid	3010A	21939
140-11946-6	SB-1806 (46-60')	Step 5	Solid	3010A	21939
140-11946-8	SB-1806 (70-76')	Step 5	Solid	3010A	21939
140-11946-9	SB-1808 (45-57')	Step 5	Solid	3010A	21939
MB 140-21939/7-B ^5	Method Blank	Step 5	Solid	3010A	21939

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Metals (Continued)

### Prep Batch: 22010 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 140-21939/8-B ^5	Lab Control Sample	Step 5	Solid	3010A	21939
LCSD 140-21939/9-B ^5	Lab Control Sample Dup	Step 5	Solid	3010A	21939
140-11946-3 DU	SB-1805 (50-60')	Step 5	Solid	3010A	21939

### SEP Batch: 22011

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 6	Solid	Acid/Sulfide	
140-11946-5	SB-1805 (66-78')	Step 6	Solid	Acid/Sulfide	
140-11946-6	SB-1806 (46-60')	Step 6	Solid	Acid/Sulfide	
140-11946-8	SB-1806 (70-76')	Step 6	Solid	Acid/Sulfide	
140-11946-9	SB-1808 (45-57')	Step 6	Solid	Acid/Sulfide	
MB 140-22011/7-A	Method Blank	Step 6	Solid	Acid/Sulfide	
LCS 140-22011/8-A	Lab Control Sample	Step 6	Solid	Acid/Sulfide	
LCSD 140-22011/9-A	Lab Control Sample Dup	Step 6	Solid	Acid/Sulfide	
140-11946-3 DU	SB-1805 (50-60')	Step 6	Solid	Acid/Sulfide	

### Prep Batch: 22041

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 7	Solid	Residual	
140-11946-5	SB-1805 (66-78')	Step 7	Solid	Residual	
140-11946-6	SB-1806 (46-60')	Step 7	Solid	Residual	
140-11946-8	SB-1806 (70-76')	Step 7	Solid	Residual	
140-11946-9	SB-1808 (45-57')	Step 7	Solid	Residual	
MB 140-22041/7-A	Method Blank	Step 7	Solid	Residual	
LCS 140-22041/8-A	Lab Control Sample	Step 7	Solid	Residual	
LCSD 140-22041/9-A	Lab Control Sample Dup	Step 7	Solid	Residual	
140-11946-3 DU	SB-1805 (50-60')	Step 7	Solid	Residual	

### Analysis Batch: 22042

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 1	Solid	6010B SEP	21773
140-11946-3	SB-1805 (50-60')	Step 2	Solid	6010B SEP	21848
140-11946-3	SB-1805 (50-60')	Step 3	Solid	6010B SEP	21890
140-11946-5	SB-1805 (66-78')	Step 1	Solid	6010B SEP	21773
140-11946-5	SB-1805 (66-78')	Step 2	Solid	6010B SEP	21848
140-11946-5	SB-1805 (66-78')	Step 3	Solid	6010B SEP	21890
140-11946-6	SB-1806 (46-60')	Step 1	Solid	6010B SEP	21773
140-11946-6	SB-1806 (46-60')	Step 2	Solid	6010B SEP	21848
140-11946-6	SB-1806 (46-60')	Step 3	Solid	6010B SEP	21890
140-11946-8	SB-1806 (70-76')	Step 1	Solid	6010B SEP	21773
140-11946-8	SB-1806 (70-76')	Step 2	Solid	6010B SEP	21848
140-11946-8	SB-1806 (70-76')	Step 3	Solid	6010B SEP	21890
140-11946-9	SB-1808 (45-57')	Step 1	Solid	6010B SEP	21773
140-11946-9	SB-1808 (45-57')	Step 2	Solid	6010B SEP	21848
140-11946-9	SB-1808 (45-57')	Step 3	Solid	6010B SEP	21890
MB 140-21746/7-B ^4	Method Blank	Step 1	Solid	6010B SEP	21773
MB 140-21838/7-B ^3	Method Blank	Step 2	Solid	6010B SEP	21848
MB 140-21855/7-B	Method Blank	Step 3	Solid	6010B SEP	21890
LCS 140-21746/8-B ^5	Lab Control Sample	Step 1	Solid	6010B SEP	21773
LCS 140-21838/8-B ^5	Lab Control Sample	Step 2	Solid	6010B SEP	21848
LCS 140-21855/8-B	Lab Control Sample	Step 3	Solid	6010B SEP	21890

TestAmerica Knoxville

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Metals (Continued)

### Analysis Batch: 22042 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 140-21746/9-B ^5	Lab Control Sample Dup	Step 1	Solid	6010B SEP	21773
LCSD 140-21838/9-B ^5	Lab Control Sample Dup	Step 2	Solid	6010B SEP	21848
LCSD 140-21855/9-B	Lab Control Sample Dup	Step 3	Solid	6010B SEP	21890
140-11946-3 DU	SB-1805 (50-60')	Step 1	Solid	6010B SEP	21773
140-11946-3 DU	SB-1805 (50-60')	Step 2	Solid	6010B SEP	21848
140-11946-3 DU	SB-1805 (50-60')	Step 3	Solid	6010B SEP	21890

### Analysis Batch: 22073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 4	Solid	6010B SEP	21927
140-11946-3	SB-1805 (50-60')	Step 5	Solid	6010B SEP	22010
140-11946-3	SB-1805 (50-60')	Step 6	Solid	6010B SEP	22011
140-11946-5	SB-1805 (66-78')	Step 4	Solid	6010B SEP	21927
140-11946-5	SB-1805 (66-78')	Step 5	Solid	6010B SEP	22010
140-11946-5	SB-1805 (66-78')	Step 6	Solid	6010B SEP	22011
140-11946-6	SB-1806 (46-60')	Step 4	Solid	6010B SEP	21927
140-11946-6	SB-1806 (46-60')	Step 5	Solid	6010B SEP	22010
140-11946-6	SB-1806 (46-60')	Step 6	Solid	6010B SEP	22011
140-11946-8	SB-1806 (70-76')	Step 4	Solid	6010B SEP	21927
140-11946-8	SB-1806 (70-76')	Step 5	Solid	6010B SEP	22010
140-11946-8	SB-1806 (70-76')	Step 6	Solid	6010B SEP	22011
140-11946-9	SB-1808 (45-57')	Step 4	Solid	6010B SEP	21927
140-11946-9	SB-1808 (45-57')	Step 5	Solid	6010B SEP	22010
140-11946-9	SB-1808 (45-57')	Step 6	Solid	6010B SEP	22011
MB 140-21891/7-B	Method Blank	Step 4	Solid	6010B SEP	21927
MB 140-21939/7-B ^5	Method Blank	Step 5	Solid	6010B SEP	22010
MB 140-22011/7-A	Method Blank	Step 6	Solid	6010B SEP	22011
LCS 140-21891/8-B	Lab Control Sample	Step 4	Solid	6010B SEP	21927
LCS 140-21939/8-B ^5	Lab Control Sample	Step 5	Solid	6010B SEP	22010
LCS 140-22011/8-A	Lab Control Sample	Step 6	Solid	6010B SEP	22011
LCSD 140-21891/9-B	Lab Control Sample Dup	Step 4	Solid	6010B SEP	21927
LCSD 140-21939/9-B ^5	Lab Control Sample Dup	Step 5	Solid	6010B SEP	22010
LCSD 140-22011/9-A	Lab Control Sample Dup	Step 6	Solid	6010B SEP	22011
140-11946-3 DU	SB-1805 (50-60')	Step 4	Solid	6010B SEP	21927
140-11946-3 DU	SB-1805 (50-60')	Step 5	Solid	6010B SEP	22010
140-11946-3 DU	SB-1805 (50-60')	Step 6	Solid	6010B SEP	22011

### Analysis Batch: 22173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Step 7	Solid	6010B SEP	22041
140-11946-3	SB-1805 (50-60')	Step 7	Solid	6010B SEP	22041
140-11946-3	SB-1805 (50-60')	Total/NA	Solid	6010B	21745
140-11946-3	SB-1805 (50-60')	Total/NA	Solid	6010B	21745
140-11946-5	SB-1805 (66-78')	Step 7	Solid	6010B SEP	22041
140-11946-5	SB-1805 (66-78')	Step 7	Solid	6010B SEP	22041
140-11946-5	SB-1805 (66-78')	Total/NA	Solid	6010B	21745
140-11946-5	SB-1805 (66-78')	Total/NA	Solid	6010B	21745
140-11946-6	SB-1806 (46-60')	Step 7	Solid	6010B SEP	22041
140-11946-6	SB-1806 (46-60')	Step 7	Solid	6010B SEP	22041
140-11946-6	SB-1806 (46-60')	Total/NA	Solid	6010B	21745
140-11946-6	SB-1806 (46-60')	Total/NA	Solid	6010B	21745

TestAmerica Knoxville



# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Metals (Continued)

### Analysis Batch: 22173 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-8	SB-1806 (70-76')	Step 7	Solid	6010B SEP	22041
140-11946-8	SB-1806 (70-76')	Step 7	Solid	6010B SEP	22041
140-11946-8	SB-1806 (70-76')	Total/NA	Solid	6010B	21745
140-11946-8	SB-1806 (70-76')	Total/NA	Solid	6010B	21745
140-11946-9	SB-1808 (45-57')	Step 7	Solid	6010B SEP	22041
140-11946-9	SB-1808 (45-57')	Step 7	Solid	6010B SEP	22041
140-11946-9	SB-1808 (45-57')	Total/NA	Solid	6010B	21745
140-11946-9	SB-1808 (45-57')	Total/NA	Solid	6010B	21745
MB 140-21745/7-A	Method Blank	Total/NA	Solid	6010B	21745
MB 140-22041/7-A	Method Blank	Step 7	Solid	6010B SEP	22041
LCS 140-21745/8-A	Lab Control Sample	Total/NA	Solid	6010B	21745
LCS 140-22041/8-A	Lab Control Sample	Step 7	Solid	6010B SEP	22041
LCSD 140-21745/9-A	Lab Control Sample Dup	Total/NA	Solid	6010B	21745
LCSD 140-22041/9-A	Lab Control Sample Dup	Step 7	Solid	6010B SEP	22041
140-11946-3 DU	SB-1805 (50-60')	Step 7	Solid	6010B SEP	22041
140-11946-3 DU	SB-1805 (50-60')	Step 7	Solid	6010B SEP	22041
140-11946-3 DU	SB-1805 (50-60')	Total/NA	Solid	6010B	21745
140-11946-3 DU	SB-1805 (50-60')	Total/NA	Solid	6010B	21745

### Analysis Batch: 22218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Sum of Steps 1-7	Solid	6010B SEP	
140-11946-5	SB-1805 (66-78')	Sum of Steps 1-7	Solid	6010B SEP	
140-11946-6	SB-1806 (46-60')	Sum of Steps 1-7	Solid	6010B SEP	
140-11946-8	SB-1806 (70-76')	Sum of Steps 1-7	Solid	6010B SEP	
140-11946-9	SB-1808 (45-57')	Sum of Steps 1-7	Solid	6010B SEP	

## General Chemistry

### Analysis Batch: 21685

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-11946-3	SB-1805 (50-60')	Total/NA	Solid	Moisture	
140-11946-5	SB-1805 (66-78')	Total/NA	Solid	Moisture	
140-11946-6	SB-1806 (46-60')	Total/NA	Solid	Moisture	
140-11946-8	SB-1806 (70-76')	Total/NA	Solid	Moisture	
140-11946-9	SB-1808 (45-57')	Total/NA	Solid	Moisture	
140-11946-3 DU	SB-1805 (50-60')	Total/NA	Solid	Moisture	

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3**

**Date Collected: 06/19/18 16:00**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			22218	07/24/18 13:52	KNC	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			21685	07/02/18 16:28	KW1	TAL KNX
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3**

**Date Collected: 06/19/18 16:00**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 83.7**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 13:03	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			22173	07/23/18 13:55	KNC	TAL KNX
		Instrument ID: DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			22042	07/17/18 12:33	KNC	TAL KNX
		Instrument ID: DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			22042	07/17/18 13:33	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 14:34	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 11:03	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 12:02	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 13:04	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 11:13	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			22173	07/23/18 12:03	KNC	TAL KNX
		Instrument ID: DUO								

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:13	DKW	TAL KNX
Instrument ID: HG										

## Client Sample ID: SB-1805 (66-78')

Lab Sample ID: 140-11946-5

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			22218	07/24/18 13:52	KNC	TAL KNX
Instrument ID: NOEQUIP										
Total/NA	Analysis	Moisture		1			21685	07/02/18 16:28	KW1	TAL KNX
Instrument ID: NOEQUIP										

## Client Sample ID: SB-1805 (66-78')

Lab Sample ID: 140-11946-5

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 87.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 13:13	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			22173	07/23/18 14:05	KNC	TAL KNX
Instrument ID: DUO										
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			22042	07/17/18 12:43	KNC	TAL KNX
Instrument ID: DUO										
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			22042	07/17/18 13:44	KNC	TAL KNX
Instrument ID: DUO										
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 14:44	KNC	TAL KNX
Instrument ID: DUO										
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 11:12	KNC	TAL KNX
Instrument ID: DUO										
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 12:13	KNC	TAL KNX
Instrument ID: DUO										
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 13:14	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (66-78')**

**Lab Sample ID: 140-11946-5**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 87.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 11:23	KNC	TAL KNX
Instrument ID: DUO										
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			22173	07/23/18 12:13	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:18	DKW	TAL KNX
Instrument ID: HG										

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 140-11946-6**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			22218	07/24/18 13:52	KNC	TAL KNX
Instrument ID: NOEQUIP										
Total/NA	Analysis	Moisture		1			21685	07/02/18 16:28	KW1	TAL KNX
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 140-11946-6**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 88.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 13:19	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			22173	07/23/18 14:10	KNC	TAL KNX
Instrument ID: DUO										
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			22042	07/17/18 12:48	KNC	TAL KNX
Instrument ID: DUO										
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			22042	07/17/18 13:49	KNC	TAL KNX
Instrument ID: DUO										
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 14:49	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (46-60')**

**Lab Sample ID: 140-11946-6**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 88.6**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 11:17	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 12:18	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 13:19	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 11:28	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			22173	07/23/18 12:18	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:25	DKW	TAL KNX
		Instrument ID: HG								

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 140-11946-8**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			22218	07/24/18 13:52	KNC	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			21685	07/02/18 16:28	KW1	TAL KNX
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 140-11946-8**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 88.1**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 13:24	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			22173	07/23/18 14:15	KNC	TAL KNX
		Instrument ID: DUO								
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1806 (70-76')**

**Lab Sample ID: 140-11946-8**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 88.1**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			22042	07/17/18 12:53	KNC	TAL KNX
		Instrument ID: DUO								
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			22042	07/17/18 13:54	KNC	TAL KNX
		Instrument ID: DUO								
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 14:55	KNC	TAL KNX
		Instrument ID: DUO								
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 11:22	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 12:23	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 13:24	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 11:48	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			22173	07/23/18 12:23	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:29	DKW	TAL KNX
		Instrument ID: HG								

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 140-11946-9**

**Date Collected: 06/25/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Sum of Steps 1-7	Analysis	6010B SEP		1			22218	07/24/18 13:52	KNC	TAL KNX
		Instrument ID: NOEQUIP								
Total/NA	Analysis	Moisture		1			21685	07/02/18 16:28	KW1	TAL KNX
		Instrument ID: NOEQUIP								

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1808 (45-57')**

**Lab Sample ID: 140-11946-9**

**Date Collected: 06/25/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 80.4**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 13:29	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			22173	07/23/18 14:20	KNC	TAL KNX
Instrument ID: DUO										
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			22042	07/17/18 12:58	KNC	TAL KNX
Instrument ID: DUO										
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			22042	07/17/18 13:59	KNC	TAL KNX
Instrument ID: DUO										
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 15:00	KNC	TAL KNX
Instrument ID: DUO										
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 11:27	KNC	TAL KNX
Instrument ID: DUO										
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 12:28	KNC	TAL KNX
Instrument ID: DUO										
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 13:29	KNC	TAL KNX
Instrument ID: DUO										
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 11:53	KNC	TAL KNX
Instrument ID: DUO										
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			22173	07/23/18 12:28	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:31	DKW	TAL KNX
Instrument ID: HG										

TestAmerica Knoxville



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-21745/7-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 12:48	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-21745/7-B**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:05	DKW	TAL KNX
Instrument ID: HG										

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-21746/7-B ^4**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			22042	07/17/18 12:18	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-21838/7-B ^3**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			22042	07/17/18 13:18	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-21855/7-B**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 14:19	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-21891/7-B**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 10:48	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-21939/7-B ^5**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 11:47	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-22011/7-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 12:49	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Method Blank**

**Lab Sample ID: MB 140-22041/7-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 10:58	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-21745/8-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 12:53	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-21745/8-B**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:08	DKW	TAL KNX
Instrument ID: HG										

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-21746/8-B ^5**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			22042	07/17/18 12:23	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-21838/8-B ^5**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			22042	07/17/18 13:23	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-21855/8-B**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 14:24	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-21891/8-B**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 10:53	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-21939/8-B ^5**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 11:52	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-22011/8-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 12:54	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample**

**Lab Sample ID: LCS 140-22041/8-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 11:03	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 140-21745/9-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 14:30	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 140-21745/9-B**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:10	DKW	TAL KNX
Instrument ID: HG										

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

## Client Sample ID: Lab Control Sample Dup

## Lab Sample ID: LCSD 140-21746/9-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		5			22042	07/17/18 12:28	KNC	TAL KNX
Instrument ID: DUO										

## Client Sample ID: Lab Control Sample Dup

## Lab Sample ID: LCSD 140-21838/9-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		5			22042	07/17/18 13:28	KNC	TAL KNX
Instrument ID: DUO										

## Client Sample ID: Lab Control Sample Dup

## Lab Sample ID: LCSD 140-21855/9-B

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 14:29	KNC	TAL KNX
Instrument ID: DUO										

## Client Sample ID: Lab Control Sample Dup

## Lab Sample ID: LCSD 140-21891/9-B

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 10:58	KNC	TAL KNX
Instrument ID: DUO										

## Client Sample ID: Lab Control Sample Dup

## Lab Sample ID: LCSD 140-21939/9-B ^5

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 11:57	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 140-22011/9-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 12:59	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: Lab Control Sample Dup**

**Lab Sample ID: LCSD 140-22041/9-A**

Date Collected: N/A

Matrix: Solid

Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 11:08	KNC	TAL KNX
Instrument ID: DUO										

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3 DU**

Date Collected: 06/19/18 16:00

Matrix: Solid

Date Received: 06/29/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			21685	07/02/18 16:28	KW1	TAL KNX
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3 DU**

Date Collected: 06/19/18 16:00

Matrix: Solid

Date Received: 06/29/18 09:00

Percent Solids: 83.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		1			22173	07/23/18 13:08	KNC	TAL KNX
Instrument ID: DUO										
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Analysis	6010B		10			22173	07/23/18 14:00	KNC	TAL KNX
Instrument ID: DUO										
Step 1	SEP	Exchangeable			5.000 g	25 mL	21746	07/06/18 08:00	KNC	TAL KNX
Step 1	Prep	3010A			5 mL	50 mL	21773	07/09/18 08:00	KNC	TAL KNX
Step 1	Analysis	6010B SEP		4			22042	07/17/18 12:38	KNC	TAL KNX
Instrument ID: DUO										
Step 2	SEP	Carbonate			5.000 g	25 mL	21838	07/10/18 10:40	KNC	TAL KNX
Step 2	Prep	3010A			5 mL	50 mL	21848	07/11/18 08:00	KNC	TAL KNX
Step 2	Analysis	6010B SEP		3			22042	07/17/18 13:39	KNC	TAL KNX
Instrument ID: DUO										
Step 3	SEP	Non-Crystalline			5.000 g	25 mL	21855	07/11/18 08:00	KNC	TAL KNX
Step 3	Prep	3010A			5 mL	50 mL	21890	07/12/18 08:00	KNC	TAL KNX
Step 3	Analysis	6010B SEP		1			22042	07/17/18 14:39	KNC	TAL KNX
Instrument ID: DUO										

TestAmerica Knoxville

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

**Client Sample ID: SB-1805 (50-60')**

**Lab Sample ID: 140-11946-3 DU**

**Date Collected: 06/19/18 16:00**

**Matrix: Solid**

**Date Received: 06/29/18 09:00**

**Percent Solids: 83.7**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Step 4	SEP	Metal Hydroxide			5.000 g	25 mL	21891	07/12/18 08:00	KNC	TAL KNX
Step 4	Prep	3010A			5 mL	50 mL	21927	07/13/18 08:00	KNC	TAL KNX
Step 4	Analysis	6010B SEP		1			22073	07/18/18 11:07	KNC	TAL KNX
		Instrument ID: DUO								
Step 5	SEP	Organic-Bound			5.000 g	75 mL	21939	07/16/18 08:00	KNC	TAL KNX
Step 5	Prep	3010A			5 mL	50 mL	22010	07/17/18 08:00	KNC	TAL KNX
Step 5	Analysis	6010B SEP		5			22073	07/18/18 12:07	KNC	TAL KNX
		Instrument ID: DUO								
Step 6	SEP	Acid/Sulfide			5.000 g	250 mL	22011	07/17/18 08:00	KNC	TAL KNX
Step 6	Analysis	6010B SEP		1			22073	07/18/18 13:09	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		1			22173	07/23/18 11:18	KNC	TAL KNX
		Instrument ID: DUO								
Step 7	Prep	Residual			1.000 g	50 mL	22041	07/18/18 08:00	KNC	TAL KNX
Step 7	Analysis	6010B SEP		10			22173	07/23/18 12:08	KNC	TAL KNX
		Instrument ID: DUO								
Total/NA	Prep	Total			1.000 g	50 mL	21745	07/06/18 08:00	KNC	TAL KNX
Total/NA	Prep	7470A			5.0 mL	50.0 mL	21798	07/09/18 10:32	DKW	TAL KNX
Total/NA	Analysis	7470A		1			21840	07/10/18 12:15	DKW	TAL KNX
		Instrument ID: HG								

**Laboratory References:**

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000



# Method Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

Method	Method Description	Protocol	Laboratory
6010B	SEP Metals (ICP) - Total	SW846	TAL KNX
6010B SEP	SEP Metals (ICP)	SW846	TAL KNX
7470A	SEP Mercury (CVAA) - Total	SW846	TAL KNX
Moisture	Percent Moisture	EPA	TAL KNX
3010A	Preparation, Total Metals	SW846	TAL KNX
7470A	Preparation, Mercury	SW846	TAL KNX
Acid/Sulfide	Sequential Extraction Procedure, Acid/Sulfide Fraction	TAL-KNOX	TAL KNX
Carbonate	Sequential Extraction Procedure, Carbonate Fraction	TAL-KNOX	TAL KNX
Exchangeable	Sequential Extraction Procedure, Exchangeable Fraction	TAL-KNOX	TAL KNX
Metal Hydroxide	Sequential Extraction Procedure, Metal Hydroxide Fraction	TAL-KNOX	TAL KNX
Non-Crystalline	Sequential Extraction Procedure, Non-crystalline Materials	TAL-KNOX	TAL KNX
Organic-Bound	Sequential Extraction Procedure, Organic Bound Fraction	TAL-KNOX	TAL KNX
Residual	Sequential Extraction Procedure, Residual Fraction	TAL-KNOX	TAL KNX
Total	Preparation, Total Material	TAL-KNOX	TAL KNX

**Protocol References:**

- EPA = US Environmental Protection Agency
- SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.
- TAL-KNOX = TestAmerica Laboratories, Knoxville, Facility Standard Operating Procedure.

**Laboratory References:**

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000



# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: Mountaineer, New Haven, WV - SEP Metals

TestAmerica Job ID: 140-11946-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-11946-3	SB-1805 (50-60')	Solid	06/19/18 16:00	06/29/18 09:00
140-11946-5	SB-1805 (66-78')	Solid	06/19/18 19:10	06/29/18 09:00
140-11946-6	SB-1806 (46-60')	Solid	06/25/18 11:35	06/29/18 09:00
140-11946-8	SB-1806 (70-76')	Solid	06/25/18 15:05	06/29/18 09:00
140-11946-9	SB-1808 (45-57')	Solid	06/25/18 12:05	06/29/18 09:00

- 1
- 2
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# Chain of Custody Record

TestAmerica Laboratories, Inc.

Regulatory Program:  DW  NPDES  RCRA  Other: USEPA CCR

Client Contact: Sanborn, Head & Associates, Inc.  
 20 Foundry Street  
 Concord, NH 03301  
 (603) 229-1900 Phone  
 (603) 229-1919 FAX  
 Project Name: Mountaineer  
 Site: New Haven, West Virginia  
 P O #: 4345-00

Project Manager: Andrew Ashton  
 Tel/Fax: (603) 415-6173  
 Lab Contact: Terry Walker Wasmu  
 Carrier: Date:

Site Contact: USEPA CCR  
 Date: \_\_\_\_\_  
 Lab Contact: Terry Walker Wasmu  
 Carrier: \_\_\_\_\_

Analysis Turnaround Time  
 CALENDAR DAYS  WORKING DAYS  
 TAT if different from Below Standard (25)  
 2 weeks  
 1 week  
 2 days  
 1 day

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	Sample Specific Notes:
SB-1802 (60-66')	6/26/18	1130	C	Soil	1	N	N	Hold
SB-1802 (66-72')	6/26/18	1210			1			Hold
SB-1805 (50-60')	6/29/18	1600			1		✓	
SB-1805 (60-66')	6/29/18	1715			1		✓	Hold
SB-1805 (66-78')	6/19/18	1910			1		✓	
SB-1806 (46-60')	6/25/18	1135			1		✓	
SB-1806 (64-70')	6/25/18	1320			1		✓	
SB-1806 (70-76')	6/25/18	1505			1		✓	
SB-1808 (45-53')	6/27/18	1205			1		✓	
Preservation Used: 1=Ice, 2=HC, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other Possible Hazard Identification: Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample. <input checked="" type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown Special Instructions/QC Requirements & Comments: *SEP TAL Metals + Li & Mo Seven step SEP + totals								

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)  
 Return to Client  Disposal by Lab  Archive for 1 Months

Received by: *FedEx*  
 Received by: *Ryan Henry*  
 Received in Laboratory by: \_\_\_\_\_

Company: *Sanborn Head & Associates*  
 Company: *TA KNUX*  
 Company: \_\_\_\_\_

Date/Time: *6/28/18 0955*  
 Date/Time: *6/29/18 0900*  
 Date/Time: \_\_\_\_\_

Custody Seal No.: \_\_\_\_\_  
 Relinquished by: *Lilly Corenthal*  
 Relinquished by: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_

Cooler Temp. (°C): Obs'd: \_\_\_\_\_  
 Therm ID No.: \_\_\_\_\_



TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Review Items	Yes	No	NA	If No, what was the problem?	Comments/Actions Taken
1. Are the shipping containers intact?	✓			<input type="checkbox"/> Containers, Broken	
2. Were ambient air containers received intact?		✓		<input type="checkbox"/> Checked in lab	
3. The coolers/containers custody seal if present, is it intact?	✓			<input type="checkbox"/> Yes <input type="checkbox"/> NA	
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID : <u>5667</u> Correction factor: <u>0</u>	✓			<input type="checkbox"/> Cooler Out of Temp, Client Contacted, Proceed/Cancel <input type="checkbox"/> Cooler Out of Temp, Same Day Receipt	
5. Were all of the sample containers received intact?	✓			<input type="checkbox"/> Containers, Broken	
6. Were samples received in appropriate containers?	✓			<input type="checkbox"/> Containers, Improper; Client Contacted; Proceed/Cancel	
7. Do sample container labels match COC? (IDs, Dates, Times)	✓			<input type="checkbox"/> COC & Samples Do Not Match <input type="checkbox"/> COC Incorrect/Incomplete <input type="checkbox"/> COC Not Received	
8. Were all of the samples listed on the COC received?	✓			<input type="checkbox"/> Sample Received, Not on COC <input type="checkbox"/> Sample on COC, Not Received	
9. Is the date/time of sample collection noted?	✓			<input type="checkbox"/> COC; No Date/Time; Client Contacted	Labeling Verified by: _____ Date: _____
10. Was the sampler identified on the COC?	✓			<input type="checkbox"/> Sampler Not Listed on COC	pH test strip lot number: _____
11. Is the client and project name/# identified?	✓			<input type="checkbox"/> COC Incorrect/Incomplete	
12. Are tests/parameters listed for each sample?	✓			<input type="checkbox"/> COC No tests on COC	
13. Is the matrix of the samples noted?	✓			<input type="checkbox"/> COC Incorrect/Incomplete	
14. Was COC relinquished? (Signed/Dated/Timed)	✓			<input type="checkbox"/> COC Incorrect/Incomplete	Box 16A: pH Preservation Box 18A: Residual Chlorine
15. Were samples received within holding time?	✓			<input type="checkbox"/> Holding Time - Receipt	Preservative: _____
16. Were samples received with correct chemical preservative (excluding Encore)?			✓	<input type="checkbox"/> pH Adjusted, pH Included (See box 16A) <input type="checkbox"/> Incorrect Preservative	Lot Number: _____ Exp Date: _____ Analyst: _____
17. Were VOA samples received without headspace?			✓	<input type="checkbox"/> Headspace (VOA only) <input type="checkbox"/> Residual Chlorine	Date: _____ Time: _____
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number: _____			✓		
19. For 1613B water samples is pH<9?			✓	<input type="checkbox"/> If no, lab will adjust	
20. For rad samples was sample activity info. Provided?			✓	<input type="checkbox"/> Project missing info	

Project #: \_\_\_\_\_ PM Instructions: \_\_\_\_\_

Sample Receiving Associate: Ryan Henry Date: 6/29/18

QA026R30.doc, 080916



**APPENDIX H.3**  
**PARTITION COEFFICIENT REPORTS**

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-79418-1

Client Project/Site: LEAF Metals and CCR Constituent Analysis

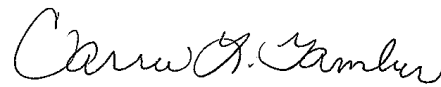
For:

Sanborn Head & Associates Inc

20 Foundry Street

Concord, New Hampshire 03301

Attn: Andrew Ashton



Authorized for release by:

8/3/2018 7:43:25 AM

Carrie Gamber, Senior Project Manager

(412)963-2428

[carrie.gamber@testamericainc.com](mailto:carrie.gamber@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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13



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions/Glossary . . . . .	4
Certification Summary . . . . .	5
Sample Summary . . . . .	6
Method Summary . . . . .	8
Lab Chronicle . . . . .	9
Client Sample Results . . . . .	26
QC Sample Results . . . . .	41
QC Association Summary . . . . .	44
Chain of Custody . . . . .	50
Receipt Checklists . . . . .	54



# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Job ID: 180-79418-1**

**Laboratory: TestAmerica Pittsburgh**

**Narrative**

## CASE NARRATIVE

**Client: Sanborn Head & Associates Inc**

**Project: LEAF Metals and CCR Constituent Analysis**

**Report Number: 180-79418-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 06/29/2018; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 2.8° C, 4.6° C and 4.8° C.

### **METALS**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PH**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PERCENT SOLIDS**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Definitions/Glossary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Accreditation/Certification Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Laboratory: TestAmerica Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
West Virginia DEP	State Program	3	142	01-31-19

The following analytes are included in this report, but are not accredited/certified under this accreditation/certification:

Analysis Method	Prep Method	Matrix	Analyte
2540G		Solid	Percent Moisture
2540G		Solid	Percent Solids

- 1
- 2
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# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-79418-1	SB-1806 (46-60') PH 6.0 LOW 12 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-2	SB-1806 (46-60') PH 6.0 LOW 18 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-3	SB-1806 (46-60') PH 6.0 LOW 22 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-4	SB-1806 (46-60') PH 6.0 LOW REP1	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-5	SB-1806 (46-60') PH 6.0 LOW REP2	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-6	SB-1806 (46-60') PH 6.0 LOW REP3	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-7	SB-1806 (46-60') PH 6.0 HIGH 12 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-8	SB-1806 (46-60') PH 6.0 HIGH 18 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-9	SB-1806 (46-60') PH 6.0 HIGH 22 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-10	SB-1806 (46-60') PH 6.0 HIGH REP1	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-11	SB-1806 (46-60') PH 6.0 HIGH REP2	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-12	SB-1806 (46-60') PH 6.0 HIGH REP3	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-19	SB-1806 (46-60') PH 7.5 LOW 12 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-20	SB-1806 (46-60') PH 7.5 LOW 18 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-21	SB-1806 (46-60') PH 7.5 LOW 22 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-22	SB-1806 (46-60') PH 7.5 LOW REP1	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-23	SB-1806 (46-60') PH 7.5 LOW REP2	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-24	SB-1806 (46-60') PH 7.5 LOW REP3	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-25	SB-1806 (46-60') PH 7.5 HIGH 12 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-26	SB-1806 (46-60') PH 7.5 HIGH 18 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-27	SB-1806 (46-60') PH 7.5 HIGH 22 HOUR	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-28	SB-1806 (46-60') PH 7.5 HIGH REP1	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-29	SB-1806 (46-60') PH 7.5 HIGH REP2	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-30	SB-1806 (46-60') PH 7.5 HIGH REP3	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-37	SB-1806 (70-76') PH 6.0 LOW 12 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-38	SB-1806 (70-76') PH 6.0 LOW 18 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-39	SB-1806 (70-76') PH 6.0 LOW 22 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-40	SB-1806 (70-76') PH 6.0 LOW REP1	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-41	SB-1806 (70-76') PH 6.0 LOW REP2	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-42	SB-1806 (70-76') PH 6.0 LOW REP3	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-43	SB-1806 (70-76') PH 6.0 HIGH 12 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-44	SB-1806 (70-76') PH 6.0 HIGH 18 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-45	SB-1806 (70-76') PH 6.0 HIGH 22 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-46	SB-1806 (70-76') PH 6.0 HIGH REP1	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-47	SB-1806 (70-76') PH 6.0 HIGH REP2	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-48	SB-1806 (70-76') PH 6.0 HIGH REP3	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-55	SB-1806 (70-76') PH 7.5 LOW 12 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-56	SB-1806 (70-76') PH 7.5 LOW 18 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-57	SB-1806 (70-76') PH 7.5 LOW 22 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-58	SB-1806 (70-76') PH 7.5 LOW REP1	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-59	SB-1806 (70-76') PH 7.5 LOW REP2	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-60	SB-1806 (70-76') PH 7.5 LOW REP3	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-61	SB-1806 (70-76') PH 7.5 HIGH 12 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-62	SB-1806 (70-76') PH 7.5 HIGH 18 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-63	SB-1806 (70-76') PH 7.5 HIGH 22 HOUR	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-64	SB-1806 (70-76') PH 7.5 HIGH REP1	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-65	SB-1806 (70-76') PH 7.5 HIGH REP2	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-66	SB-1806 (70-76') PH 7.5 HIGH REP3	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-73	SB-1808 (45-57') PH 6.0 LOW 12 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-74	SB-1808 (45-57') PH 6.0 LOW 18 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-75	SB-1808 (45-57') PH 6.0 LOW 22 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-76	SB-1808 (45-57') PH 6.0 LOW REP1	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-77	SB-1808 (45-57') PH 6.0 LOW REP2	Solid	06/27/18 12:05	06/29/18 09:20

TestAmerica Pittsburgh

# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-79418-78	SB-1808 (45-57") PH 6.0 LOW REP3	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-79	SB-1808 (45-57") PH 6.0 HIGH 12 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-80	SB-1808 (45-57") PH 6.0 HIGH 18 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-81	SB-1808 (45-57") PH 6.0 HIGH 22 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-82	SB-1808 (45-57") PH 6.0 HIGH REP1	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-83	SB-1808 (45-57") PH 6.0 HIGH REP2	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-84	SB-1808 (45-57") PH 6.0 HIGH REP3	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-91	SB-1808 (45-57") PH 7.5 LOW 12 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-92	SB-1808 (45-57") PH 7.5 LOW 18 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-93	SB-1808 (45-57") PH 7.5 LOW 22 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-94	SB-1808 (45-57") PH 7.5 LOW REP1	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-95	SB-1808 (45-57") PH 7.5 LOW REP2	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-96	SB-1808 (45-57") PH 7.5 LOW REP3	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-97	SB-1808 (45-57") PH 7.5 HIGH 12 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-98	SB-1808 (45-57") PH 7.5 HIGH 18 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-99	SB-1808 (45-57") PH 7.5 HIGH 22 HOUR	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-100	SB-1808 (45-57") PH 7.5 HIGH REP1	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-101	SB-1808 (45-57") PH 7.5 HIGH REP2	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-102	SB-1808 (45-57") PH 7.5 HIGH REP3	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-109	LOW SPIKE pH 6.0	Water	06/27/18 12:05	06/29/18 09:20
180-79418-110	HIGH SPIKE pH 6.0	Water	06/27/18 12:05	06/29/18 09:20
180-79418-112	LOW SPIKE pH 7.5	Water	06/27/18 12:05	06/29/18 09:20
180-79418-113	HIGH SPIKE pH 7.5	Water	06/27/18 12:05	06/29/18 09:20
180-79418-115	LOW SPIKE pH 6.0	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-116	HIGH SPIKE pH 6.0	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-118	LOW SPIKE pH 7.5	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-119	HIGH SPIKE pH 7.5	Solid	06/27/18 12:05	06/29/18 09:20

# Method Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
2540G	SM 2540G	SM22	TAL PIT
EPA 9040C	pH	SW846	TAL PIT
3010A	Preparation, Total Metals	SW846	TAL PIT
D4646 03	Test Method for 24 Hour Batch-Type Measurement of Sorption	ASTM	TAL PIT

#### Protocol References:

ASTM = ASTM International

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (46-60') PH 6.0 LOW 12 HOUR**

**Lab Sample ID: 180-79418-1**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:05	RSK	TAL PIT
		Instrument ID: A								
Total/NA	Analysis	2540G		1			251132	07/20/18 08:44	CRM	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (46-60') PH 6.0 LOW 18 HOUR**

**Lab Sample ID: 180-79418-2**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:23	WTR	TAL PIT
		Instrument ID: A								

**Client Sample ID: SB-1806 (46-60') PH 6.0 LOW 22 HOUR**

**Lab Sample ID: 180-79418-3**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:12	WTR	TAL PIT
		Instrument ID: A								

**Client Sample ID: SB-1806 (46-60') PH 6.0 LOW REP1**

**Lab Sample ID: 180-79418-4**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:18	WTR	TAL PIT
		Instrument ID: A								

**Client Sample ID: SB-1806 (46-60') PH 6.0 LOW REP2**

**Lab Sample ID: 180-79418-5**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (46-60') PH 6.0 LOW REP2

## Lab Sample ID: 180-79418-5

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:21	WTR	TAL PIT
Instrument ID: A										

## Client Sample ID: SB-1806 (46-60') PH 6.0 LOW REP3

## Lab Sample ID: 180-79418-6

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:24	WTR	TAL PIT
Instrument ID: A										

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH 12 HOUR

## Lab Sample ID: 180-79418-7

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:08	RSK	TAL PIT
Instrument ID: A										

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH 18 HOUR

## Lab Sample ID: 180-79418-8

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:26	WTR	TAL PIT
Instrument ID: A										

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH 22 HOUR

## Lab Sample ID: 180-79418-9

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:15	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH REP1**

**Lab Sample ID: 180-79418-10**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:27	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH REP2**

**Lab Sample ID: 180-79418-11**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:30	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH REP3**

**Lab Sample ID: 180-79418-12**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:33	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 LOW 12 HOUR**

**Lab Sample ID: 180-79418-19**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:11	RSK	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 LOW 18 HOUR**

**Lab Sample ID: 180-79418-20**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:29	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (46-60') PH 7.5 LOW 22 HOUR**

**Lab Sample ID: 180-79418-21**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:18	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 LOW REP1**

**Lab Sample ID: 180-79418-22**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:36	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 LOW REP2**

**Lab Sample ID: 180-79418-23**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:39	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 LOW REP3**

**Lab Sample ID: 180-79418-24**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:42	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH 12 HOUR**

**Lab Sample ID: 180-79418-25**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:14	RSK	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH 18 HOUR**

**Lab Sample ID: 180-79418-26**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:32	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH 22 HOUR**

**Lab Sample ID: 180-79418-27**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:21	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH REP1**

**Lab Sample ID: 180-79418-28**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:45	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH REP2**

**Lab Sample ID: 180-79418-29**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:54	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH REP3**

**Lab Sample ID: 180-79418-30**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	398.4 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:57	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW 12 HOUR

Lab Sample ID: 180-79418-37

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:17	RSK	TAL PIT
		Instrument ID: A								
Total/NA	Analysis	2540G		1			251132	07/20/18 08:44	CRM	TAL PIT
		Instrument ID: NOEQUIP								

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW 18 HOUR

Lab Sample ID: 180-79418-38

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:35	WTR	TAL PIT
		Instrument ID: A								

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW 22 HOUR

Lab Sample ID: 180-79418-39

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:24	WTR	TAL PIT
		Instrument ID: A								

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW REP1

Lab Sample ID: 180-79418-40

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 13:59	WTR	TAL PIT
		Instrument ID: A								

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW REP2

Lab Sample ID: 180-79418-41

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (70-76') PH 6.0 LOW REP2**

**Lab Sample ID: 180-79418-41**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:02	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 6.0 LOW REP3**

**Lab Sample ID: 180-79418-42**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:05	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH 12 HOUR**

**Lab Sample ID: 180-79418-43**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:20	RSK	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH 18 HOUR**

**Lab Sample ID: 180-79418-44**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:38	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH 22 HOUR**

**Lab Sample ID: 180-79418-45**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:27	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH REP1**

**Lab Sample ID: 180-79418-46**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:08	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH REP2**

**Lab Sample ID: 180-79418-47**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:11	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH REP3**

**Lab Sample ID: 180-79418-48**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:14	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW 12 HOUR**

**Lab Sample ID: 180-79418-55**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:29	RSK	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW 18 HOUR**

**Lab Sample ID: 180-79418-56**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:41	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW 22 HOUR**

**Lab Sample ID: 180-79418-57**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:30	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW REP1**

**Lab Sample ID: 180-79418-58**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:17	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW REP2**

**Lab Sample ID: 180-79418-59**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251470	07/24/18 13:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:20	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW REP3**

**Lab Sample ID: 180-79418-60**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:50	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH 12 HOUR**

**Lab Sample ID: 180-79418-61**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:32	RSK	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH 18 HOUR**

**Lab Sample ID: 180-79418-62**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:43	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH 22 HOUR**

**Lab Sample ID: 180-79418-63**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:33	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH REP1**

**Lab Sample ID: 180-79418-64**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:53	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH REP2**

**Lab Sample ID: 180-79418-65**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:55	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH REP3**

**Lab Sample ID: 180-79418-66**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 14:58	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW 12 HOUR

Lab Sample ID: 180-79418-73

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:35	RSK	TAL PIT
		Instrument ID: A								
Total/NA	Analysis	2540G		1			251132	07/20/18 08:44	CRM	TAL PIT
		Instrument ID: NOEQUIP								

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW 18 HOUR

Lab Sample ID: 180-79418-74

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:52	WTR	TAL PIT
		Instrument ID: A								

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW 22 HOUR

Lab Sample ID: 180-79418-75

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:41	WTR	TAL PIT
		Instrument ID: A								

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW REP1

Lab Sample ID: 180-79418-76

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:01	WTR	TAL PIT
		Instrument ID: A								

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW REP2

Lab Sample ID: 180-79418-77

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1808 (45-57') PH 6.0 LOW REP2**

**Lab Sample ID: 180-79418-77**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:04	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 6.0 LOW REP3**

**Lab Sample ID: 180-79418-78**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:07	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH 12 HOUR**

**Lab Sample ID: 180-79418-79**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:37	RSK	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH 18 HOUR**

**Lab Sample ID: 180-79418-80**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 18:18	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH 22 HOUR**

**Lab Sample ID: 180-79418-81**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:44	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH REP1**

**Lab Sample ID: 180-79418-82**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:10	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH REP2**

**Lab Sample ID: 180-79418-83**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:19	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH REP3**

**Lab Sample ID: 180-79418-84**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:22	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW 12 HOUR**

**Lab Sample ID: 180-79418-91**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:40	RSK	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW 18 HOUR**

**Lab Sample ID: 180-79418-92**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 18:27	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW 22 HOUR**

**Lab Sample ID: 180-79418-93**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:47	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW REP1**

**Lab Sample ID: 180-79418-94**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:25	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW REP2**

**Lab Sample ID: 180-79418-95**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:28	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW REP3**

**Lab Sample ID: 180-79418-96**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:31	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH 12 HOUR**

**Lab Sample ID: 180-79418-97**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251297	07/23/18 07:05	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251469	07/24/18 13:10	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 17:43	RSK	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH 18 HOUR**

**Lab Sample ID: 180-79418-98**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251383	07/23/18 19:15	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 18:30	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH 22 HOUR**

**Lab Sample ID: 180-79418-99**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251313	07/23/18 10:40	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251475	07/24/18 13:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 16:50	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH REP1**

**Lab Sample ID: 180-79418-100**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:34	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH REP2**

**Lab Sample ID: 180-79418-101**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:37	WTR	TAL PIT
Instrument ID: A										

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH REP3**

**Lab Sample ID: 180-79418-102**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251474	07/24/18 13:16	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 15:40	WTR	TAL PIT
Instrument ID: A										

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: LOW SPIKE pH 6.0

Lab Sample ID: 180-79418-109

Date Collected: 06/27/18 12:05

Matrix: Water

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9040C		1			251442	07/19/18 16:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

## Client Sample ID: HIGH SPIKE pH 6.0

Lab Sample ID: 180-79418-110

Date Collected: 06/27/18 12:05

Matrix: Water

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9040C		1			251442	07/19/18 16:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

## Client Sample ID: LOW SPIKE pH 7.5

Lab Sample ID: 180-79418-112

Date Collected: 06/27/18 12:05

Matrix: Water

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9040C		1			251442	07/19/18 16:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

## Client Sample ID: HIGH SPIKE pH 7.5

Lab Sample ID: 180-79418-113

Date Collected: 06/27/18 12:05

Matrix: Water

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9040C		1			251442	07/19/18 16:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

## Client Sample ID: LOW SPIKE pH 6.0

Lab Sample ID: 180-79418-115

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	1.0 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:05	WTR	TAL PIT
Instrument ID: A										

## Client Sample ID: HIGH SPIKE pH 6.0

Lab Sample ID: 180-79418-116

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	1.0 mL	251323	07/23/18 09:10	LWM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: HIGH SPIKE pH 6.0

Lab Sample ID: 180-79418-116

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:08	WTR	TAL PIT
Instrument ID: A										

## Client Sample ID: LOW SPIKE pH 7.5

Lab Sample ID: 180-79418-118

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	1.0 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:17	WTR	TAL PIT
Instrument ID: A										

## Client Sample ID: HIGH SPIKE pH 7.5

Lab Sample ID: 180-79418-119

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	1.0 mL	251323	07/23/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251600	07/25/18 11:22	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			252063	07/28/18 17:20	WTR	TAL PIT
Instrument ID: A										

**Laboratory References:**

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

**Analyst References:**

Lab: TAL PIT

Batch Type: Leach

LWM = Larry Matko

Batch Type: Prep

KA = Kayla Kalamasz

NAM = Nicole Marfisi

Batch Type: Analysis

CRM = Caitlin McEvoy

MTW = Michael Wesoloski

RSK = Robert Kurtz

WTR = Bill Reinheimer

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (46-60') PH 6.0 LOW 12 HOUR

## Lab Sample ID: 180-79418-1

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.36	J	0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:05	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:05	1
Lithium	120		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:05	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	0.4		0.1	0.1	%			07/20/18 08:44	1
Percent Solids	99.6		0.1	0.1	%			07/20/18 08:44	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 LOW 18 HOUR

## Lab Sample ID: 180-79418-2

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.18	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:23	1
Molybdenum	130		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:23	1
Lithium	110		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:23	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 LOW 22 HOUR

## Lab Sample ID: 180-79418-3

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.28	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:12	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:12	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:12	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 LOW REP1

## Lab Sample ID: 180-79418-4

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:18	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:18	1
Lithium	100		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:18	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 LOW REP2

## Lab Sample ID: 180-79418-5

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:21	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:21	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:21	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (46-60') PH 6.0 LOW REP3

Lab Sample ID: 180-79418-6

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:24	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:24	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:24	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH 12 HOUR

Lab Sample ID: 180-79418-7

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.38	J	0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:08	1
Molybdenum	250		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:08	1
Lithium	250		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:08	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH 18 HOUR

Lab Sample ID: 180-79418-8

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:26	1
Molybdenum	230		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:26	1
Lithium	220		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:26	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH 22 HOUR

Lab Sample ID: 180-79418-9

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.21	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:15	1
Molybdenum	240		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:15	1
Lithium	220		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:15	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH REP1

Lab Sample ID: 180-79418-10

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.36	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:27	1
Molybdenum	240		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:27	1
Lithium	220		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:27	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH REP2

Lab Sample ID: 180-79418-11

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.25	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:30	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH REP2

Lab Sample ID: 180-79418-11

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	230		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:30	1
Lithium	210		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:30	1

## Client Sample ID: SB-1806 (46-60') PH 6.0 HIGH REP3

Lab Sample ID: 180-79418-12

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.28	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:33	1
Molybdenum	240		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:33	1
Lithium	220		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:33	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 LOW 12 HOUR

Lab Sample ID: 180-79418-19

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.35	J	0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:11	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:11	1
Lithium	130		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:11	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 LOW 18 HOUR

Lab Sample ID: 180-79418-20

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.20	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:29	1
Molybdenum	130		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:29	1
Lithium	110		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:29	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 LOW 22 HOUR

Lab Sample ID: 180-79418-21

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.17	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:18	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:18	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:18	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 LOW REP1

Lab Sample ID: 180-79418-22

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:36	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:36	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (46-60') PH 7.5 LOW REP1

Lab Sample ID: 180-79418-22

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	110		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:36	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 LOW REP2

Lab Sample ID: 180-79418-23

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.30	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:39	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:39	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:39	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 LOW REP3

Lab Sample ID: 180-79418-24

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.25	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:42	1
Molybdenum	130		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:42	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:42	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH 12 HOUR

Lab Sample ID: 180-79418-25

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.39	J	0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:14	1
Molybdenum	240		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:14	1
Lithium	240		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:14	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH 18 HOUR

Lab Sample ID: 180-79418-26

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.25	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:32	1
Molybdenum	240		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:32	1
Lithium	240		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:32	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH 22 HOUR

Lab Sample ID: 180-79418-27

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.21	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:21	1
Molybdenum	240		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:21	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:21	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH REP1

## Lab Sample ID: 180-79418-28

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.32	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:45	1
Molybdenum	240		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:45	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:45	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH REP2

## Lab Sample ID: 180-79418-29

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.31	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:54	1
Molybdenum	230		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:54	1
Lithium	220		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:54	1

## Client Sample ID: SB-1806 (46-60') PH 7.5 HIGH REP3

## Lab Sample ID: 180-79418-30

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.25	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:57	1
Molybdenum	240		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:57	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:57	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW 12 HOUR

## Lab Sample ID: 180-79418-37

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.30	J	0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:17	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:17	1
Lithium	120		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:17	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	0.2		0.1	0.1	%			07/20/18 08:44	1
Percent Solids	99.8		0.1	0.1	%			07/20/18 08:44	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW 18 HOUR

## Lab Sample ID: 180-79418-38

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.15	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:35	1
Molybdenum	110		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:35	1
Lithium	120		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:35	1

TestAmerica Pittsburgh



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW 22 HOUR

Lab Sample ID: 180-79418-39

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.16	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:24	1
Molybdenum	120		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:24	1
Lithium	120		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:24	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW REP1

Lab Sample ID: 180-79418-40

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.28	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:59	1
Molybdenum	120		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:59	1
Lithium	120		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:59	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW REP2

Lab Sample ID: 180-79418-41

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 14:02	1
Molybdenum	120		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 14:02	1
Lithium	120		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 14:02	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 LOW REP3

Lab Sample ID: 180-79418-42

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.23	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 14:05	1
Molybdenum	120		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 14:05	1
Lithium	120		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 14:05	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH 12 HOUR

Lab Sample ID: 180-79418-43

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.42	J	0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:20	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:20	1
Lithium	260		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:20	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH 18 HOUR

Lab Sample ID: 180-79418-44

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:38	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH 18 HOUR

Lab Sample ID: 180-79418-44

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	220		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:38	1
Lithium	230		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:38	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH 22 HOUR

Lab Sample ID: 180-79418-45

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.27	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:27	1
Molybdenum	230		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:27	1
Lithium	240		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:27	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH REP1

Lab Sample ID: 180-79418-46

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.39	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 14:08	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 14:08	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 14:08	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH REP2

Lab Sample ID: 180-79418-47

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.34	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 14:11	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 14:11	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 14:11	1

## Client Sample ID: SB-1806 (70-76') PH 6.0 HIGH REP3

Lab Sample ID: 180-79418-48

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 14:14	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 14:14	1
Lithium	240		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 14:14	1

## Client Sample ID: SB-1806 (70-76') PH 7.5 LOW 12 HOUR

Lab Sample ID: 180-79418-55

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.28	J	0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:29	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:29	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW 12 HOUR**

**Lab Sample ID: 180-79418-55**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	120		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:29	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW 18 HOUR**

**Lab Sample ID: 180-79418-56**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.18	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:41	1
Molybdenum	110		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:41	1
Lithium	120		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:41	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW 22 HOUR**

**Lab Sample ID: 180-79418-57**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.17	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:30	1
Molybdenum	120		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:30	1
Lithium	120		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:30	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW REP1**

**Lab Sample ID: 180-79418-58**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.33	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 14:17	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 14:17	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 14:17	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW REP2**

**Lab Sample ID: 180-79418-59**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.21	J	0.50	0.075	ug/L		07/24/18 13:13	07/28/18 14:20	1
Molybdenum	120		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 14:20	1
Lithium	120		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 14:20	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 LOW REP3**

**Lab Sample ID: 180-79418-60**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.28	J	0.50	0.075	ug/L		07/24/18 13:16	07/28/18 14:50	1
Molybdenum	120		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 14:50	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 14:50	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH 12 HOUR**

**Lab Sample ID: 180-79418-61**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.37	J	0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:32	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:32	1
Lithium	250		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:32	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH 18 HOUR**

**Lab Sample ID: 180-79418-62**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.36	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:43	1
Molybdenum	230		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:43	1
Lithium	250		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:43	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH 22 HOUR**

**Lab Sample ID: 180-79418-63**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.28	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:33	1
Molybdenum	230		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:33	1
Lithium	240		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:33	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH REP1**

**Lab Sample ID: 180-79418-64**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.35	J	0.50	0.075	ug/L		07/24/18 13:16	07/28/18 14:53	1
Molybdenum	230		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 14:53	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 14:53	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH REP2**

**Lab Sample ID: 180-79418-65**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.42	J	0.50	0.075	ug/L		07/24/18 13:16	07/28/18 14:55	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 14:55	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 14:55	1

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1806 (70-76') PH 7.5 HIGH REP3

Lab Sample ID: 180-79418-66

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.31	J	0.50	0.075	ug/L		07/24/18 13:16	07/28/18 14:58	1
Molybdenum	230		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 14:58	1
Lithium	240		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 14:58	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW 12 HOUR

Lab Sample ID: 180-79418-73

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.70		0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:35	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:35	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:35	1

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	0.2		0.1	0.1	%			07/20/18 08:44	1
Percent Solids	99.8		0.1	0.1	%			07/20/18 08:44	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW 18 HOUR

Lab Sample ID: 180-79418-74

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.46	J	0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:52	1
Molybdenum	110		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:52	1
Lithium	100		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:52	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW 22 HOUR

Lab Sample ID: 180-79418-75

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.52		0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:41	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:41	1
Lithium	100		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:41	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW REP1

Lab Sample ID: 180-79418-76

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.56		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:01	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:01	1
Lithium	100		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:01	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW REP2

Lab Sample ID: 180-79418-77

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.57		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:04	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:04	1
Lithium	100		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:04	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 LOW REP3

Lab Sample ID: 180-79418-78

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.61		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:07	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:07	1
Lithium	100		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:07	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH 12 HOUR

Lab Sample ID: 180-79418-79

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.78		0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:37	1
Molybdenum	210		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:37	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:37	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH 18 HOUR

Lab Sample ID: 180-79418-80

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.78		0.50	0.075	ug/L		07/25/18 11:22	07/28/18 18:18	1
Molybdenum	210		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 18:18	1
Lithium	210		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 18:18	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH 22 HOUR

Lab Sample ID: 180-79418-81

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.69		0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:44	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:44	1
Lithium	220		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:44	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH REP1

Lab Sample ID: 180-79418-82

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.88		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:10	1

TestAmerica Pittsburgh



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH REP1

Lab Sample ID: 180-79418-82

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	210		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:10	1
Lithium	210		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:10	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH REP2

Lab Sample ID: 180-79418-83

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.63		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:19	1
Molybdenum	210		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:19	1
Lithium	200		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:19	1

## Client Sample ID: SB-1808 (45-57') PH 6.0 HIGH REP3

Lab Sample ID: 180-79418-84

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.85		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:22	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:22	1
Lithium	210		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:22	1

## Client Sample ID: SB-1808 (45-57') PH 7.5 LOW 12 HOUR

Lab Sample ID: 180-79418-91

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.61		0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:40	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:40	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:40	1

## Client Sample ID: SB-1808 (45-57') PH 7.5 LOW 18 HOUR

Lab Sample ID: 180-79418-92

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.57		0.50	0.075	ug/L		07/25/18 11:22	07/28/18 18:27	1
Molybdenum	110		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 18:27	1
Lithium	100		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 18:27	1

## Client Sample ID: SB-1808 (45-57') PH 7.5 LOW 22 HOUR

Lab Sample ID: 180-79418-93

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.45	J	0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:47	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:47	1

TestAmerica Pittsburgh



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW 22 HOUR**

**Lab Sample ID: 180-79418-93**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lithium	110		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:47	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW REP1**

**Lab Sample ID: 180-79418-94**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.65		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:25	1
Molybdenum	120		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:25	1
Lithium	110		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:25	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW REP2**

**Lab Sample ID: 180-79418-95**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.67		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:28	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:28	1
Lithium	100		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:28	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 LOW REP3**

**Lab Sample ID: 180-79418-96**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.65		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:31	1
Molybdenum	110		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:31	1
Lithium	100		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:31	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH 12 HOUR**

**Lab Sample ID: 180-79418-97**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.72		0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:43	1
Molybdenum	210		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:43	1
Lithium	230		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:43	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH 18 HOUR**

**Lab Sample ID: 180-79418-98**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.63		0.50	0.075	ug/L		07/25/18 11:22	07/28/18 18:30	1
Molybdenum	220		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 18:30	1
Lithium	210		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 18:30	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH 22 HOUR**

**Lab Sample ID: 180-79418-99**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.75		0.50	0.075	ug/L		07/24/18 13:27	07/28/18 16:50	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 16:50	1
Lithium	220		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 16:50	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH REP1**

**Lab Sample ID: 180-79418-100**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.67		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:34	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:34	1
Lithium	220		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:34	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH REP2**

**Lab Sample ID: 180-79418-101**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.68		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:37	1
Molybdenum	220		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:37	1
Lithium	210		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:37	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 HIGH REP3**

**Lab Sample ID: 180-79418-102**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.56		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 15:40	1
Molybdenum	210		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 15:40	1
Lithium	210		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 15:40	1

**Client Sample ID: LOW SPIKE pH 6.0**

**Lab Sample ID: 180-79418-109**

Date Collected: 06/27/18 12:05

Matrix: Water

Date Received: 06/29/18 09:20

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.0		0.1	0.1	SU			07/19/18 16:00	1

**Client Sample ID: HIGH SPIKE pH 6.0**

**Lab Sample ID: 180-79418-110**

Date Collected: 06/27/18 12:05

Matrix: Water

Date Received: 06/29/18 09:20

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.0		0.1	0.1	SU			07/19/18 16:00	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Client Sample ID: LOW SPIKE pH 7.5

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79418-112

Matrix: Water

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5		0.1	0.1	SU			07/19/18 16:00	1

## Client Sample ID: HIGH SPIKE pH 7.5

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79418-113

Matrix: Water

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5		0.1	0.1	SU			07/19/18 16:00	1

## Client Sample ID: LOW SPIKE pH 6.0

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79418-115

Matrix: Solid

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	18		0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:05	1
Molybdenum	110		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:05	1
Lithium	120		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:05	1

## Client Sample ID: HIGH SPIKE pH 6.0

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79418-116

Matrix: Solid

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	36		0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:08	1
Molybdenum	210		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:08	1
Lithium	240		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:08	1

## Client Sample ID: LOW SPIKE pH 7.5

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79418-118

Matrix: Solid

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	17		0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:17	1
Molybdenum	110		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:17	1
Lithium	130		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:17	1

## Client Sample ID: HIGH SPIKE pH 7.5

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79418-119

Matrix: Solid

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	36		0.50	0.075	ug/L		07/25/18 11:22	07/28/18 17:20	1
Molybdenum	220		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 17:20	1
Lithium	250		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 17:20	1

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Method: EPA 6020A - Metals (ICP/MS)

**Lab Sample ID: MB 180-251469/1-A**  
**Matrix: Solid**  
**Analysis Batch: 251997**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 251469**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		0.50	0.075	ug/L		07/24/18 13:10	07/27/18 16:54	1
Molybdenum	ND		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 16:54	1
Lithium	ND		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 16:54	1

**Lab Sample ID: LCS 180-251469/2-A**  
**Matrix: Solid**  
**Analysis Batch: 251997**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 251469**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	500	464		ug/L		93	80 - 120
Molybdenum	1000	992		ug/L		99	80 - 120
Lithium	50.0	40.3		ug/L		81	80 - 120

**Lab Sample ID: LCSD 180-251469/3-A**  
**Matrix: Solid**  
**Analysis Batch: 251997**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 251469**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	500	464		ug/L		93	80 - 120	0	20
Molybdenum	1000	1000		ug/L		100	80 - 120	1	20
Lithium	50.0	40.8		ug/L		82	80 - 120	1	20

**Lab Sample ID: MB 180-251470/1-A**  
**Matrix: Solid**  
**Analysis Batch: 252063**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 251470**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		0.50	0.075	ug/L		07/24/18 13:13	07/28/18 13:01	1
Molybdenum	ND		5.0	0.47	ug/L		07/24/18 13:13	07/28/18 13:01	1
Lithium	ND		5.0	2.6	ug/L		07/24/18 13:13	07/28/18 13:01	1

**Lab Sample ID: LCS 180-251470/2-A**  
**Matrix: Solid**  
**Analysis Batch: 252059**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 251470**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	500	475		ug/L		95	80 - 120
Molybdenum	1000	924		ug/L		92	80 - 120
Lithium	50.0	50.4		ug/L		101	80 - 120

**Lab Sample ID: LCSD 180-251470/3-A**  
**Matrix: Solid**  
**Analysis Batch: 252059**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 251470**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	500	474		ug/L		95	80 - 120	0	20
Molybdenum	1000	934		ug/L		93	80 - 120	1	20
Lithium	50.0	47.6		ug/L		95	80 - 120	6	20

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: MB 180-251474/1-A**  
**Matrix: Solid**  
**Analysis Batch: 252063**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 251474**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		0.50	0.075	ug/L		07/24/18 13:16	07/28/18 14:32	1
Molybdenum	ND		5.0	0.47	ug/L		07/24/18 13:16	07/28/18 14:32	1
Lithium	ND		5.0	2.6	ug/L		07/24/18 13:16	07/28/18 14:32	1

**Lab Sample ID: LCS 180-251474/2-A**  
**Matrix: Solid**  
**Analysis Batch: 252063**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 251474**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	500	457		ug/L		91	80 - 120
Molybdenum	1000	969		ug/L		97	80 - 120
Lithium	50.0	47.8		ug/L		96	80 - 120

**Lab Sample ID: LCSD 180-251474/3-A**  
**Matrix: Solid**  
**Analysis Batch: 252063**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 251474**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	500	456		ug/L		91	80 - 120	0	20
Molybdenum	1000	988		ug/L		99	80 - 120	2	20
Lithium	50.0	48.1		ug/L		96	80 - 120	1	20

**Lab Sample ID: MB 180-251475/1-A**  
**Matrix: Solid**  
**Analysis Batch: 252063**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 251475**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		0.50	0.075	ug/L		07/24/18 13:27	07/28/18 15:46	1
Molybdenum	ND		5.0	0.47	ug/L		07/24/18 13:27	07/28/18 15:46	1
Lithium	ND		5.0	2.6	ug/L		07/24/18 13:27	07/28/18 15:46	1

**Lab Sample ID: LCS 180-251475/2-A**  
**Matrix: Solid**  
**Analysis Batch: 252063**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 251475**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	500	472		ug/L		94	80 - 120
Molybdenum	1000	985		ug/L		99	80 - 120
Lithium	50.0	47.9		ug/L		96	80 - 120

**Lab Sample ID: LCSD 180-251475/3-A**  
**Matrix: Solid**  
**Analysis Batch: 252063**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 251475**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	500	464		ug/L		93	80 - 120	2	20
Molybdenum	1000	990		ug/L		99	80 - 120	0	20
Lithium	50.0	47.8		ug/L		96	80 - 120	0	20

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: MB 180-251600/1-A**  
**Matrix: Solid**  
**Analysis Batch: 252063**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 251600**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		0.50	0.075	ug/L		07/25/18 11:22	07/28/18 16:56	1
Molybdenum	ND		5.0	0.47	ug/L		07/25/18 11:22	07/28/18 16:56	1
Lithium	ND		5.0	2.6	ug/L		07/25/18 11:22	07/28/18 16:56	1

**Lab Sample ID: LCS 180-251600/2-A**  
**Matrix: Solid**  
**Analysis Batch: 252059**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 251600**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	500	477		ug/L		95	80 - 120
Molybdenum	1000	933		ug/L		93	80 - 120
Lithium	50.0	48.8		ug/L		98	80 - 120

**Lab Sample ID: LCSD 180-251600/3-A**  
**Matrix: Solid**  
**Analysis Batch: 252059**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 251600**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	500	471		ug/L		94	80 - 120	1	20
Molybdenum	1000	928		ug/L		93	80 - 120	1	20
Lithium	50.0	48.8		ug/L		98	80 - 120	0	20

**Lab Sample ID: LB 180-251297/1-C**  
**Matrix: Solid**  
**Analysis Batch: 251997**

**Client Sample ID: Method Blank**  
**Prep Type: Leach**  
**Prep Batch: 251469**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		0.50	0.075	ug/L		07/24/18 13:10	07/27/18 17:02	1
Molybdenum	ND		5.0	0.47	ug/L		07/24/18 13:10	07/27/18 17:02	1
Lithium	ND		5.0	2.6	ug/L		07/24/18 13:10	07/27/18 17:02	1

## Method: EPA 9040C - pH

**Lab Sample ID: LCS 180-251442/1**  
**Matrix: Water**  
**Analysis Batch: 251442**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
pH	7.00	7.0		SU		100	99 - 101

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Metals

### Leach Batch: 251297

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-1	SB-1806 (46-60') PH 6.0 LOW 12 HOUR	Leach	Solid	D4646 03	
180-79418-7	SB-1806 (46-60') PH 6.0 HIGH 12 HOUR	Leach	Solid	D4646 03	
180-79418-19	SB-1806 (46-60') PH 7.5 LOW 12 HOUR	Leach	Solid	D4646 03	
180-79418-25	SB-1806 (46-60') PH 7.5 HIGH 12 HOUR	Leach	Solid	D4646 03	
180-79418-37	SB-1806 (70-76') PH 6.0 LOW 12 HOUR	Leach	Solid	D4646 03	
180-79418-43	SB-1806 (70-76') PH 6.0 HIGH 12 HOUR	Leach	Solid	D4646 03	
180-79418-55	SB-1806 (70-76') PH 7.5 LOW 12 HOUR	Leach	Solid	D4646 03	
180-79418-61	SB-1806 (70-76') PH 7.5 HIGH 12 HOUR	Leach	Solid	D4646 03	
180-79418-73	SB-1808 (45-57') PH 6.0 LOW 12 HOUR	Leach	Solid	D4646 03	
180-79418-79	SB-1808 (45-57') PH 6.0 HIGH 12 HOUR	Leach	Solid	D4646 03	
180-79418-91	SB-1808 (45-57') PH 7.5 LOW 12 HOUR	Leach	Solid	D4646 03	
180-79418-97	SB-1808 (45-57') PH 7.5 HIGH 12 HOUR	Leach	Solid	D4646 03	
LB 180-251297/1-C	Method Blank	Leach	Solid	D4646 03	

### Leach Batch: 251313

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-3	SB-1806 (46-60') PH 6.0 LOW 22 HOUR	Leach	Solid	D4646 03	
180-79418-9	SB-1806 (46-60') PH 6.0 HIGH 22 HOUR	Leach	Solid	D4646 03	
180-79418-21	SB-1806 (46-60') PH 7.5 LOW 22 HOUR	Leach	Solid	D4646 03	
180-79418-27	SB-1806 (46-60') PH 7.5 HIGH 22 HOUR	Leach	Solid	D4646 03	
180-79418-39	SB-1806 (70-76') PH 6.0 LOW 22 HOUR	Leach	Solid	D4646 03	
180-79418-45	SB-1806 (70-76') PH 6.0 HIGH 22 HOUR	Leach	Solid	D4646 03	
180-79418-57	SB-1806 (70-76') PH 7.5 LOW 22 HOUR	Leach	Solid	D4646 03	
180-79418-63	SB-1806 (70-76') PH 7.5 HIGH 22 HOUR	Leach	Solid	D4646 03	
180-79418-75	SB-1808 (45-57') PH 6.0 LOW 22 HOUR	Leach	Solid	D4646 03	
180-79418-81	SB-1808 (45-57') PH 6.0 HIGH 22 HOUR	Leach	Solid	D4646 03	
180-79418-93	SB-1808 (45-57') PH 7.5 LOW 22 HOUR	Leach	Solid	D4646 03	
180-79418-99	SB-1808 (45-57') PH 7.5 HIGH 22 HOUR	Leach	Solid	D4646 03	

### Leach Batch: 251323

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-4	SB-1806 (46-60') PH 6.0 LOW REP1	Leach	Solid	D4646 03	
180-79418-5	SB-1806 (46-60') PH 6.0 LOW REP2	Leach	Solid	D4646 03	
180-79418-6	SB-1806 (46-60') PH 6.0 LOW REP3	Leach	Solid	D4646 03	
180-79418-10	SB-1806 (46-60') PH 6.0 HIGH REP1	Leach	Solid	D4646 03	
180-79418-11	SB-1806 (46-60') PH 6.0 HIGH REP2	Leach	Solid	D4646 03	
180-79418-12	SB-1806 (46-60') PH 6.0 HIGH REP3	Leach	Solid	D4646 03	
180-79418-22	SB-1806 (46-60') PH 7.5 LOW REP1	Leach	Solid	D4646 03	
180-79418-23	SB-1806 (46-60') PH 7.5 LOW REP2	Leach	Solid	D4646 03	
180-79418-24	SB-1806 (46-60') PH 7.5 LOW REP3	Leach	Solid	D4646 03	
180-79418-28	SB-1806 (46-60') PH 7.5 HIGH REP1	Leach	Solid	D4646 03	
180-79418-29	SB-1806 (46-60') PH 7.5 HIGH REP2	Leach	Solid	D4646 03	
180-79418-30	SB-1806 (46-60') PH 7.5 HIGH REP3	Leach	Solid	D4646 03	
180-79418-40	SB-1806 (70-76') PH 6.0 LOW REP1	Leach	Solid	D4646 03	
180-79418-41	SB-1806 (70-76') PH 6.0 LOW REP2	Leach	Solid	D4646 03	
180-79418-42	SB-1806 (70-76') PH 6.0 LOW REP3	Leach	Solid	D4646 03	
180-79418-46	SB-1806 (70-76') PH 6.0 HIGH REP1	Leach	Solid	D4646 03	
180-79418-47	SB-1806 (70-76') PH 6.0 HIGH REP2	Leach	Solid	D4646 03	
180-79418-48	SB-1806 (70-76') PH 6.0 HIGH REP3	Leach	Solid	D4646 03	
180-79418-58	SB-1806 (70-76') PH 7.5 LOW REP1	Leach	Solid	D4646 03	
180-79418-59	SB-1806 (70-76') PH 7.5 LOW REP2	Leach	Solid	D4646 03	

TestAmerica Pittsburgh



# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Metals (Continued)

### Leach Batch: 251323 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-60	SB-1806 (70-76") PH 7.5 LOW REP3	Leach	Solid	D4646 03	
180-79418-64	SB-1806 (70-76") PH 7.5 HIGH REP1	Leach	Solid	D4646 03	
180-79418-65	SB-1806 (70-76") PH 7.5 HIGH REP2	Leach	Solid	D4646 03	
180-79418-66	SB-1806 (70-76") PH 7.5 HIGH REP3	Leach	Solid	D4646 03	
180-79418-76	SB-1808 (45-57") PH 6.0 LOW REP1	Leach	Solid	D4646 03	
180-79418-77	SB-1808 (45-57") PH 6.0 LOW REP2	Leach	Solid	D4646 03	
180-79418-78	SB-1808 (45-57") PH 6.0 LOW REP3	Leach	Solid	D4646 03	
180-79418-82	SB-1808 (45-57") PH 6.0 HIGH REP1	Leach	Solid	D4646 03	
180-79418-83	SB-1808 (45-57") PH 6.0 HIGH REP2	Leach	Solid	D4646 03	
180-79418-84	SB-1808 (45-57") PH 6.0 HIGH REP3	Leach	Solid	D4646 03	
180-79418-94	SB-1808 (45-57") PH 7.5 LOW REP1	Leach	Solid	D4646 03	
180-79418-95	SB-1808 (45-57") PH 7.5 LOW REP2	Leach	Solid	D4646 03	
180-79418-96	SB-1808 (45-57") PH 7.5 LOW REP3	Leach	Solid	D4646 03	
180-79418-100	SB-1808 (45-57") PH 7.5 HIGH REP1	Leach	Solid	D4646 03	
180-79418-101	SB-1808 (45-57") PH 7.5 HIGH REP2	Leach	Solid	D4646 03	
180-79418-102	SB-1808 (45-57") PH 7.5 HIGH REP3	Leach	Solid	D4646 03	
180-79418-115	LOW SPIKE pH 6.0	Leach	Solid	D4646 03	
180-79418-116	HIGH SPIKE pH 6.0	Leach	Solid	D4646 03	
180-79418-118	LOW SPIKE pH 7.5	Leach	Solid	D4646 03	
180-79418-119	HIGH SPIKE pH 7.5	Leach	Solid	D4646 03	

### Leach Batch: 251383

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-2	SB-1806 (46-60") PH 6.0 LOW 18 HOUR	Leach	Solid	D4646 03	
180-79418-8	SB-1806 (46-60") PH 6.0 HIGH 18 HOUR	Leach	Solid	D4646 03	
180-79418-20	SB-1806 (46-60") PH 7.5 LOW 18 HOUR	Leach	Solid	D4646 03	
180-79418-26	SB-1806 (46-60") PH 7.5 HIGH 18 HOUR	Leach	Solid	D4646 03	
180-79418-38	SB-1806 (70-76") PH 6.0 LOW 18 HOUR	Leach	Solid	D4646 03	
180-79418-44	SB-1806 (70-76") PH 6.0 HIGH 18 HOUR	Leach	Solid	D4646 03	
180-79418-56	SB-1806 (70-76") PH 7.5 LOW 18 HOUR	Leach	Solid	D4646 03	
180-79418-62	SB-1806 (70-76") PH 7.5 HIGH 18 HOUR	Leach	Solid	D4646 03	
180-79418-74	SB-1808 (45-57") PH 6.0 LOW 18 HOUR	Leach	Solid	D4646 03	
180-79418-80	SB-1808 (45-57") PH 6.0 HIGH 18 HOUR	Leach	Solid	D4646 03	
180-79418-92	SB-1808 (45-57") PH 7.5 LOW 18 HOUR	Leach	Solid	D4646 03	
180-79418-98	SB-1808 (45-57") PH 7.5 HIGH 18 HOUR	Leach	Solid	D4646 03	

### Prep Batch: 251469

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-1	SB-1806 (46-60") PH 6.0 LOW 12 HOUR	Leach	Solid	3010A	251297
180-79418-7	SB-1806 (46-60") PH 6.0 HIGH 12 HOUR	Leach	Solid	3010A	251297
180-79418-19	SB-1806 (46-60") PH 7.5 LOW 12 HOUR	Leach	Solid	3010A	251297
180-79418-25	SB-1806 (46-60") PH 7.5 HIGH 12 HOUR	Leach	Solid	3010A	251297
180-79418-37	SB-1806 (70-76") PH 6.0 LOW 12 HOUR	Leach	Solid	3010A	251297
180-79418-43	SB-1806 (70-76") PH 6.0 HIGH 12 HOUR	Leach	Solid	3010A	251297
180-79418-55	SB-1806 (70-76") PH 7.5 LOW 12 HOUR	Leach	Solid	3010A	251297
180-79418-61	SB-1806 (70-76") PH 7.5 HIGH 12 HOUR	Leach	Solid	3010A	251297
180-79418-73	SB-1808 (45-57") PH 6.0 LOW 12 HOUR	Leach	Solid	3010A	251297
180-79418-79	SB-1808 (45-57") PH 6.0 HIGH 12 HOUR	Leach	Solid	3010A	251297
180-79418-91	SB-1808 (45-57") PH 7.5 LOW 12 HOUR	Leach	Solid	3010A	251297
180-79418-97	SB-1808 (45-57") PH 7.5 HIGH 12 HOUR	Leach	Solid	3010A	251297
LB 180-251297/1-C	Method Blank	Leach	Solid	3010A	251297

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Metals (Continued)

### Prep Batch: 251469 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-251469/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-251469/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 180-251469/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	

### Prep Batch: 251470

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-4	SB-1806 (46-60') PH 6.0 LOW REP1	Leach	Solid	3010A	251323
180-79418-5	SB-1806 (46-60') PH 6.0 LOW REP2	Leach	Solid	3010A	251323
180-79418-6	SB-1806 (46-60') PH 6.0 LOW REP3	Leach	Solid	3010A	251323
180-79418-10	SB-1806 (46-60') PH 6.0 HIGH REP1	Leach	Solid	3010A	251323
180-79418-11	SB-1806 (46-60') PH 6.0 HIGH REP2	Leach	Solid	3010A	251323
180-79418-12	SB-1806 (46-60') PH 6.0 HIGH REP3	Leach	Solid	3010A	251323
180-79418-22	SB-1806 (46-60') PH 7.5 LOW REP1	Leach	Solid	3010A	251323
180-79418-23	SB-1806 (46-60') PH 7.5 LOW REP2	Leach	Solid	3010A	251323
180-79418-24	SB-1806 (46-60') PH 7.5 LOW REP3	Leach	Solid	3010A	251323
180-79418-28	SB-1806 (46-60') PH 7.5 HIGH REP1	Leach	Solid	3010A	251323
180-79418-29	SB-1806 (46-60') PH 7.5 HIGH REP2	Leach	Solid	3010A	251323
180-79418-30	SB-1806 (46-60') PH 7.5 HIGH REP3	Leach	Solid	3010A	251323
180-79418-40	SB-1806 (70-76') PH 6.0 LOW REP1	Leach	Solid	3010A	251323
180-79418-41	SB-1806 (70-76') PH 6.0 LOW REP2	Leach	Solid	3010A	251323
180-79418-42	SB-1806 (70-76') PH 6.0 LOW REP3	Leach	Solid	3010A	251323
180-79418-46	SB-1806 (70-76') PH 6.0 HIGH REP1	Leach	Solid	3010A	251323
180-79418-47	SB-1806 (70-76') PH 6.0 HIGH REP2	Leach	Solid	3010A	251323
180-79418-48	SB-1806 (70-76') PH 6.0 HIGH REP3	Leach	Solid	3010A	251323
180-79418-58	SB-1806 (70-76') PH 7.5 LOW REP1	Leach	Solid	3010A	251323
180-79418-59	SB-1806 (70-76') PH 7.5 LOW REP2	Leach	Solid	3010A	251323
MB 180-251470/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-251470/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 180-251470/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	

### Prep Batch: 251474

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-60	SB-1806 (70-76') PH 7.5 LOW REP3	Leach	Solid	3010A	251323
180-79418-64	SB-1806 (70-76') PH 7.5 HIGH REP1	Leach	Solid	3010A	251323
180-79418-65	SB-1806 (70-76') PH 7.5 HIGH REP2	Leach	Solid	3010A	251323
180-79418-66	SB-1806 (70-76') PH 7.5 HIGH REP3	Leach	Solid	3010A	251323
180-79418-76	SB-1808 (45-57') PH 6.0 LOW REP1	Leach	Solid	3010A	251323
180-79418-77	SB-1808 (45-57') PH 6.0 LOW REP2	Leach	Solid	3010A	251323
180-79418-78	SB-1808 (45-57') PH 6.0 LOW REP3	Leach	Solid	3010A	251323
180-79418-82	SB-1808 (45-57') PH 6.0 HIGH REP1	Leach	Solid	3010A	251323
180-79418-83	SB-1808 (45-57') PH 6.0 HIGH REP2	Leach	Solid	3010A	251323
180-79418-84	SB-1808 (45-57') PH 6.0 HIGH REP3	Leach	Solid	3010A	251323
180-79418-94	SB-1808 (45-57') PH 7.5 LOW REP1	Leach	Solid	3010A	251323
180-79418-95	SB-1808 (45-57') PH 7.5 LOW REP2	Leach	Solid	3010A	251323
180-79418-96	SB-1808 (45-57') PH 7.5 LOW REP3	Leach	Solid	3010A	251323
180-79418-100	SB-1808 (45-57') PH 7.5 HIGH REP1	Leach	Solid	3010A	251323
180-79418-101	SB-1808 (45-57') PH 7.5 HIGH REP2	Leach	Solid	3010A	251323
180-79418-102	SB-1808 (45-57') PH 7.5 HIGH REP3	Leach	Solid	3010A	251323
MB 180-251474/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-251474/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 180-251474/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Prep Batch: 251475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-3	SB-1806 (46-60') PH 6.0 LOW 22 HOUR	Leach	Solid	3010A	251313
180-79418-9	SB-1806 (46-60') PH 6.0 HIGH 22 HOUR	Leach	Solid	3010A	251313
180-79418-21	SB-1806 (46-60') PH 7.5 LOW 22 HOUR	Leach	Solid	3010A	251313
180-79418-27	SB-1806 (46-60') PH 7.5 HIGH 22 HOUR	Leach	Solid	3010A	251313
180-79418-39	SB-1806 (70-76') PH 6.0 LOW 22 HOUR	Leach	Solid	3010A	251313
180-79418-45	SB-1806 (70-76') PH 6.0 HIGH 22 HOUR	Leach	Solid	3010A	251313
180-79418-57	SB-1806 (70-76') PH 7.5 LOW 22 HOUR	Leach	Solid	3010A	251313
180-79418-63	SB-1806 (70-76') PH 7.5 HIGH 22 HOUR	Leach	Solid	3010A	251313
180-79418-75	SB-1808 (45-57') PH 6.0 LOW 22 HOUR	Leach	Solid	3010A	251313
180-79418-81	SB-1808 (45-57') PH 6.0 HIGH 22 HOUR	Leach	Solid	3010A	251313
180-79418-93	SB-1808 (45-57') PH 7.5 LOW 22 HOUR	Leach	Solid	3010A	251313
180-79418-99	SB-1808 (45-57') PH 7.5 HIGH 22 HOUR	Leach	Solid	3010A	251313
MB 180-251475/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-251475/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 180-251475/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	

## Prep Batch: 251600

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-2	SB-1806 (46-60') PH 6.0 LOW 18 HOUR	Leach	Solid	3010A	251383
180-79418-8	SB-1806 (46-60') PH 6.0 HIGH 18 HOUR	Leach	Solid	3010A	251383
180-79418-20	SB-1806 (46-60') PH 7.5 LOW 18 HOUR	Leach	Solid	3010A	251383
180-79418-26	SB-1806 (46-60') PH 7.5 HIGH 18 HOUR	Leach	Solid	3010A	251383
180-79418-38	SB-1806 (70-76') PH 6.0 LOW 18 HOUR	Leach	Solid	3010A	251383
180-79418-44	SB-1806 (70-76') PH 6.0 HIGH 18 HOUR	Leach	Solid	3010A	251383
180-79418-56	SB-1806 (70-76') PH 7.5 LOW 18 HOUR	Leach	Solid	3010A	251383
180-79418-62	SB-1806 (70-76') PH 7.5 HIGH 18 HOUR	Leach	Solid	3010A	251383
180-79418-74	SB-1808 (45-57') PH 6.0 LOW 18 HOUR	Leach	Solid	3010A	251383
180-79418-80	SB-1808 (45-57') PH 6.0 HIGH 18 HOUR	Leach	Solid	3010A	251383
180-79418-92	SB-1808 (45-57') PH 7.5 LOW 18 HOUR	Leach	Solid	3010A	251383
180-79418-98	SB-1808 (45-57') PH 7.5 HIGH 18 HOUR	Leach	Solid	3010A	251383
180-79418-115	LOW SPIKE pH 6.0	Leach	Solid	3010A	251323
180-79418-116	HIGH SPIKE pH 6.0	Leach	Solid	3010A	251323
180-79418-118	LOW SPIKE pH 7.5	Leach	Solid	3010A	251323
180-79418-119	HIGH SPIKE pH 7.5	Leach	Solid	3010A	251323
MB 180-251600/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-251600/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 180-251600/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	

## Analysis Batch: 251997

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-1	SB-1806 (46-60') PH 6.0 LOW 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-7	SB-1806 (46-60') PH 6.0 HIGH 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-19	SB-1806 (46-60') PH 7.5 LOW 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-25	SB-1806 (46-60') PH 7.5 HIGH 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-37	SB-1806 (70-76') PH 6.0 LOW 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-43	SB-1806 (70-76') PH 6.0 HIGH 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-55	SB-1806 (70-76') PH 7.5 LOW 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-61	SB-1806 (70-76') PH 7.5 HIGH 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-73	SB-1808 (45-57') PH 6.0 LOW 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-79	SB-1808 (45-57') PH 6.0 HIGH 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-91	SB-1808 (45-57') PH 7.5 LOW 12 HOUR	Leach	Solid	EPA 6020A	251469
180-79418-97	SB-1808 (45-57') PH 7.5 HIGH 12 HOUR	Leach	Solid	EPA 6020A	251469
LB 180-251297/1-C	Method Blank	Leach	Solid	EPA 6020A	251469

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Metals (Continued)

### Analysis Batch: 251997 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-251469/1-A	Method Blank	Total/NA	Solid	EPA 6020A	251469
LCS 180-251469/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	251469
LCSD 180-251469/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	251469

### Analysis Batch: 252059

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-251470/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	251470
LCS 180-251600/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	251600
LCSD 180-251470/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	251470
LCSD 180-251600/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	251600

### Analysis Batch: 252063

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-2	SB-1806 (46-60') PH 6.0 LOW 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-3	SB-1806 (46-60') PH 6.0 LOW 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-4	SB-1806 (46-60') PH 6.0 LOW REP1	Leach	Solid	EPA 6020A	251470
180-79418-5	SB-1806 (46-60') PH 6.0 LOW REP2	Leach	Solid	EPA 6020A	251470
180-79418-6	SB-1806 (46-60') PH 6.0 LOW REP3	Leach	Solid	EPA 6020A	251470
180-79418-8	SB-1806 (46-60') PH 6.0 HIGH 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-9	SB-1806 (46-60') PH 6.0 HIGH 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-10	SB-1806 (46-60') PH 6.0 HIGH REP1	Leach	Solid	EPA 6020A	251470
180-79418-11	SB-1806 (46-60') PH 6.0 HIGH REP2	Leach	Solid	EPA 6020A	251470
180-79418-12	SB-1806 (46-60') PH 6.0 HIGH REP3	Leach	Solid	EPA 6020A	251470
180-79418-20	SB-1806 (46-60') PH 7.5 LOW 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-21	SB-1806 (46-60') PH 7.5 LOW 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-22	SB-1806 (46-60') PH 7.5 LOW REP1	Leach	Solid	EPA 6020A	251470
180-79418-23	SB-1806 (46-60') PH 7.5 LOW REP2	Leach	Solid	EPA 6020A	251470
180-79418-24	SB-1806 (46-60') PH 7.5 LOW REP3	Leach	Solid	EPA 6020A	251470
180-79418-26	SB-1806 (46-60') PH 7.5 HIGH 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-27	SB-1806 (46-60') PH 7.5 HIGH 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-28	SB-1806 (46-60') PH 7.5 HIGH REP1	Leach	Solid	EPA 6020A	251470
180-79418-29	SB-1806 (46-60') PH 7.5 HIGH REP2	Leach	Solid	EPA 6020A	251470
180-79418-30	SB-1806 (46-60') PH 7.5 HIGH REP3	Leach	Solid	EPA 6020A	251470
180-79418-38	SB-1806 (70-76') PH 6.0 LOW 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-39	SB-1806 (70-76') PH 6.0 LOW 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-40	SB-1806 (70-76') PH 6.0 LOW REP1	Leach	Solid	EPA 6020A	251470
180-79418-41	SB-1806 (70-76') PH 6.0 LOW REP2	Leach	Solid	EPA 6020A	251470
180-79418-42	SB-1806 (70-76') PH 6.0 LOW REP3	Leach	Solid	EPA 6020A	251470
180-79418-44	SB-1806 (70-76') PH 6.0 HIGH 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-45	SB-1806 (70-76') PH 6.0 HIGH 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-46	SB-1806 (70-76') PH 6.0 HIGH REP1	Leach	Solid	EPA 6020A	251470
180-79418-47	SB-1806 (70-76') PH 6.0 HIGH REP2	Leach	Solid	EPA 6020A	251470
180-79418-48	SB-1806 (70-76') PH 6.0 HIGH REP3	Leach	Solid	EPA 6020A	251470
180-79418-56	SB-1806 (70-76') PH 7.5 LOW 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-57	SB-1806 (70-76') PH 7.5 LOW 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-58	SB-1806 (70-76') PH 7.5 LOW REP1	Leach	Solid	EPA 6020A	251470
180-79418-59	SB-1806 (70-76') PH 7.5 LOW REP2	Leach	Solid	EPA 6020A	251470
180-79418-60	SB-1806 (70-76') PH 7.5 LOW REP3	Leach	Solid	EPA 6020A	251474
180-79418-62	SB-1806 (70-76') PH 7.5 HIGH 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-63	SB-1806 (70-76') PH 7.5 HIGH 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-64	SB-1806 (70-76') PH 7.5 HIGH REP1	Leach	Solid	EPA 6020A	251474

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-1

## Metals (Continued)

### Analysis Batch: 252063 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-65	SB-1806 (70-76") PH 7.5 HIGH REP2	Leach	Solid	EPA 6020A	251474
180-79418-66	SB-1806 (70-76") PH 7.5 HIGH REP3	Leach	Solid	EPA 6020A	251474
180-79418-74	SB-1808 (45-57") PH 6.0 LOW 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-75	SB-1808 (45-57") PH 6.0 LOW 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-76	SB-1808 (45-57") PH 6.0 LOW REP1	Leach	Solid	EPA 6020A	251474
180-79418-77	SB-1808 (45-57") PH 6.0 LOW REP2	Leach	Solid	EPA 6020A	251474
180-79418-78	SB-1808 (45-57") PH 6.0 LOW REP3	Leach	Solid	EPA 6020A	251474
180-79418-80	SB-1808 (45-57") PH 6.0 HIGH 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-81	SB-1808 (45-57") PH 6.0 HIGH 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-82	SB-1808 (45-57") PH 6.0 HIGH REP1	Leach	Solid	EPA 6020A	251474
180-79418-83	SB-1808 (45-57") PH 6.0 HIGH REP2	Leach	Solid	EPA 6020A	251474
180-79418-84	SB-1808 (45-57") PH 6.0 HIGH REP3	Leach	Solid	EPA 6020A	251474
180-79418-92	SB-1808 (45-57") PH 7.5 LOW 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-93	SB-1808 (45-57") PH 7.5 LOW 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-94	SB-1808 (45-57") PH 7.5 LOW REP1	Leach	Solid	EPA 6020A	251474
180-79418-95	SB-1808 (45-57") PH 7.5 LOW REP2	Leach	Solid	EPA 6020A	251474
180-79418-96	SB-1808 (45-57") PH 7.5 LOW REP3	Leach	Solid	EPA 6020A	251474
180-79418-98	SB-1808 (45-57") PH 7.5 HIGH 18 HOUR	Leach	Solid	EPA 6020A	251600
180-79418-99	SB-1808 (45-57") PH 7.5 HIGH 22 HOUR	Leach	Solid	EPA 6020A	251475
180-79418-100	SB-1808 (45-57") PH 7.5 HIGH REP1	Leach	Solid	EPA 6020A	251474
180-79418-101	SB-1808 (45-57") PH 7.5 HIGH REP2	Leach	Solid	EPA 6020A	251474
180-79418-102	SB-1808 (45-57") PH 7.5 HIGH REP3	Leach	Solid	EPA 6020A	251474
180-79418-115	LOW SPIKE pH 6.0	Leach	Solid	EPA 6020A	251600
180-79418-116	HIGH SPIKE pH 6.0	Leach	Solid	EPA 6020A	251600
180-79418-118	LOW SPIKE pH 7.5	Leach	Solid	EPA 6020A	251600
180-79418-119	HIGH SPIKE pH 7.5	Leach	Solid	EPA 6020A	251600
MB 180-251470/1-A	Method Blank	Total/NA	Solid	EPA 6020A	251470
MB 180-251474/1-A	Method Blank	Total/NA	Solid	EPA 6020A	251474
MB 180-251475/1-A	Method Blank	Total/NA	Solid	EPA 6020A	251475
MB 180-251600/1-A	Method Blank	Total/NA	Solid	EPA 6020A	251600
LCS 180-251474/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	251474
LCS 180-251475/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	251475
LCSD 180-251474/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	251474
LCSD 180-251475/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	251475

## General Chemistry

### Analysis Batch: 251132

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-1	SB-1806 (46-60") PH 6.0 LOW 12 HOUR	Total/NA	Solid	2540G	
180-79418-37	SB-1806 (70-76") PH 6.0 LOW 12 HOUR	Total/NA	Solid	2540G	
180-79418-73	SB-1808 (45-57") PH 6.0 LOW 12 HOUR	Total/NA	Solid	2540G	

### Analysis Batch: 251442

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-109	LOW SPIKE pH 6.0	Total/NA	Water	EPA 9040C	
180-79418-110	HIGH SPIKE pH 6.0	Total/NA	Water	EPA 9040C	
180-79418-112	LOW SPIKE pH 7.5	Total/NA	Water	EPA 9040C	
180-79418-113	HIGH SPIKE pH 7.5	Total/NA	Water	EPA 9040C	
LCS 180-251442/1	Lab Control Sample	Total/NA	Water	EPA 9040C	

TestAmerica Pittsburgh



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 Pittsburgh, PA 15238-2907  
 phone 412.963.7058 Fax 412.963.2468

**Chain of Custody Record**

**TestAmerica**  
 THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program:  DW  NPDES  RCRA  Other: **USEPA CCR**

**Client Contact**  
 Samborn, Head & Associates, Inc.  
 20 Foundry Street  
 Concord, NH 03301  
 (603) 229-1900 Phone  
 (603) 229-1919 FAX  
 Project Name: Mountaineer  
 Site: New Haven, West Virginia  
 P O # : 4345.00

**Project Manager: Andrew Ashton**  
 Tel/Fax: (603) 415-6173

**Site Contact:**  
 Lab Contact: Carrie Gamber  
 Date: \_\_\_\_\_

**Carrier:**  
 Date: \_\_\_\_\_

**Analysis Turnaround Time**  
 CALENDAR DAYS  WORKING DAYS  
 TAT if different from Below Standard  
 2 weeks  
 1 week  
 2 days  
 1 day

Sample Identification	Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Site Contact: Carrie Gamber										Sample Specific Notes:				
						Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	% moisture/solids (2540G)	CCR App III/IV Metals (6020A)	Mercury (741B)	Cl, Fl, SO4 (9056A, DI Leach)	pH (9045D)	Radium-226 (9315)	Radium-226 (9320)	LEAF Method 1313 (see comment)		ASTM D4646 (see comments)			
SB-1802 (10-12')	6/26/18	0930	C	SO1	2	N														
SB-1802 (60-66')	6/26/18	1130	C		2															
SB-1802 (66-72')	6/26/18	1210	C		2															
SB-1805 (9-11')	6/18/18	1350	C		2															
SB-1805 (50-60')	6/19/18	1600	C		2															
SB-1805 (60-66')	6/19/18	1715	C		2															
SB-1805 (66-78')	6/19/18	1910	C		4															
SB-1806 (46-60')	6/25/18	1135	C		4															
SB-1806 (64-70')	6/25/18	1320	C		4															
SB-1806 (70-76')	6/25/18	1505	C		4															
SB-1806 (45-57')	6/27/18	1205	C		6															



180-79418 Chain of Custody

**Preservation Used:** 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other  
**Possible Hazard Identification:** Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

**Special Instructions/QC Requirements & Comments:**  
 ASTM D4646 modified to three concentration points (Co: 20 ug/l, 40 ug/l and spike; Li: 130 ug/l, 250 ug/l, and spike; Mo: 110 ug/l, 220 ug/l, and spike) and two pH points (6.0 and 7.5)  
 LEAF Method 1313 modified to 6 pH points (5.0, 6.0, 7.0, 8.0, 9.0, and DI water)

**Custody Seals Intact:**  Yes  No  
**Relinquished by:** *Lily Cantrell*  
 Company: *Samborn Head & Associates*  
 Date/Time: *6/28/18 0945*  
**Relinquished by:** *Julie Watson*  
 Company: *AAVIT*  
 Date/Time: *6-29-18*  
**Relinquished by:** \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Date/Time: \_\_\_\_\_

**Therm ID No.:** \_\_\_\_\_  
**Cooler Temp. (°C):** Obs'd: \_\_\_\_\_  
**Company:** \_\_\_\_\_  
**Date/Time:** \_\_\_\_\_  
**Company:** \_\_\_\_\_  
**Date/Time:** \_\_\_\_\_  
**Company:** \_\_\_\_\_  
**Date/Time:** \_\_\_\_\_





180-79418 Login

PM Gamber, Carrie L.

Company: Sanborn Lead & Associates Inc

Controlled Document

Pittsburgh

WI No. PT-SR-WI-015\_R2

Effective Date: 11/9/2017

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Temperature Check Performed by: *P. Watson*

Date: *6/29/18*

IR Temp. Gun ID and Correction Factor: *916 4.8 2.8*

Sample ID	Uncorrected Temp. °C	Corrected Temp. °C	Uncorrected Temp. °C	Corrected Temp. °C
 180-79418-A-1 SB-1806 (46-60) PH 6 0 Bottle Clear Glass 32oz Wide - unpreserved Sampled 6/25/2018 11:35 AM 180-2811852 COC	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>
 180-79418-B-1 SB-1806 (46-60) PH 6 0 Bottle Clear Glass 32oz Wide - unpreserved Sampled 6/25/2018 11:35 AM 180-2811853 COC	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>
 180-79418-A-3 SB-1806 (70-76) PH 6 0 Bottle Clear Glass 32oz Wide - unpreserved Sampled 6/25/2018 3:05 PM 180-2811854 COC	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>
 180-79418-B-3 SB-1806 (70-76) PH 6 0 Bottle Clear Glass 32oz Wide - unpreserved Sampled 6/25/2018 3:05 PM 180-2811855 COC	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>
 180-79418-A-5 SB-1808 (45-57) PH 6 0 Bottle Clear Glass 32oz Wide - unpreserved Sampled 6/27/2018 12:05 PM 180-2811856 COC	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>
 180-79418-B-5 SB-1808 (45-57) PH 6 0 Bottle Clear Glass 32oz Wide - unpreserved Sampled 6/27/2018 12:05 PM 180-2811857 COC	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>	<i>4.6</i>

INSTRUCTIONS: The temperature of ALL sample containers received from the state of West Virginia are to be checked and this document is





Do Not Lift Using This Tag

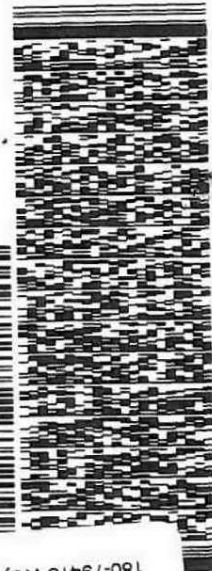
ORIGIN ID:CRWA (603) 415-6128  
LILLY CORENTHAL  
20 FOUNDRY ST  
CONCORD, NH 03301  
UNITED STATES US

SHIP DATE: 28 JUN 18  
ACTWGT: 60.10 LB  
CAD: 6996935/SSF01904  
DIMS: 25x14x14 IN  
BILL THIRD PARTY

TO TEST AMERICA  
TEST AMERICA  
301 ALPHA DR  
RIDC PARK  
PITTSBURGH PA 15238  
REF: (412) 963-7068



DEPT:



FRI - 29 JUN 10:30A  
PRIORITY OVERNIGHT  
AHS 15238  
PA-US PIT

2 of 3

MPS# 7816 2476 7040  
Mstr# 7816 2476 7039

0201

XH AGCA

Uncorrected temp 4.8 °C  
Thermometer ID 9  
CF 0 Initials BS

PT-WI-SR-001 effective 7/26/13

Do Not Lift Using This Tag

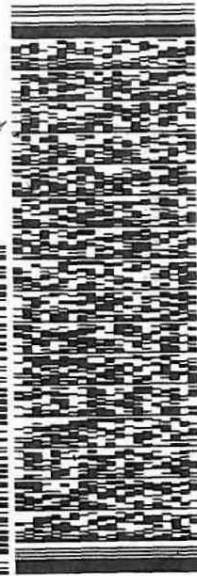
ORIGIN ID:CRWA (603) 415-6128  
LILLY CORENTHAL  
20 FOUNDRY ST  
CONCORD, NH 03301  
UNITED STATES US

SHIP DATE: 28 JUN 18  
ACTWGT: 55.40 LB  
CAD: 6996935/SSF01904  
DIMS: 25x14x14 IN  
BILL THIRD PARTY

TO TEST AMERICA  
TEST AMERICA  
301 ALPHA DR  
RIDC PARK  
PITTSBURGH PA 15238  
REF: (412) 963-7068

DEPT:

DEPT:



FRI - 29 JUN 10:30A  
PRIORITY OVERNIGHT  
AHS 15238  
PA-US PIT

1 of 3

TRK# 7816 2476 7039  
# MASTER #

XH AGCA  
Uncorrected temp  
Thermometer ID

Uncorrected temp 2.8 °C  
Thermometer ID 9  
CF 0 Initials BS

PT-WI-SR-001 effective 7/26/13

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## Login Sample Receipt Checklist

Client: Sanborn Head & Associates Inc

Job Number: 180-79418-1

**Login Number: 79418**

**List Number: 1**

**Creator: Watson, Debbie**

**List Source: TestAmerica Pittsburgh**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-79418-3

Client Project/Site: LEAF Metals and CCR Constituent Analysis

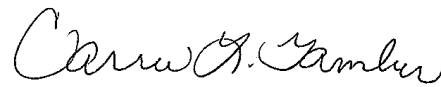
For:

Sanborn Head & Associates Inc

20 Foundry Street

Concord, New Hampshire 03301

Attn: Andrew Ashton



Authorized for release by:

8/29/2018 1:53:45 PM

Carrie Gamber, Senior Project Manager

(412)963-2428

[carrie.gamber@testamericainc.com](mailto:carrie.gamber@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

PA Lab ID: 02-00416

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# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions/Glossary . . . . .	4
Certification Summary . . . . .	5
Sample Summary . . . . .	6
Method Summary . . . . .	7
Lab Chronicle . . . . .	8
Client Sample Results . . . . .	12
QC Sample Results . . . . .	15
QC Association Summary . . . . .	16
Chain of Custody . . . . .	18
Receipt Checklists . . . . .	21

# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

**Job ID: 180-79418-3**

**Laboratory: TestAmerica Pittsburgh**

**Narrative**

## CASE NARRATIVE

**Client: Sanborn Head & Associates Inc**

**Project: LEAF Metals and CCR Constituent Analysis**

**Report Number: 180-79418-3**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 06/29/2018; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 2.8° C, 4.6° C and 4.8° C.

### **METALS**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PH**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



# Definitions/Glossary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

## Qualifiers

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



# Accreditation/Certification Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

## Laboratory: TestAmerica Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
West Virginia DEP	State Program	3	142	01-31-19

Analysis Method	Prep Method	Matrix	Analyte
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# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-79418-13	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-14	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP2	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-15	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP3	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-31	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-32	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP2	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-33	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP3	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-34	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP1	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-35	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP2	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-36	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP3	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-111	10 PPB SPIKE pH 7.5	Water	06/27/18 12:05	06/29/18 09:20
180-79418-117	10 PPB SPIKE pH 7.5	Solid	06/27/18 12:05	06/29/18 09:20



# Method Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 9040C	pH	SW846	TAL PIT
3010A	Preparation, Total Metals	SW846	TAL PIT
D4646 03	Test Method for 24 Hour Batch-Type Measurement of Sorption	ASTM	TAL PIT

**Protocol References:**

ASTM = ASTM International

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1**

**Lab Sample ID: 180-79418-13**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5.0 g	499 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 13:31	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	D4646 03			5.0 g	499 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP2**

**Lab Sample ID: 180-79418-14**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5.0 g	499 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 13:46	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	D4646 03			5.0 g	499 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP3**

**Lab Sample ID: 180-79418-15**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5.0 g	499 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 13:49	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	D4646 03			5.0 g	499 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1**

**Lab Sample ID: 180-79418-31**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20.0 g	398.3 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 13:52	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	D4646 03			20.0 g	398.3 mL	254708	08/22/18 10:00	MTW	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1**

**Lab Sample ID: 180-79418-31**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP2**

**Lab Sample ID: 180-79418-32**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20.0 g	398.3 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 13:55	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			20.0 g	398.3 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP3**

**Lab Sample ID: 180-79418-33**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20.0 g	398.3 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 14:04	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			20.0 g	398.3 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP1**

**Lab Sample ID: 180-79418-34**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40.0 g	159.6 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 14:06	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40.0 g	159.6 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP2**

**Lab Sample ID: 180-79418-35**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40.0 g	159.6 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 14:09	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40.0 g	159.6 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP3**

**Lab Sample ID: 180-79418-36**

**Date Collected: 06/25/18 11:35**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40.0 g	159.6 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 14:12	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40.0 g	159.6 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: 10 PPB SPIKE pH 7.5**

**Lab Sample ID: 180-79418-111**

**Date Collected: 06/27/18 12:05**

**Matrix: Water**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	EPA 9040C		1			254661	08/22/18 09:45	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: 10 PPB SPIKE pH 7.5**

**Lab Sample ID: 180-79418-117**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			1.0 g	1.0 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254840	08/23/18 13:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			255315	08/28/18 14:15	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			1.0 g	1.0 mL	254708	08/22/18 10:00	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			254866	08/23/18 10:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Laboratory References:**

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

## Analyst References:

Lab: TAL PIT

Batch Type: Leach

MTW = Michael Wesoloski

Batch Type: Prep

NAM = Nicole Marfisi

Batch Type: Analysis

MTW = Michael Wesoloski

RSK = Robert Kurtz

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# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1**

**Lab Sample ID: 180-79418-13**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.44	J	0.50	0.075	ug/L		08/23/18 13:37	08/28/18 13:31	1
Molybdenum	15		5.0	0.47	ug/L		08/23/18 13:37	08/28/18 13:31	1
Lithium	8.2		5.0	2.6	ug/L		08/23/18 13:37	08/28/18 13:31	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.7		0.1	0.1	SU			08/23/18 10:00	1

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP2**

**Lab Sample ID: 180-79418-14**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.44	J	0.50	0.075	ug/L		08/23/18 13:37	08/28/18 13:46	1
Molybdenum	14		5.0	0.47	ug/L		08/23/18 13:37	08/28/18 13:46	1
Lithium	8.1		5.0	2.6	ug/L		08/23/18 13:37	08/28/18 13:46	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.7		0.1	0.1	SU			08/23/18 10:00	1

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP3**

**Lab Sample ID: 180-79418-15**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.43	J	0.50	0.075	ug/L		08/23/18 13:37	08/28/18 13:49	1
Molybdenum	14		5.0	0.47	ug/L		08/23/18 13:37	08/28/18 13:49	1
Lithium	8.3		5.0	2.6	ug/L		08/23/18 13:37	08/28/18 13:49	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.7		0.1	0.1	SU			08/23/18 10:00	1

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1**

**Lab Sample ID: 180-79418-31**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.26	J	0.50	0.075	ug/L		08/23/18 13:37	08/28/18 13:52	1
Molybdenum	31		5.0	0.47	ug/L		08/23/18 13:37	08/28/18 13:52	1
Lithium	7.6		5.0	2.6	ug/L		08/23/18 13:37	08/28/18 13:52	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.5		0.1	0.1	SU			08/23/18 10:00	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP2**

**Lab Sample ID: 180-79418-32**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.27	J	0.50	0.075	ug/L	-	08/23/18 13:37	08/28/18 13:55	1
Molybdenum	32		5.0	0.47	ug/L	-	08/23/18 13:37	08/28/18 13:55	1
Lithium	7.6		5.0	2.6	ug/L	-	08/23/18 13:37	08/28/18 13:55	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.5		0.1	0.1	SU	-		08/23/18 10:00	1

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP3**

**Lab Sample ID: 180-79418-33**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.28	J	0.50	0.075	ug/L	-	08/23/18 13:37	08/28/18 14:04	1
Molybdenum	31		5.0	0.47	ug/L	-	08/23/18 13:37	08/28/18 14:04	1
Lithium	7.5		5.0	2.6	ug/L	-	08/23/18 13:37	08/28/18 14:04	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.5		0.1	0.1	SU	-		08/23/18 10:00	1

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP1**

**Lab Sample ID: 180-79418-34**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.30	J	0.50	0.075	ug/L	-	08/23/18 13:37	08/28/18 14:06	1
Molybdenum	120		5.0	0.47	ug/L	-	08/23/18 13:37	08/28/18 14:06	1
Lithium	10		5.0	2.6	ug/L	-	08/23/18 13:37	08/28/18 14:06	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.0		0.1	0.1	SU	-		08/23/18 10:00	1

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP2**

**Lab Sample ID: 180-79418-35**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L	-	08/23/18 13:37	08/28/18 14:09	1
Molybdenum	110		5.0	0.47	ug/L	-	08/23/18 13:37	08/28/18 14:09	1
Lithium	9.8		5.0	2.6	ug/L	-	08/23/18 13:37	08/28/18 14:09	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.0		0.1	0.1	SU	-		08/23/18 10:00	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

## Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP3

## Lab Sample ID: 180-79418-36

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.24	J	0.50	0.075	ug/L		08/23/18 13:37	08/28/18 14:12	1
Molybdenum	110		5.0	0.47	ug/L		08/23/18 13:37	08/28/18 14:12	1
Lithium	11		5.0	2.6	ug/L		08/23/18 13:37	08/28/18 14:12	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.0		0.1	0.1	SU			08/23/18 10:00	1

## Client Sample ID: 10 PPB SPIKE pH 7.5

## Lab Sample ID: 180-79418-111

Date Collected: 06/27/18 12:05

Matrix: Water

Date Received: 06/29/18 09:20

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5		0.1	0.1	SU			08/22/18 09:45	1

## Client Sample ID: 10 PPB SPIKE pH 7.5

## Lab Sample ID: 180-79418-117

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	9.2		0.50	0.075	ug/L		08/23/18 13:37	08/28/18 14:15	1
Molybdenum	9.4		5.0	0.47	ug/L		08/23/18 13:37	08/28/18 14:15	1
Lithium	8.6		5.0	2.6	ug/L		08/23/18 13:37	08/28/18 14:15	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5		0.1	0.1	SU			08/23/18 10:00	1

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

## Method: EPA 6020A - Metals (ICP/MS)

**Lab Sample ID: MB 180-254840/1-A**  
**Matrix: Solid**  
**Analysis Batch: 255315**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 254840**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		0.50	0.075	ug/L		08/23/18 13:37	08/28/18 13:14	1
Molybdenum	ND		5.0	0.47	ug/L		08/23/18 13:37	08/28/18 13:14	1
Lithium	ND		5.0	2.6	ug/L		08/23/18 13:37	08/28/18 13:14	1

**Lab Sample ID: LCS 180-254840/2-A**  
**Matrix: Solid**  
**Analysis Batch: 255315**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 254840**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	500	554		ug/L		111	80 - 120
Molybdenum	1000	1000		ug/L		100	80 - 120
Lithium	50.0	43.9		ug/L		88	80 - 120

**Lab Sample ID: 180-79418-13 MS**  
**Matrix: Solid**  
**Analysis Batch: 255315**

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1**  
**Prep Type: Leach**  
**Prep Batch: 254840**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Cobalt	0.44	J	500	543		ug/L		108	75 - 125
Molybdenum	15		1000	985		ug/L		97	75 - 125
Lithium	8.2		50.0	51.6		ug/L		87	75 - 125

**Lab Sample ID: 180-79418-13 MSD**  
**Matrix: Solid**  
**Analysis Batch: 255315**

**Client Sample ID: SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1**  
**Prep Type: Leach**  
**Prep Batch: 254840**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	0.44	J	500	551		ug/L		110	75 - 125	1	20
Molybdenum	15		1000	1010		ug/L		99	75 - 125	2	20
Lithium	8.2		50.0	52.8		ug/L		89	75 - 125	2	20

## Method: EPA 9040C - pH

**Lab Sample ID: LCS 180-254661/1**  
**Matrix: Water**  
**Analysis Batch: 254661**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
pH	7.00	7.0		SU		100	99 - 101

**Lab Sample ID: LCS 180-254866/1**  
**Matrix: Solid**  
**Analysis Batch: 254866**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
pH	7.00	7.0		SU		100	99 - 101

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

## Metals

### Leach Batch: 254708

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-13	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	
180-79418-14	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP2	Leach	Solid	D4646 03	
180-79418-15	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP3	Leach	Solid	D4646 03	
180-79418-31	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1	Leach	Solid	D4646 03	
180-79418-32	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP2	Leach	Solid	D4646 03	
180-79418-33	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP3	Leach	Solid	D4646 03	
180-79418-34	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP1	Leach	Solid	D4646 03	
180-79418-35	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP2	Leach	Solid	D4646 03	
180-79418-36	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP3	Leach	Solid	D4646 03	
180-79418-117	10 PPB SPIKE pH 7.5	Leach	Solid	D4646 03	
180-79418-13 MS	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	
180-79418-13 MSD	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	

### Prep Batch: 254840

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-13	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	3010A	254708
180-79418-14	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP2	Leach	Solid	3010A	254708
180-79418-15	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP3	Leach	Solid	3010A	254708
180-79418-31	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1	Leach	Solid	3010A	254708
180-79418-32	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP2	Leach	Solid	3010A	254708
180-79418-33	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP3	Leach	Solid	3010A	254708
180-79418-34	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP1	Leach	Solid	3010A	254708
180-79418-35	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP2	Leach	Solid	3010A	254708
180-79418-36	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP3	Leach	Solid	3010A	254708
180-79418-117	10 PPB SPIKE pH 7.5	Leach	Solid	3010A	254708
MB 180-254840/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-254840/2-A	Lab Control Sample	Total/NA	Solid	3010A	
180-79418-13 MS	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	3010A	254708
180-79418-13 MSD	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	3010A	254708

### Analysis Batch: 255315

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-13	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 6020A	254840
180-79418-14	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP2	Leach	Solid	EPA 6020A	254840
180-79418-15	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP3	Leach	Solid	EPA 6020A	254840
180-79418-31	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1	Leach	Solid	EPA 6020A	254840
180-79418-32	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP2	Leach	Solid	EPA 6020A	254840
180-79418-33	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP3	Leach	Solid	EPA 6020A	254840
180-79418-34	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP1	Leach	Solid	EPA 6020A	254840
180-79418-35	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP2	Leach	Solid	EPA 6020A	254840
180-79418-36	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP3	Leach	Solid	EPA 6020A	254840
180-79418-117	10 PPB SPIKE pH 7.5	Leach	Solid	EPA 6020A	254840
MB 180-254840/1-A	Method Blank	Total/NA	Solid	EPA 6020A	254840
LCS 180-254840/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	254840
180-79418-13 MS	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 6020A	254840
180-79418-13 MSD	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 6020A	254840

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-3

## General Chemistry

### Analysis Batch: 254661

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-111	10 PPB SPIKE pH 7.5	Total/NA	Water	EPA 9040C	
LCS 180-254661/1	Lab Control Sample	Total/NA	Water	EPA 9040C	

### Leach Batch: 254708

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-13	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	
180-79418-14	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP2	Leach	Solid	D4646 03	
180-79418-15	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP3	Leach	Solid	D4646 03	
180-79418-31	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1	Leach	Solid	D4646 03	
180-79418-32	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP2	Leach	Solid	D4646 03	
180-79418-33	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP3	Leach	Solid	D4646 03	
180-79418-34	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP1	Leach	Solid	D4646 03	
180-79418-35	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP2	Leach	Solid	D4646 03	
180-79418-36	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP3	Leach	Solid	D4646 03	
180-79418-117	10 PPB SPIKE pH 7.5	Leach	Solid	D4646 03	

### Analysis Batch: 254866

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-13	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 9040C	254708
180-79418-14	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP2	Leach	Solid	EPA 9040C	254708
180-79418-15	SB-1806 (46-60') PH 7.5 10 PPB 100:1 REP3	Leach	Solid	EPA 9040C	254708
180-79418-31	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP1	Leach	Solid	EPA 9040C	254708
180-79418-32	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP2	Leach	Solid	EPA 9040C	254708
180-79418-33	SB-1806 (46-60') PH 7.5 10 PPB 20:1 REP3	Leach	Solid	EPA 9040C	254708
180-79418-34	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP1	Leach	Solid	EPA 9040C	254708
180-79418-35	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP2	Leach	Solid	EPA 9040C	254708
180-79418-36	SB-1806 (46-60') PH 7.5 10 PPB 4:1 REP3	Leach	Solid	EPA 9040C	254708
180-79418-117	10 PPB SPIKE pH 7.5	Leach	Solid	EPA 9040C	254708
LCS 180-254866/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	



Client Contact: Samborn, Head & Associates, Inc.  
20 Foundry Street  
Concord, NH 03301  
(603) 229-1900 Phone  
(603) 229-1919 FAX  
Project Name: Mountaineer  
Site: New Haven, West Virginia  
P O #: 4345.00

Project Manager: Andrew Ashton  
Tel/Fax: (603) 415-6173  
Analysis Turnaround Time  
 CALENDAR DAYS  WORKING DAYS  
TAT if different from Below Standard  
 2 weeks  
 1 week  
 2 days  
 1 day

Sample Identification	Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Site Contact: Carrie Gamber										Date:	COC No:	
						Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	% moisture/solids (2540G)	CCR App III/IV Metals (6020A)	Mercury (741B)	Cl, Fl, SO4 (9056A, DI Leach)	pH (9045D)	Radium-226 (9315)	Radium-226 (9320)	LEAF Method 1313 (see comment)			ASTM D4646 (see comments)
SB-1802 (10-12')	6/26/18	0930	C	SO1	2	N												
SB-1802 (60-66')	6/26/18	1130	C		2													
SB-1802 (66-72')	6/26/18	1210	C		2													
SB-1805 (9-11')	6/18/18	1350	C		2													
SB-1805 (50-60')	6/19/18	1600	C		2													
SB-1805 (60-66')	6/19/18	1715	C		2													
SB-1805 (66-78')	6/19/18	1910	C		4													
SB-1806 (46-60')	6/25/18	1135	C		4													
SB-1806 (64-70')	6/25/18	1320	C		4													
SB-1806 (70-76')	6/25/18	1505	C		4													
SB-1806 (45-57')	6/27/18	1205	C		6													



180-79418 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other  
Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.  
 Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown

Special Instructions/QC Requirements & Comments:  
ASTM D4646 modified to three concentration points (Co: 20 ug/l, 40 ug/l and spike; Li: 130 ug/l, 250 ug/l, and spike; Mo: 110 ug/l, 220 ug/l, and spike) and two pH points (6.0 and 7.5)  
LEAF Method 1313 modified to 6 pH points (5.0, 6.0, 7.0, 8.0, 9.0, and DI water)

Custody Seal No.:  Yes  No  
Relinquished by: *Lily Cantrell*  
Relinquished by: *Samborn Head & Associates*  
Relinquished by: *Julie Watson*  
Date/Time: *6/28/18 0945*  
Date/Time: *6/28/18 0945*  
Date/Time: *6/29/18 6:20*

Received by: *FedEx*  
Received by: *Julie Watson*  
Received in Laboratory by:  
Company: *Samborn Head & Associates*  
Company: *Julie Watson*  
Company: *Julie Watson*





Do Not Lift Using This Tag

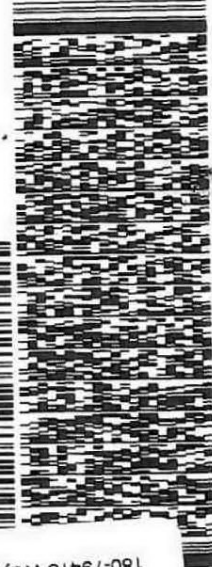
ORIGIN ID:CRWA (603) 415-6128  
LILLY CORENTHAL  
20 FOUNDRY ST  
CONCORD, NH 03301  
UNITED STATES US

SHIP DATE: 28 JUN 18  
ACTWGT: 60.10 LB  
CAD: 6996935/SSF01904  
DIMS: 25x14x14 IN  
BILL THIRD PARTY

TO TEST AMERICA  
TEST AMERICA  
301 ALPHA DR  
RIDC PARK  
PITTSBURGH PA 15238  
REF: 2) 963-7068



DEPT:



FRI - 29 JUN 10:30A  
PRIORITY OVERNIGHT  
AHS 15238  
PA-US PIT

2 of 3

MPS# 7816 2476 7040  
Mstr# 7816 2476 7039

0201

XH AGCA

Uncorrected temp 4.8 °C  
Thermometer ID 9  
CF 0 Initials BS

PT-WI-SR-001 effective 7/26/13

Do Not Lift Using This Tag

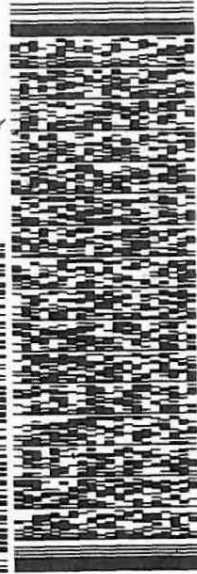
ORIGIN ID:CRWA (603) 415-6128  
LILLY CORENTHAL  
20 FOUNDRY ST  
CONCORD, NH 03301  
UNITED STATES US

SHIP DATE: 28 JUN 18  
ACTWGT: 55.40 LB  
CAD: 6996935/SSF01904  
DIMS: 25x14x14 IN  
BILL THIRD PARTY

TO TEST AMERICA  
TEST AMERICA  
301 ALPHA DR  
RIDC PARK  
PITTSBURGH PA 15238  
REF: (412) 963-7068

DEPT:

DEPT:



FRI - 29 JUN 10:30A  
PRIORITY OVERNIGHT  
AHS 15238  
PA-US PIT

1 of 3

TRK# 7816 2476 7039  
# MASTER #

XH AGCA  
Uncorrected temp  
Thermometer ID

CF 0 Initials BS  
2.8 / 9 °C  
PT-WI-SR-001 effective 7/26/13



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# Login Sample Receipt Checklist

Client: Sanborn Head & Associates Inc

Job Number: 180-79418-3

**Login Number: 79418**

**List Number: 1**

**Creator: Watson, Debbie**

**List Source: TestAmerica Pittsburgh**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-79418-4

Client Project/Site: LEAF Metals and CCR Constituent Analysis

Revision: 1

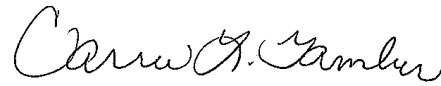
For:

Sanborn Head & Associates Inc

20 Foundry Street

Concord, New Hampshire 03301

Attn: Andrew Ashton



Authorized for release by:

10/3/2018 8:58:11 AM

Carrie Gamber, Senior Project Manager

(412)963-2428

[carrie.gamber@testamericainc.com](mailto:carrie.gamber@testamericainc.com)

### LINKS

Review your project  
results through

Total Access

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Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

PA Lab ID: 02-00416

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13



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions/Glossary . . . . .	4
Certification Summary . . . . .	5
Sample Summary . . . . .	6
Method Summary . . . . .	7
Lab Chronicle . . . . .	8
Client Sample Results . . . . .	14
QC Sample Results . . . . .	19
QC Association Summary . . . . .	20
Chain of Custody . . . . .	23
Receipt Checklists . . . . .	26

# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Job ID: 180-79418-4**

**Laboratory: TestAmerica Pittsburgh**

**Narrative**

## CASE NARRATIVE

**Client: Sanborn Head & Associates Inc**

**Project: LEAF Metals and CCR Constituent Analysis**

**Report Number: 180-79418-4 REVISED**

**Note: This report has been revised to report correct weight values.**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 6/29/2018 9:20 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 3 coolers at receipt time were 2.8° C, 4.6° C and 4.8° C.

### **METALS**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PH**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Definitions/Glossary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

## Qualifiers

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



# Accreditation/Certification Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

## Laboratory: TestAmerica Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
West Virginia DEP	State Program	3	142	01-31-19

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
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# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-79418-16	SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP1	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-17	SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP2	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-18	SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP3	Solid	06/25/18 11:35	06/29/18 09:20
180-79418-49	SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP1	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-50	SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP2	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-51	SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP3	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-52	SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP1	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-53	SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP2	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-54	SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP3	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-67	SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP1	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-68	SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP2	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-69	SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP3	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-70	SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP1	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-71	SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP2	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-72	SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP3	Solid	06/25/18 15:05	06/29/18 09:20
180-79418-85	SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP1	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-86	SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP2	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-87	SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP3	Solid	06/27/18 12:05	06/29/18 09:20
180-79418-88	10 PPB SPIKE pH 7.5	Solid	06/27/18 12:05	06/29/18 09:20

# Method Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

Method	Method Description	Protocol	Laboratory
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 9040C	pH	SW846	TAL PIT
3010A	Preparation, Total Metals	SW846	TAL PIT
D4646 03	Test Method for 24 Hour Batch-Type Measurement of Sorption	ASTM	TAL PIT

#### Protocol References:

ASTM = ASTM International

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP1**

**Lab Sample ID: 180-79418-16**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 15:41	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP2**

**Lab Sample ID: 180-79418-17**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 15:55	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP3**

**Lab Sample ID: 180-79418-18**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 15:58	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP1**

**Lab Sample ID: 180-79418-49**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:01	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	D4646 03			20 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP1**

**Lab Sample ID: 180-79418-49**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP2**

**Lab Sample ID: 180-79418-50**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:04	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			20 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP3**

**Lab Sample ID: 180-79418-51**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20.0 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:13	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			20.0 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP1**

**Lab Sample ID: 180-79418-52**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:16	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP2**

**Lab Sample ID: 180-79418-53**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:19	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP3**

**Lab Sample ID: 180-79418-54**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:22	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP1**

**Lab Sample ID: 180-79418-67**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:25	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP2**

**Lab Sample ID: 180-79418-68**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:28	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP2**

**Lab Sample ID: 180-79418-68**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP3**

**Lab Sample ID: 180-79418-69**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:30	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			5 g	499.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP1**

**Lab Sample ID: 180-79418-70**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20.0 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:33	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			20.0 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP2**

**Lab Sample ID: 180-79418-71**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20.0 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:36	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			20.0 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP3**

**Lab Sample ID: 180-79418-72**

**Date Collected: 06/25/18 15:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			20.0 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:39	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			20.0 g	399.2 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP1**

**Lab Sample ID: 180-79418-85**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:48	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP2**

**Lab Sample ID: 180-79418-86**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:51	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP3**

**Lab Sample ID: 180-79418-87**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:54	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			40 g	159.6 mL	256340	09/10/18 09:50	MTW	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP3**

**Lab Sample ID: 180-79418-87**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: 10 PPB SPIKE pH 7.5**

**Lab Sample ID: 180-79418-88**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	D4646 03			1.0 g	1.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	256460	09/11/18 13:02	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			256911	09/14/18 16:57	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	D4646 03			1.0 g	1.0 mL	256340	09/10/18 09:50	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			256466	09/11/18 09:50	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Laboratory References:**

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

**Analyst References:**

Lab: TAL PIT

Batch Type: Leach

MTW = Michael Wesoloski

Batch Type: Prep

NAM = Nicole Marfisi

Batch Type: Analysis

MTW = Michael Wesoloski

RSK = Robert Kurtz

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP1**

**Lab Sample ID: 180-79418-16**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.44	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 15:41	1
Molybdenum	12		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 15:41	1
Lithium	9.2		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 15:41	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.7		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP2**

**Lab Sample ID: 180-79418-17**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.37	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 15:55	1
Molybdenum	11		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 15:55	1
Lithium	9.0		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 15:55	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.7		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP3**

**Lab Sample ID: 180-79418-18**

Date Collected: 06/25/18 11:35

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.30	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 15:58	1
Molybdenum	12		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 15:58	1
Lithium	9.8		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 15:58	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.7		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP1**

**Lab Sample ID: 180-79418-49**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.44	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:01	1
Molybdenum	19		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:01	1
Lithium	9.4		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:01	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.5		0.1	0.1	SU	-		09/11/18 09:50	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP2**

**Lab Sample ID: 180-79418-50**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.42	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:04	1
Molybdenum	18		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:04	1
Lithium	9.3		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:04	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.6		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP3**

**Lab Sample ID: 180-79418-51**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.35	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:13	1
Molybdenum	17		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:13	1
Lithium	8.7		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:13	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.6		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP1**

**Lab Sample ID: 180-79418-52**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.089	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:16	1
Molybdenum	50		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:16	1
Lithium	13		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:16	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.1		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP2**

**Lab Sample ID: 180-79418-53**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.17	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:19	1
Molybdenum	49		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:19	1
Lithium	12		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:19	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.1		0.1	0.1	SU	-		09/11/18 09:50	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP3**

**Lab Sample ID: 180-79418-54**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.22	J	0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:22	1
Molybdenum	49		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:22	1
Lithium	12		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:22	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.1		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP1**

**Lab Sample ID: 180-79418-67**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.1		0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:25	1
Molybdenum	11		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:25	1
Lithium	8.0		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:25	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.5		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP2**

**Lab Sample ID: 180-79418-68**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.90		0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:28	1
Molybdenum	11		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:28	1
Lithium	8.2		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:28	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.4		0.1	0.1	SU	-		09/11/18 09:50	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP3**

**Lab Sample ID: 180-79418-69**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.0		0.50	0.075	ug/L	-	09/11/18 13:02	09/14/18 16:30	1
Molybdenum	11		5.0	0.47	ug/L	-	09/11/18 13:02	09/14/18 16:30	1
Lithium	7.9		5.0	2.6	ug/L	-	09/11/18 13:02	09/14/18 16:30	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.4		0.1	0.1	SU	-		09/11/18 09:50	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP1**

**Lab Sample ID: 180-79418-70**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.1		0.50	0.075	ug/L		09/11/18 13:02	09/14/18 16:33	1
Molybdenum	13		5.0	0.47	ug/L		09/11/18 13:02	09/14/18 16:33	1
Lithium	5.4		5.0	2.6	ug/L		09/11/18 13:02	09/14/18 16:33	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.2		0.1	0.1	SU			09/11/18 09:50	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP2**

**Lab Sample ID: 180-79418-71**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.4		0.50	0.075	ug/L		09/11/18 13:02	09/14/18 16:36	1
Molybdenum	12		5.0	0.47	ug/L		09/11/18 13:02	09/14/18 16:36	1
Lithium	5.3		5.0	2.6	ug/L		09/11/18 13:02	09/14/18 16:36	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.3		0.1	0.1	SU			09/11/18 09:50	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP3**

**Lab Sample ID: 180-79418-72**

Date Collected: 06/25/18 15:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.70		0.50	0.075	ug/L		09/11/18 13:02	09/14/18 16:39	1
Molybdenum	13		5.0	0.47	ug/L		09/11/18 13:02	09/14/18 16:39	1
Lithium	5.1		5.0	2.6	ug/L		09/11/18 13:02	09/14/18 16:39	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.2		0.1	0.1	SU			09/11/18 09:50	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP1**

**Lab Sample ID: 180-79418-85**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.76		0.50	0.075	ug/L		09/11/18 13:02	09/14/18 16:48	1
Molybdenum	22		5.0	0.47	ug/L		09/11/18 13:02	09/14/18 16:48	1
Lithium	3.3	J	5.0	2.6	ug/L		09/11/18 13:02	09/14/18 16:48	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.6		0.1	0.1	SU			09/11/18 09:50	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP2**

**Lab Sample ID: 180-79418-86**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	1.3		0.50	0.075	ug/L		09/11/18 13:02	09/14/18 16:51	1
Molybdenum	22		5.0	0.47	ug/L		09/11/18 13:02	09/14/18 16:51	1
Lithium	3.5	J	5.0	2.6	ug/L		09/11/18 13:02	09/14/18 16:51	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.6		0.1	0.1	SU			09/11/18 09:50	1

**Client Sample ID: SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP3**

**Lab Sample ID: 180-79418-87**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	0.78		0.50	0.075	ug/L		09/11/18 13:02	09/14/18 16:54	1
Molybdenum	22		5.0	0.47	ug/L		09/11/18 13:02	09/14/18 16:54	1
Lithium	3.6	J	5.0	2.6	ug/L		09/11/18 13:02	09/14/18 16:54	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.6		0.1	0.1	SU			09/11/18 09:50	1

**Client Sample ID: 10 PPB SPIKE pH 7.5**

**Lab Sample ID: 180-79418-88**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	8.0		0.50	0.075	ug/L		09/11/18 13:02	09/14/18 16:57	1
Molybdenum	10		5.0	0.47	ug/L		09/11/18 13:02	09/14/18 16:57	1
Lithium	9.7		5.0	2.6	ug/L		09/11/18 13:02	09/14/18 16:57	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5		0.1	0.1	SU			09/11/18 09:50	1



# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

## Method: EPA 6020A - Metals (ICP/MS)

**Lab Sample ID: MB 180-256460/1-A**  
**Matrix: Solid**  
**Analysis Batch: 256911**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 256460**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cobalt	ND		0.50	0.075	ug/L		09/11/18 13:02	09/14/18 15:26	1
Molybdenum	ND		5.0	0.47	ug/L		09/11/18 13:02	09/14/18 15:26	1
Lithium	ND		5.0	2.6	ug/L		09/11/18 13:02	09/14/18 15:26	1

**Lab Sample ID: LCS 180-256460/2-A**  
**Matrix: Solid**  
**Analysis Batch: 256911**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 256460**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cobalt	500	470		ug/L		94	80 - 120
Molybdenum	1000	1070		ug/L		107	80 - 120
Lithium	50.0	44.3		ug/L		89	80 - 120

**Lab Sample ID: 180-79418-16 MS**  
**Matrix: Solid**  
**Analysis Batch: 256911**

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP1**  
**Prep Type: Leach**  
**Prep Batch: 256460**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Cobalt	0.44	J	500	482		ug/L		96	75 - 125
Molybdenum	12		1000	1080		ug/L		107	75 - 125
Lithium	9.2		50.0	57.3		ug/L		96	75 - 125

**Lab Sample ID: 180-79418-16 MSD**  
**Matrix: Solid**  
**Analysis Batch: 256911**

**Client Sample ID: SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP1**  
**Prep Type: Leach**  
**Prep Batch: 256460**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Cobalt	0.44	J	500	478		ug/L		96	75 - 125	1	20
Molybdenum	12		1000	1100		ug/L		108	75 - 125	1	20
Lithium	9.2		50.0	56.8		ug/L		95	75 - 125	1	20

## Method: EPA 9040C - pH

**Lab Sample ID: LCS 180-256466/1**  
**Matrix: Solid**  
**Analysis Batch: 256466**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
pH	7.00	7.0		SU		100	99 - 101

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

## Metals

### Leach Batch: 256340

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-16	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	
180-79418-17	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP2	Leach	Solid	D4646 03	
180-79418-18	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP3	Leach	Solid	D4646 03	
180-79418-49	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP1	Leach	Solid	D4646 03	
180-79418-50	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP2	Leach	Solid	D4646 03	
180-79418-51	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP3	Leach	Solid	D4646 03	
180-79418-52	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP1	Leach	Solid	D4646 03	
180-79418-53	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP2	Leach	Solid	D4646 03	
180-79418-54	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP3	Leach	Solid	D4646 03	
180-79418-67	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	
180-79418-68	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP2	Leach	Solid	D4646 03	
180-79418-69	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP3	Leach	Solid	D4646 03	
180-79418-70	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP1	Leach	Solid	D4646 03	
180-79418-71	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP2	Leach	Solid	D4646 03	
180-79418-72	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP3	Leach	Solid	D4646 03	
180-79418-85	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP1	Leach	Solid	D4646 03	
180-79418-86	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP2	Leach	Solid	D4646 03	
180-79418-87	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP3	Leach	Solid	D4646 03	
180-79418-88	10 PPB SPIKE pH 7.5	Leach	Solid	D4646 03	
180-79418-16 MS	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	
180-79418-16 MSD	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	

### Prep Batch: 256460

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-16	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	3010A	256340
180-79418-17	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP2	Leach	Solid	3010A	256340
180-79418-18	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP3	Leach	Solid	3010A	256340
180-79418-49	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP1	Leach	Solid	3010A	256340
180-79418-50	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP2	Leach	Solid	3010A	256340
180-79418-51	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP3	Leach	Solid	3010A	256340
180-79418-52	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP1	Leach	Solid	3010A	256340
180-79418-53	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP2	Leach	Solid	3010A	256340
180-79418-54	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP3	Leach	Solid	3010A	256340
180-79418-67	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	3010A	256340
180-79418-68	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP2	Leach	Solid	3010A	256340
180-79418-69	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP3	Leach	Solid	3010A	256340
180-79418-70	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP1	Leach	Solid	3010A	256340
180-79418-71	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP2	Leach	Solid	3010A	256340
180-79418-72	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP3	Leach	Solid	3010A	256340
180-79418-85	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP1	Leach	Solid	3010A	256340
180-79418-86	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP2	Leach	Solid	3010A	256340
180-79418-87	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP3	Leach	Solid	3010A	256340
180-79418-88	10 PPB SPIKE pH 7.5	Leach	Solid	3010A	256340
MB 180-256460/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-256460/2-A	Lab Control Sample	Total/NA	Solid	3010A	
180-79418-16 MS	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	3010A	256340
180-79418-16 MSD	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	3010A	256340

### Analysis Batch: 256911

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-16	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 6020A	256460

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

## Metals (Continued)

### Analysis Batch: 256911 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-17	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP2	Leach	Solid	EPA 6020A	256460
180-79418-18	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP3	Leach	Solid	EPA 6020A	256460
180-79418-49	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP1	Leach	Solid	EPA 6020A	256460
180-79418-50	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP2	Leach	Solid	EPA 6020A	256460
180-79418-51	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP3	Leach	Solid	EPA 6020A	256460
180-79418-52	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP1	Leach	Solid	EPA 6020A	256460
180-79418-53	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP2	Leach	Solid	EPA 6020A	256460
180-79418-54	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP3	Leach	Solid	EPA 6020A	256460
180-79418-67	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 6020A	256460
180-79418-68	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP2	Leach	Solid	EPA 6020A	256460
180-79418-69	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP3	Leach	Solid	EPA 6020A	256460
180-79418-70	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP1	Leach	Solid	EPA 6020A	256460
180-79418-71	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP2	Leach	Solid	EPA 6020A	256460
180-79418-72	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP3	Leach	Solid	EPA 6020A	256460
180-79418-85	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP1	Leach	Solid	EPA 6020A	256460
180-79418-86	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP2	Leach	Solid	EPA 6020A	256460
180-79418-87	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP3	Leach	Solid	EPA 6020A	256460
180-79418-88	10 PPB SPIKE pH 7.5	Leach	Solid	EPA 6020A	256460
MB 180-256460/1-A	Method Blank	Total/NA	Solid	EPA 6020A	256460
LCS 180-256460/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	256460
180-79418-16 MS	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 6020A	256460
180-79418-16 MSD	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 6020A	256460

## General Chemistry

### Leach Batch: 256340

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-16	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	
180-79418-17	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP2	Leach	Solid	D4646 03	
180-79418-18	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP3	Leach	Solid	D4646 03	
180-79418-49	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP1	Leach	Solid	D4646 03	
180-79418-50	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP2	Leach	Solid	D4646 03	
180-79418-51	SB-1806 (70-76") PH 7.5 10 PPB 20:1 REP3	Leach	Solid	D4646 03	
180-79418-52	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP1	Leach	Solid	D4646 03	
180-79418-53	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP2	Leach	Solid	D4646 03	
180-79418-54	SB-1806 (70-76") PH 7.5 10 PPB 4:1 REP3	Leach	Solid	D4646 03	
180-79418-67	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	D4646 03	
180-79418-68	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP2	Leach	Solid	D4646 03	
180-79418-69	SB-1808 (45-57") PH 7.5 10 PPB 100:1 REP3	Leach	Solid	D4646 03	
180-79418-70	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP1	Leach	Solid	D4646 03	
180-79418-71	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP2	Leach	Solid	D4646 03	
180-79418-72	SB-1808 (45-57") PH 7.5 10 PPB 20:1 REP3	Leach	Solid	D4646 03	
180-79418-85	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP1	Leach	Solid	D4646 03	
180-79418-86	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP2	Leach	Solid	D4646 03	
180-79418-87	SB-1808 (45-57") PH 7.5 10 PPB 4:1 REP3	Leach	Solid	D4646 03	
180-79418-88	10 PPB SPIKE pH 7.5	Leach	Solid	D4646 03	

### Analysis Batch: 256466

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-16	SB-1806 (70-76") PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 9040C	256340

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79418-4

## General Chemistry (Continued)

### Analysis Batch: 256466 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79418-17	SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP2	Leach	Solid	EPA 9040C	256340
180-79418-18	SB-1806 (70-76') PH 7.5 10 PPB 100:1 REP3	Leach	Solid	EPA 9040C	256340
180-79418-49	SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP1	Leach	Solid	EPA 9040C	256340
180-79418-50	SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP2	Leach	Solid	EPA 9040C	256340
180-79418-51	SB-1806 (70-76') PH 7.5 10 PPB 20:1 REP3	Leach	Solid	EPA 9040C	256340
180-79418-52	SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP1	Leach	Solid	EPA 9040C	256340
180-79418-53	SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP2	Leach	Solid	EPA 9040C	256340
180-79418-54	SB-1806 (70-76') PH 7.5 10 PPB 4:1 REP3	Leach	Solid	EPA 9040C	256340
180-79418-67	SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP1	Leach	Solid	EPA 9040C	256340
180-79418-68	SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP2	Leach	Solid	EPA 9040C	256340
180-79418-69	SB-1808 (45-57') PH 7.5 10 PPB 100:1 REP3	Leach	Solid	EPA 9040C	256340
180-79418-70	SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP1	Leach	Solid	EPA 9040C	256340
180-79418-71	SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP2	Leach	Solid	EPA 9040C	256340
180-79418-72	SB-1808 (45-57') PH 7.5 10 PPB 20:1 REP3	Leach	Solid	EPA 9040C	256340
180-79418-85	SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP1	Leach	Solid	EPA 9040C	256340
180-79418-86	SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP2	Leach	Solid	EPA 9040C	256340
180-79418-87	SB-1808 (45-57') PH 7.5 10 PPB 4:1 REP3	Leach	Solid	EPA 9040C	256340
180-79418-88	10 PPB SPIKE pH 7.5	Leach	Solid	EPA 9040C	256340
LCS 180-256466/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	









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**Do Not Lift Using This Tag**

ORIGIN ID:CRWA (603) 415-6128  
 LILLY CORENTHAL  
 20 FOUNDRY ST.  
 CONCORD, NH 03301  
 UNITED STATES US

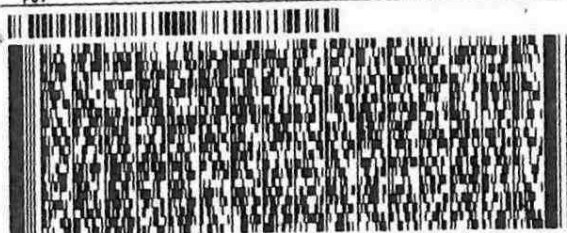
SHIP DATE: 28JUN18  
 ACTWT: 53.30 LB  
 CAD: 6996935/SSFO1904  
 DIMS: 25x14x14 IN  
 BILL THIRD PARTY

Part # 1553304/1553304/1553304EXP 05/18

TO TEST AMERICA  
 TEST AMERICA  
 301 ALPHA DR  
 RIDC PARK  
 PITTSBURGH PA 15238

(412) 963-7068  
 NU:  
 PO:

REF:  
 DEPT:



3 61 3  
 MPS# 7816 2476 7050  
 0263  
 Mstr# 7816 2476.7039

FRI - 29 JUN 10:30A  
 PRIORITY OVERNIGHT  
 AHS  
 15238  
 PA-US PIT

**XH AGCA**

Uncorrected temp 4.6 °C  
 Thermometer ID 9

CF 0 Initials TJ

PT-WI-SR-001 effective 7/26/13



## Login Sample Receipt Checklist

Client: Sanborn Head & Associates Inc

Job Number: 180-79418-4

**Login Number: 79418**

**List Number: 1**

**Creator: Watson, Debbie**

**List Source: TestAmerica Pittsburgh**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**APPENDIX H.4**  
**pH LEACHING TEST REPORT**

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-79415-1

Client Project/Site: LEAF Metals and CCR Constituent Analysis

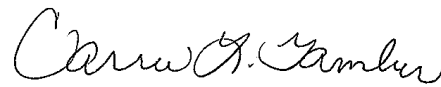
For:

Sanborn Head & Associates Inc

20 Foundry Street

Concord, New Hampshire 03301

Attn: Andrew Ashton



Authorized for release by:

9/7/2018 8:12:51 AM

Carrie Gamber, Senior Project Manager

(412)963-2428

[carrie.gamber@testamericainc.com](mailto:carrie.gamber@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

PA Lab ID: 02-00416

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2

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5

6

7

8

9

10

11

12

13



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions/Glossary . . . . .	4
Certification Summary . . . . .	5
Sample Summary . . . . .	6
Method Summary . . . . .	7
Lab Chronicle . . . . .	8
Client Sample Results . . . . .	23
QC Sample Results . . . . .	39
QC Association Summary . . . . .	49
Chain of Custody . . . . .	59
Receipt Checklists . . . . .	62

# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Job ID: 180-79415-1**

**Laboratory: TestAmerica Pittsburgh**

**Narrative**

## CASE NARRATIVE

**Client: Sanborn Head & Associates Inc**

**Project: LEAF Metals and CCR Constituent Analysis**

**Report Number: 180-79415-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 06/29/2018; the samples arrived in good condition, properly preserved and on ice. The temperatures of the 3 coolers at receipt time were 2.8° C, 4.6° C and 4.8° C.

### **IC**

Several samples were diluted due to the abundance of target/non-target analytes. Elevated reporting limits (RLs) are provided.

### **METALS**

Chromium was detected in method blank MB 180-253267/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

### **GENERAL CHEMISTRY**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Definitions/Glossary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Qualifiers

### HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Accreditation/Certification Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Laboratory: TestAmerica Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
West Virginia DEP	State Program	3	142	01-31-19

The following analytes are included in this report, but are not accredited/certified under this accreditation/certification:

Analysis Method	Prep Method	Matrix	Analyte
2540G		Solid	Percent Moisture
2540G		Solid	Percent Solids
SM 2510B		Solid	Specific Conductance
SM 2580B		Solid	Oxidation Reduction Potential



# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-79415-1	SB-1805 (66-78') PRETEST	Solid	06/19/18 19:10	06/29/18 09:20
180-79415-2	SB-1805 (66-78') PH 10.0	Solid	06/19/18 19:10	06/29/18 09:20
180-79415-3	SB-1805 (66-78') PH 8.0	Solid	06/19/18 19:10	06/29/18 09:20
180-79415-4	SB-1805 (66-78') PH 7.0	Solid	06/19/18 19:10	06/29/18 09:20
180-79415-5	SB-1805 (66-78') PH 6.0	Solid	06/19/18 19:10	06/29/18 09:20
180-79415-6	SB-1805 (66-78') PH 5.0	Solid	06/19/18 19:10	06/29/18 09:20
180-79415-11	SB-1805 (66-78') PH NATURAL	Solid	06/19/18 19:10	06/29/18 09:20
180-79415-12	SB-1806 (64-70') PRETEST	Solid	06/25/18 13:20	06/29/18 09:20
180-79415-13	SB-1806 (64-70') PH 10.0	Solid	06/25/18 13:20	06/29/18 09:20
180-79415-14	SB-1806 (64-70') PH 8.0	Solid	06/25/18 13:20	06/29/18 09:20
180-79415-15	SB-1806 (64-70') PH 7.0	Solid	06/25/18 13:20	06/29/18 09:20
180-79415-16	SB-1806 (64-70') PH 6.0	Solid	06/25/18 13:20	06/29/18 09:20
180-79415-17	SB-1806 (64-70') PH 5.0	Solid	06/25/18 13:20	06/29/18 09:20
180-79415-22	SB-1806 (64-70') PH NATURAL	Solid	06/25/18 13:20	06/29/18 09:20
180-79415-23	SB-1808 (45-57') PRETEST	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-24	SB-1808 (45-57') PH 10.0	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-25	SB-1808 (45-57') PH 8.0	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-26	SB-1808 (45-57') PH 7.0	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-27	SB-1808 (45-57') PH 6.0	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-28	SB-1808 (45-57') PH 5.0	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-33	SB-1808 (45-57') PH NATURAL	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-34	MB NEUTRAL	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-35	MB LOW	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-36	MB1 LOW	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-37	MB HIGH	Solid	06/27/18 12:05	06/29/18 09:20
180-79415-38	MB2 LOW	Solid	06/27/18 12:05	06/29/18 09:20

# Method Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

Method	Method Description	Protocol	Laboratory
EPA 9056A	Anions, Ion Chromatography	SW846	TAL PIT
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 7470A	Mercury (CVAA)	SW846	TAL PIT
2540G	SM 2540G	SM22	TAL PIT
EPA 9040C	pH	SW846	TAL PIT
SM 2510B	Conductivity, Specific Conductance	SM	TAL PIT
SM 2580B	Reduction-Oxidation (REDOX) Potential	SM	TAL PIT
1313	Liquid-Solid Partitioning as a Function of pH via Parallel Batch	SW846	TAL PIT
3010A	Preparation, Total Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT

#### Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: SB-1805 (66-78') PRETEST

## Lab Sample ID: 180-79415-1

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249914	07/09/18 09:32	CRM	TAL PIT
		Instrument ID: NOEQUIP								
Total/NA	Analysis	2540G		1			251132	07/20/18 08:44	CRM	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								

## Client Sample ID: SB-1805 (66-78') PH 10.0

## Lab Sample ID: 180-79415-2

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			253351	08/10/18 07:53	MJH	TAL PIT
		Instrument ID: CHIC2100A								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 17:44	WTR	TAL PIT
		Instrument ID: A								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:06	RJR	TAL PIT
		Instrument ID: HGZ								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								

## Client Sample ID: SB-1805 (66-78') PH 8.0

## Lab Sample ID: 180-79415-3

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1805 (66-78') PH 8.0**

**Lab Sample ID: 180-79415-3**

**Date Collected: 06/19/18 19:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 9056A		1			252532	08/02/18 08:49	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 21:34	WTR	TAL PIT
		Instrument ID: M								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252436	08/01/18 12:00	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252785	08/04/18 13:25	RSK	TAL PIT
		Instrument ID: K								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252448	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252444	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1805 (66-78') PH 7.0**

**Lab Sample ID: 180-79415-4**

**Date Collected: 06/19/18 19:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			252532	08/02/18 09:04	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 21:29	WTR	TAL PIT
		Instrument ID: M								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252436	08/01/18 12:00	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252785	08/04/18 13:23	RSK	TAL PIT
		Instrument ID: K								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252448	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252444	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1805 (66-78') PH 6.0**

**Lab Sample ID: 180-79415-5**

**Date Collected: 06/19/18 19:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		2.5			253351	08/10/18 08:08	MJH	TAL PIT
		Instrument ID: CHIC2100A								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 17:47	WTR	TAL PIT
		Instrument ID: A								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:09	RJR	TAL PIT
		Instrument ID: HGZ								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1805 (66-78') PH 5.0**

**Lab Sample ID: 180-79415-6**

**Date Collected: 06/19/18 19:10**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	EPA 9056A		10			255975	09/06/18 10:46	CMR	TAL PIT
		Instrument ID: CHICS2000								
Leach	Leach	1313			20 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254424	08/20/18 13:33	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			254734	08/22/18 07:15	WTR	TAL PIT
		Instrument ID: M								
Leach	Leach	1313			20 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	254383	08/20/18 10:27	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			254593	08/21/18 14:47	RJR	TAL PIT
		Instrument ID: HGZ								
Leach	Leach	1313			20 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			254402	08/17/18 09:55	LWM	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			254404	08/17/18 09:55	LWM	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: SB-1805 (66-78') PH 5.0

## Lab Sample ID: 180-79415-6

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	SM 2580B		1			254403	08/17/18 09:55	LWM	TAL PIT
Instrument ID: NOEQUIP										

## Client Sample ID: SB-1805 (66-78') PH NATURAL

## Lab Sample ID: 180-79415-11

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			252367	08/01/18 08:06	MJH	TAL PIT
Instrument ID: CHICS2000										
Leach	Leach	1313			20 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 21:52	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1313			20 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 10:47	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1313			20 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252035	07/26/18 08:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252034	07/26/18 08:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252033	07/26/18 08:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

## Client Sample ID: SB-1806 (64-70') PRETEST

## Lab Sample ID: 180-79415-12

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249921	07/09/18 09:55	CRM	TAL PIT
Instrument ID: NOEQUIP										
Total/NA	Analysis	2540G		1			251132	07/20/18 08:44	CRM	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1806 (64-70') PH 10.0**

**Lab Sample ID: 180-79415-13**

**Date Collected: 06/25/18 13:20**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			253351	08/10/18 08:28	MJH	TAL PIT
		Instrument ID: CHIC2100A								
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 17:50	WTR	TAL PIT
		Instrument ID: A								
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:10	RJR	TAL PIT
		Instrument ID: HGZ								
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (64-70') PH 8.0**

**Lab Sample ID: 180-79415-14**

**Date Collected: 06/25/18 13:20**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			252670	08/03/18 10:40	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 21:25	WTR	TAL PIT
		Instrument ID: M								
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252436	08/01/18 12:00	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252785	08/04/18 13:21	RSK	TAL PIT
		Instrument ID: K								
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252448	07/30/18 11:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: SB-1806 (64-70') PH 8.0

Lab Sample ID: 180-79415-14

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	SM 2580B		1			252444	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

## Client Sample ID: SB-1806 (64-70') PH 7.0

Lab Sample ID: 180-79415-15

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			252532	08/02/18 14:23	MJH	TAL PIT
Instrument ID: CHICS2100B										
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 21:20	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252436	08/01/18 12:00	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252785	08/04/18 13:15	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252448	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.6 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252444	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

## Client Sample ID: SB-1806 (64-70') PH 6.0

Lab Sample ID: 180-79415-16

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		2.5			253351	08/10/18 08:43	MJH	TAL PIT
Instrument ID: CHIC2100A										
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 17:53	WTR	TAL PIT
Instrument ID: A										
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1806 (64-70') PH 6.0**

**Lab Sample ID: 180-79415-16**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:11	RJR	TAL PIT
		Instrument ID: HGZ								
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.6 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (64-70') PH 5.0**

**Lab Sample ID: 180-79415-17**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.6 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	EPA 9056A		10			255975	09/06/18 11:02	CMR	TAL PIT
		Instrument ID: CHICS2000								
Leach	Leach	1313			20 g	199.6 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254424	08/20/18 13:33	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			254734	08/22/18 07:20	WTR	TAL PIT
		Instrument ID: M								
Leach	Leach	1313			20 g	199.6 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	254383	08/20/18 10:27	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			254593	08/21/18 14:48	RJR	TAL PIT
		Instrument ID: HGZ								
Leach	Leach	1313			20 g	199.6 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			254402	08/17/18 09:55	LWM	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.6 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			254404	08/17/18 09:55	LWM	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.6 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			254403	08/17/18 09:55	LWM	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: SB-1806 (64-70') PH NATURAL**

**Lab Sample ID: 180-79415-22**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.6 mL	251445	07/24/18 09:10	LWM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1806 (64-70') PH NATURAL**

**Lab Sample ID: 180-79415-22**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 9056A		1			252206	07/31/18 11:20	MJH	TAL PIT
Instrument ID: CHICS2000										
Leach	Leach	1313			20 g	199.6 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 22:33	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1313			20 g	199.6 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 10:49	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1313			20 g	199.6 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252035	07/26/18 08:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.6 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252034	07/26/18 08:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.6 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252033	07/26/18 08:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PRETEST**

**Lab Sample ID: 180-79415-23**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	2540G		1			249921	07/09/18 09:55	CRM	TAL PIT
Instrument ID: NOEQUIP										
Total/NA	Analysis	2540G		1			251132	07/20/18 08:44	CRM	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 10.0**

**Lab Sample ID: 180-79415-24**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			253351	08/10/18 09:15	MJH	TAL PIT
Instrument ID: CHIC2100A										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1808 (45-57') PH 10.0**

**Lab Sample ID: 180-79415-24**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 17:56	WTR	TAL PIT
Instrument ID: A										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:12	RJR	TAL PIT
Instrument ID: HGZ										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 8.0**

**Lab Sample ID: 180-79415-25**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			252532	08/02/18 14:39	MJH	TAL PIT
Instrument ID: CHICS2100B										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 21:43	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252436	08/01/18 12:00	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252785	08/04/18 13:29	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252448	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252444	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1808 (45-57') PH 7.0**

**Lab Sample ID: 180-79415-26**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			252532	08/02/18 14:55	MJH	TAL PIT
Instrument ID: CHICS2100B										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 21:38	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252436	08/01/18 12:00	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252785	08/04/18 13:27	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252448	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.4 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252444	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 6.0**

**Lab Sample ID: 180-79415-27**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		2.5			253597	08/13/18 05:57	MJH	TAL PIT
Instrument ID: CHICS2100B										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 18:01	WTR	TAL PIT
Instrument ID: A										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:14	RJR	TAL PIT
Instrument ID: HGZ										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1808 (45-57') PH 6.0**

**Lab Sample ID: 180-79415-27**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH 5.0**

**Lab Sample ID: 180-79415-28**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		2.5			253597	08/13/18 06:13	MJH	TAL PIT
Instrument ID: CHICS2100B										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 17:59	WTR	TAL PIT
Instrument ID: A										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:13	RJR	TAL PIT
Instrument ID: HGZ										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			20 g	199.3 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: SB-1808 (45-57') PH NATURAL**

**Lab Sample ID: 180-79415-33**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			20 g	199.3 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			252206	07/31/18 11:36	MJH	TAL PIT
Instrument ID: CHICS2000										
Leach	Leach	1313			20 g	199.3 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 22:38	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1313			20 g	199.3 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: SB-1808 (45-57') PH NATURAL

Lab Sample ID: 180-79415-33

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 7470A		1			252481	08/01/18 10:55	RSK	TAL PIT
		Instrument ID: K								
Leach	Leach	1313			20 g	199.3 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252035	07/26/18 08:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.3 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252034	07/26/18 08:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			20 g	199.3 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252033	07/26/18 08:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								

## Client Sample ID: MB NEUTRAL

Lab Sample ID: 180-79415-34

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			1.0 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1	1 mL	1.0 mL	252206	07/31/18 11:52	MJH	TAL PIT
		Instrument ID: CHICS2000								
Leach	Leach	1313			1.0 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 22:10	WTR	TAL PIT
		Instrument ID: M								
Leach	Leach	1313			1.0 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 10:45	RSK	TAL PIT
		Instrument ID: K								
Leach	Leach	1313			1.0 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252035	07/26/18 08:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			1.0 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252034	07/26/18 08:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1313			1.0 g	200 mL	251445	07/24/18 09:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252033	07/26/18 08:10	MTW	TAL PIT
		Instrument ID: NOEQUIP								

## Client Sample ID: MB LOW

Lab Sample ID: 180-79415-35

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			1.0 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: MB LOW**

**Lab Sample ID: 180-79415-35**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 9056A		1			252532	08/02/18 14:07	MJH	TAL PIT
Instrument ID: CHICS2100B										
Leach	Leach	1313			1.0 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252470	08/01/18 12:13	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 21:48	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1313			1.0 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252436	08/01/18 12:00	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252785	08/04/18 13:31	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1313			1.0 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252414	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			1.0 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			252448	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			1.0 g	200 mL	252153	07/28/18 11:10	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252444	07/30/18 11:10	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: MB1 LOW**

**Lab Sample ID: 180-79415-36**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		10			253351	08/10/18 06:57	MJH	TAL PIT
Instrument ID: CHIC2100A										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 18:13	WTR	TAL PIT
Instrument ID: A										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:16	RJR	TAL PIT
Instrument ID: HGZ										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: MB HIGH**

**Lab Sample ID: 180-79415-37**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			253351	08/10/18 06:41	MJH	TAL PIT
Instrument ID: CHIC2100A										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	253267	08/09/18 10:37	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253691	08/11/18 18:04	WTR	TAL PIT
Instrument ID: A										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	253225	08/09/18 07:04	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			253331	08/09/18 15:15	RJR	TAL PIT
Instrument ID: HGZ										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			253315	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			253317	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			1.0 g	200 mL	253180	08/06/18 09:00	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			253316	08/08/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: MB2 LOW**

**Lab Sample ID: 180-79415-38**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1313			1.0 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	EPA 9056A		50			255975	09/06/18 11:18	CMR	TAL PIT
Instrument ID: CHICS2000										
Leach	Leach	1313			1.0 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	254424	08/20/18 13:33	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			254734	08/22/18 07:25	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1313			1.0 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	254383	08/20/18 10:27	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			254593	08/21/18 14:49	RJR	TAL PIT
Instrument ID: HGZ										
Leach	Leach	1313			1.0 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			254402	08/17/18 09:55	LWM	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			1.0 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			254404	08/17/18 09:55	LWM	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1313			1.0 g	200 mL	253650	08/15/18 09:55	LWM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: MB2 LOW**

**Lab Sample ID: 180-79415-38**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	SM 2580B		1			254403	08/17/18 09:55	LWM	TAL PIT
Instrument ID: NOEQUIP										

## Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

## Analyst References:

Lab: TAL PIT

Batch Type: Leach

LWM = Larry Matko

Batch Type: Prep

NAM = Nicole Marfisi

RJR = Ron Rosenbaum

RSK = Robert Kurtz

Batch Type: Analysis

CMR = Carl Reagle

CRM = Caitlin McEvoy

LWM = Larry Matko

MJH = Matthew Hartman

MTW = Michael Wesoloski

RJR = Ron Rosenbaum

RSK = Robert Kurtz

WTR = Bill Reinheimer

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: SB-1805 (66-78') PRETEST

Lab Sample ID: 180-79415-1

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.8		0.1	0.1	%			07/09/18 09:32	1
Percent Moisture	0.0		0.1	0.1	%			07/20/18 08:44	1
Percent Solids	87.2		0.1	0.1	%			07/09/18 09:32	1
Percent Solids	100.0		0.1	0.1	%			07/20/18 08:44	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5		0.1	0.1	SU			07/30/18 11:10	1
pH	8.4		0.1	0.1	SU			07/30/18 11:10	1

## Client Sample ID: SB-1805 (66-78') PH 10.0

Lab Sample ID: 180-79415-2

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.075	J	0.10	0.026	mg/L			08/10/18 07:53	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	4.0		1.0	0.32	ug/L		08/09/18 10:37	08/11/18 17:44	1
Barium	110		10	0.37	ug/L		08/09/18 10:37	08/11/18 17:44	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 17:44	1
Cadmium	ND		1.0	0.13	ug/L		08/09/18 10:37	08/11/18 17:44	1
Chromium	2.7	B	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 17:44	1
Cobalt	0.70		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 17:44	1
Molybdenum	11		5.0	0.47	ug/L		08/09/18 10:37	08/11/18 17:44	1
Lead	0.68	J	1.0	0.094	ug/L		08/09/18 10:37	08/11/18 17:44	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 17:44	1
Selenium	0.93	J	5.0	0.81	ug/L		08/09/18 10:37	08/11/18 17:44	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 17:44	1
Lithium	3.1	J	5.0	2.6	ug/L		08/09/18 10:37	08/11/18 17:44	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:06	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	10		0.1	0.1	SU			08/08/18 09:00	1
Specific Conductance	140		1.0	1.0	umhos/cm			08/08/18 09:00	1
Oxidation Reduction Potential	550		10	10	millivolts			08/08/18 09:00	1

## Client Sample ID: SB-1805 (66-78') PH 8.0

Lab Sample ID: 180-79415-3

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.17		0.10	0.026	mg/L			08/02/18 08:49	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1805 (66-78') PH 8.0**

**Lab Sample ID: 180-79415-3**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.46	J	1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:34	1
Barium	46		10	0.37	ug/L		08/01/18 12:13	08/03/18 21:34	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:34	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:34	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:34	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:34	1
Molybdenum	8.2		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:34	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:34	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:34	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:34	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:34	1
Lithium	7.5		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:34	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/01/18 12:00	08/04/18 13:25	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.9		0.1	0.1	SU			07/30/18 11:10	1
Specific Conductance	430		1.0	1.0	umhos/cm			07/30/18 11:10	1
Oxidation Reduction Potential	260		10	10	millivolts			07/30/18 11:10	1

**Client Sample ID: SB-1805 (66-78') PH 7.0**

**Lab Sample ID: 180-79415-4**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.13		0.10	0.026	mg/L			08/02/18 09:04	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.79	J	1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:29	1
Barium	99		10	0.37	ug/L		08/01/18 12:13	08/03/18 21:29	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:29	1
Cadmium	0.24	J	1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:29	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:29	1
Cobalt	1.8		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:29	1
Molybdenum	5.3		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:29	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:29	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:29	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:29	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:29	1
Lithium	8.5		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:29	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/01/18 12:00	08/04/18 13:23	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1805 (66-78') PH 7.0**

**Lab Sample ID: 180-79415-4**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.0		0.1	0.1	SU			07/30/18 11:10	1
Specific Conductance	1100		1.0	1.0	umhos/cm			07/30/18 11:10	1
Oxidation Reduction Potential	280		10	10	millivolts			07/30/18 11:10	1

**Client Sample ID: SB-1805 (66-78') PH 6.0**

**Lab Sample ID: 180-79415-5**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.13	J	0.25	0.066	mg/L			08/10/18 08:08	2.5

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.4		1.0	0.32	ug/L		08/09/18 10:37	08/11/18 17:47	1
Barium	500		10	0.37	ug/L		08/09/18 10:37	08/11/18 17:47	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 17:47	1
Cadmium	1.6		1.0	0.13	ug/L		08/09/18 10:37	08/11/18 17:47	1
Chromium	1.3	J B	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 17:47	1
Cobalt	14		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 17:47	1
Molybdenum	3.5	J	5.0	0.47	ug/L		08/09/18 10:37	08/11/18 17:47	1
Lead	ND		1.0	0.094	ug/L		08/09/18 10:37	08/11/18 17:47	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 17:47	1
Selenium	ND		5.0	0.81	ug/L		08/09/18 10:37	08/11/18 17:47	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 17:47	1
Lithium	10		5.0	2.6	ug/L		08/09/18 10:37	08/11/18 17:47	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:09	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.2		0.1	0.1	SU			08/08/18 09:00	1
Specific Conductance	3500		1.0	1.0	umhos/cm			08/08/18 09:00	1
Oxidation Reduction Potential	210		10	10	millivolts			08/08/18 09:00	1

**Client Sample ID: SB-1805 (66-78') PH 5.0**

**Lab Sample ID: 180-79415-6**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.0		1.0	0.26	mg/L			09/06/18 10:46	10

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.97	J	1.0	0.32	ug/L		08/20/18 13:33	08/22/18 07:15	1
Barium	480		10	0.37	ug/L		08/20/18 13:33	08/22/18 07:15	1
Beryllium	0.31	J	1.0	0.057	ug/L		08/20/18 13:33	08/22/18 07:15	1
Cadmium	3.5		1.0	0.13	ug/L		08/20/18 13:33	08/22/18 07:15	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1805 (66-78') PH 5.0**

**Lab Sample ID: 180-79415-6**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	0.78	J	2.0	0.63	ug/L		08/20/18 13:33	08/22/18 07:15	1
Cobalt	33		0.50	0.075	ug/L		08/20/18 13:33	08/22/18 07:15	1
Molybdenum	2.0	J	5.0	0.47	ug/L		08/20/18 13:33	08/22/18 07:15	1
Lead	0.13	J	1.0	0.094	ug/L		08/20/18 13:33	08/22/18 07:15	1
Antimony	ND		2.0	1.1	ug/L		08/20/18 13:33	08/22/18 07:15	1
Selenium	1.2	J	5.0	0.81	ug/L		08/20/18 13:33	08/22/18 07:15	1
Thallium	0.11	J	1.0	0.063	ug/L		08/20/18 13:33	08/22/18 07:15	1
Lithium	17		5.0	2.6	ug/L		08/20/18 13:33	08/22/18 07:15	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/20/18 10:27	08/21/18 14:47	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.5		0.1	0.1	SU			08/17/18 09:55	1
Specific Conductance	9500		1.0	1.0	umhos/cm			08/17/18 09:55	1
Oxidation Reduction Potential	220		10	10	millivolts			08/17/18 09:55	1

**Client Sample ID: SB-1805 (66-78') PH NATURAL**

**Lab Sample ID: 180-79415-11**

Date Collected: 06/19/18 19:10

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.17		0.10	0.026	mg/L			08/01/18 08:06	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3		1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:52	1
Barium	170		10	0.37	ug/L		08/01/18 12:13	08/03/18 21:52	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:52	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:52	1
Chromium	0.87	J	2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:52	1
Cobalt	0.24	J	0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:52	1
Molybdenum	9.3		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:52	1
Lead	0.32	J	1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:52	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:52	1
Selenium	1.3	J	5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:52	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:52	1
Lithium	4.7	J	5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:52	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:47	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.2		0.1	0.1	SU			07/26/18 08:10	1
Specific Conductance	100		1.0	1.0	umhos/cm			07/26/18 08:10	1
Oxidation Reduction Potential	230		10	10	millivolts			07/26/18 08:10	1

TestAmerica Pittsburgh



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1806 (64-70') PRETEST**

**Lab Sample ID: 180-79415-12**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.5		0.1	0.1	%			07/09/18 09:55	1
Percent Moisture	0.2		0.1	0.1	%			07/20/18 08:44	1
Percent Solids	92.5		0.1	0.1	%			07/09/18 09:55	1
Percent Solids	99.8		0.1	0.1	%			07/20/18 08:44	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.5		0.1	0.1	SU			07/30/18 11:10	1
pH	8.5		0.1	0.1	SU			07/30/18 11:10	1

**Client Sample ID: SB-1806 (64-70') PH 10.0**

**Lab Sample ID: 180-79415-13**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.060	J	0.10	0.026	mg/L			08/10/18 08:28	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	5.5		1.0	0.32	ug/L		08/09/18 10:37	08/11/18 17:50	1
Barium	110		10	0.37	ug/L		08/09/18 10:37	08/11/18 17:50	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 17:50	1
Cadmium	ND		1.0	0.13	ug/L		08/09/18 10:37	08/11/18 17:50	1
Chromium	3.6	B	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 17:50	1
Cobalt	1.5		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 17:50	1
Molybdenum	20		5.0	0.47	ug/L		08/09/18 10:37	08/11/18 17:50	1
Lead	1.1		1.0	0.094	ug/L		08/09/18 10:37	08/11/18 17:50	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 17:50	1
Selenium	1.8	J	5.0	0.81	ug/L		08/09/18 10:37	08/11/18 17:50	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 17:50	1
Lithium	3.2	J	5.0	2.6	ug/L		08/09/18 10:37	08/11/18 17:50	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:10	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	10.1		0.1	0.1	SU			08/08/18 09:00	1
Specific Conductance	120		1.0	1.0	umhos/cm			08/08/18 09:00	1
Oxidation Reduction Potential	160		10	10	millivolts			08/08/18 09:00	1

**Client Sample ID: SB-1806 (64-70') PH 8.0**

**Lab Sample ID: 180-79415-14**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.16		0.10	0.026	mg/L			08/03/18 10:40	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1806 (64-70') PH 8.0**

**Lab Sample ID: 180-79415-14**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.76	J	1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:25	1
Barium	12		10	0.37	ug/L		08/01/18 12:13	08/03/18 21:25	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:25	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:25	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:25	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:25	1
Molybdenum	17		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:25	1
Lead	0.12	J	1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:25	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:25	1
Selenium	1.1	J	5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:25	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:25	1
Lithium	7.8		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:25	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/01/18 12:00	08/04/18 13:21	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.0		0.1	0.1	SU			07/30/18 11:10	1
Specific Conductance	430		1.0	1.0	umhos/cm			07/30/18 11:10	1
Oxidation Reduction Potential	270		10	10	millivolts			07/30/18 11:10	1

**Client Sample ID: SB-1806 (64-70') PH 7.0**

**Lab Sample ID: 180-79415-15**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.062	J	0.10	0.026	mg/L			08/02/18 14:23	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.74	J	1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:20	1
Barium	34		10	0.37	ug/L		08/01/18 12:13	08/03/18 21:20	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:20	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:20	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:20	1
Cobalt	1.4		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:20	1
Molybdenum	11		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:20	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:20	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:20	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:20	1
Thallium	0.10	J	1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:20	1
Lithium	8.0		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:20	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/01/18 12:00	08/04/18 13:15	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1806 (64-70') PH 7.0**

**Lab Sample ID: 180-79415-15**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.1		0.1	0.1	SU			07/30/18 11:10	1
Specific Conductance	1200		1.0	1.0	umhos/cm			07/30/18 11:10	1
Oxidation Reduction Potential	310		10	10	millivolts			07/30/18 11:10	1

**Client Sample ID: SB-1806 (64-70') PH 6.0**

**Lab Sample ID: 180-79415-16**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.28		0.25	0.066	mg/L			08/10/18 08:43	2.5

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.1		1.0	0.32	ug/L		08/09/18 10:37	08/11/18 17:53	1
Barium	350		10	0.37	ug/L		08/09/18 10:37	08/11/18 17:53	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 17:53	1
Cadmium	0.50	J	1.0	0.13	ug/L		08/09/18 10:37	08/11/18 17:53	1
Chromium	1.4	J B	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 17:53	1
Cobalt	17		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 17:53	1
Molybdenum	5.4		5.0	0.47	ug/L		08/09/18 10:37	08/11/18 17:53	1
Lead	ND		1.0	0.094	ug/L		08/09/18 10:37	08/11/18 17:53	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 17:53	1
Selenium	ND		5.0	0.81	ug/L		08/09/18 10:37	08/11/18 17:53	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 17:53	1
Lithium	10		5.0	2.6	ug/L		08/09/18 10:37	08/11/18 17:53	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:11	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.2		0.1	0.1	SU			08/08/18 09:00	1
Specific Conductance	3500		1.0	1.0	umhos/cm			08/08/18 09:00	1
Oxidation Reduction Potential	170		10	10	millivolts			08/08/18 09:00	1

**Client Sample ID: SB-1806 (64-70') PH 5.0**

**Lab Sample ID: 180-79415-17**

Date Collected: 06/25/18 13:20

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	1.5		1.0	0.26	mg/L			09/06/18 11:02	10

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3		1.0	0.32	ug/L		08/20/18 13:33	08/22/18 07:20	1
Barium	280		10	0.37	ug/L		08/20/18 13:33	08/22/18 07:20	1
Beryllium	0.30	J	1.0	0.057	ug/L		08/20/18 13:33	08/22/18 07:20	1
Cadmium	1.6		1.0	0.13	ug/L		08/20/18 13:33	08/22/18 07:20	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: SB-1806 (64-70') PH 5.0

Date Collected: 06/25/18 13:20

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-17

Matrix: Solid

### Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	1.2	J	2.0	0.63	ug/L		08/20/18 13:33	08/22/18 07:20	1
Cobalt	49		0.50	0.075	ug/L		08/20/18 13:33	08/22/18 07:20	1
Molybdenum	2.2	J	5.0	0.47	ug/L		08/20/18 13:33	08/22/18 07:20	1
Lead	0.15	J	1.0	0.094	ug/L		08/20/18 13:33	08/22/18 07:20	1
Antimony	ND		2.0	1.1	ug/L		08/20/18 13:33	08/22/18 07:20	1
Selenium	1.7	J	5.0	0.81	ug/L		08/20/18 13:33	08/22/18 07:20	1
Thallium	0.072	J	1.0	0.063	ug/L		08/20/18 13:33	08/22/18 07:20	1
Lithium	20		5.0	2.6	ug/L		08/20/18 13:33	08/22/18 07:20	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/20/18 10:27	08/21/18 14:48	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.3		0.1	0.1	SU			08/17/18 09:55	1
Specific Conductance	11000		1.0	1.0	umhos/cm			08/17/18 09:55	1
Oxidation Reduction Potential	230		10	10	millivolts			08/17/18 09:55	1

## Client Sample ID: SB-1806 (64-70') PH NATURAL

Date Collected: 06/25/18 13:20

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-22

Matrix: Solid

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.16		0.10	0.026	mg/L			07/31/18 11:20	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.7		1.0	0.32	ug/L		08/01/18 12:13	08/03/18 22:33	1
Barium	180		10	0.37	ug/L		08/01/18 12:13	08/03/18 22:33	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 22:33	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 22:33	1
Chromium	1.0	J	2.0	0.63	ug/L		08/01/18 12:13	08/03/18 22:33	1
Cobalt	0.50		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 22:33	1
Molybdenum	18		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 22:33	1
Lead	0.43	J	1.0	0.094	ug/L		08/01/18 12:13	08/03/18 22:33	1
Antimony	2.4		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 22:33	1
Selenium	1.7	J	5.0	0.81	ug/L		08/01/18 12:13	08/03/18 22:33	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 22:33	1
Lithium	3.7	J	5.0	2.6	ug/L		08/01/18 12:13	08/03/18 22:33	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:49	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.3		0.1	0.1	SU			07/26/18 08:10	1
Specific Conductance	77		1.0	1.0	umhos/cm			07/26/18 08:10	1
Oxidation Reduction Potential	210		10	10	millivolts			07/26/18 08:10	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: SB-1808 (45-57') PRETEST

## Lab Sample ID: 180-79415-23

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	20.4		0.1	0.1	%			07/09/18 09:55	1
Percent Moisture	0.3		0.1	0.1	%			07/20/18 08:44	1
Percent Solids	79.6		0.1	0.1	%			07/09/18 09:55	1
Percent Solids	99.7		0.1	0.1	%			07/20/18 08:44	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.8		0.1	0.1	SU			07/30/18 11:10	1
pH	7.7		0.1	0.1	SU			07/30/18 11:10	1

## Client Sample ID: SB-1808 (45-57') PH 10.0

## Lab Sample ID: 180-79415-24

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.38		0.10	0.026	mg/L			08/10/18 09:15	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	12		1.0	0.32	ug/L		08/09/18 10:37	08/11/18 17:56	1
Barium	58		10	0.37	ug/L		08/09/18 10:37	08/11/18 17:56	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 17:56	1
Cadmium	ND		1.0	0.13	ug/L		08/09/18 10:37	08/11/18 17:56	1
Chromium	8.1	B	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 17:56	1
Cobalt	3.3		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 17:56	1
Molybdenum	13		5.0	0.47	ug/L		08/09/18 10:37	08/11/18 17:56	1
Lead	1.8		1.0	0.094	ug/L		08/09/18 10:37	08/11/18 17:56	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 17:56	1
Selenium	ND		5.0	0.81	ug/L		08/09/18 10:37	08/11/18 17:56	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 17:56	1
Lithium	ND		5.0	2.6	ug/L		08/09/18 10:37	08/11/18 17:56	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:12	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.9		0.1	0.1	SU			08/08/18 09:00	1
Specific Conductance	83		1.0	1.0	umhos/cm			08/08/18 09:00	1
Oxidation Reduction Potential	120		10	10	millivolts			08/08/18 09:00	1

## Client Sample ID: SB-1808 (45-57') PH 8.0

## Lab Sample ID: 180-79415-25

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.11		0.10	0.026	mg/L			08/02/18 14:39	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1808 (45-57') PH 8.0**

**Lab Sample ID: 180-79415-25**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.74	J	1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:43	1
Barium	6.1	J	10	0.37	ug/L		08/01/18 12:13	08/03/18 21:43	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:43	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:43	1
Chromium	2.2		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:43	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:43	1
Molybdenum	11		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:43	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:43	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:43	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:43	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:43	1
Lithium	ND		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:43	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/01/18 12:00	08/04/18 13:29	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	8.2		0.1	0.1	SU			07/30/18 11:10	1
Specific Conductance	220		1.0	1.0	umhos/cm			07/30/18 11:10	1
Oxidation Reduction Potential	250		10	10	millivolts			07/30/18 11:10	1

**Client Sample ID: SB-1808 (45-57') PH 7.0**

**Lab Sample ID: 180-79415-26**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.097	J	0.10	0.026	mg/L			08/02/18 14:55	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.34	J	1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:38	1
Barium	23		10	0.37	ug/L		08/01/18 12:13	08/03/18 21:38	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:38	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:38	1
Chromium	2.4		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:38	1
Cobalt	0.18	J	0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:38	1
Molybdenum	6.0		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:38	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:38	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:38	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:38	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:38	1
Lithium	4.5	J	5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:38	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/01/18 12:00	08/04/18 13:27	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: SB-1808 (45-57') PH 7.0**

**Lab Sample ID: 180-79415-26**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.3		0.1	0.1	SU			07/30/18 11:10	1
Specific Conductance	650		1.0	1.0	umhos/cm			07/30/18 11:10	1
Oxidation Reduction Potential	270		10	10	millivolts			07/30/18 11:10	1

**Client Sample ID: SB-1808 (45-57') PH 6.0**

**Lab Sample ID: 180-79415-27**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.091	J	0.25	0.066	mg/L			08/13/18 05:57	2.5

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.64	J	1.0	0.32	ug/L		08/09/18 10:37	08/11/18 18:01	1
Barium	460		10	0.37	ug/L		08/09/18 10:37	08/11/18 18:01	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 18:01	1
Cadmium	0.40	J	1.0	0.13	ug/L		08/09/18 10:37	08/11/18 18:01	1
Chromium	5.1	B	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 18:01	1
Cobalt	6.7		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 18:01	1
Molybdenum	1.4	J	5.0	0.47	ug/L		08/09/18 10:37	08/11/18 18:01	1
Lead	ND		1.0	0.094	ug/L		08/09/18 10:37	08/11/18 18:01	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 18:01	1
Selenium	ND		5.0	0.81	ug/L		08/09/18 10:37	08/11/18 18:01	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 18:01	1
Lithium	7.4		5.0	2.6	ug/L		08/09/18 10:37	08/11/18 18:01	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:14	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	6.0		0.1	0.1	SU			08/08/18 09:00	1
Specific Conductance	2600		1.0	1.0	umhos/cm			08/08/18 09:00	1
Oxidation Reduction Potential	270		10	10	millivolts			08/08/18 09:00	1

**Client Sample ID: SB-1808 (45-57') PH 5.0**

**Lab Sample ID: 180-79415-28**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.17	J	0.25	0.066	mg/L			08/13/18 06:13	2.5

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.70	J	1.0	0.32	ug/L		08/09/18 10:37	08/11/18 17:59	1
Barium	650		10	0.37	ug/L		08/09/18 10:37	08/11/18 17:59	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 17:59	1
Cadmium	0.85	J	1.0	0.13	ug/L		08/09/18 10:37	08/11/18 17:59	1

TestAmerica Pittsburgh



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: SB-1808 (45-57') PH 5.0

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-28

Matrix: Solid

### Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	7.0	B	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 17:59	1
Cobalt	14		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 17:59	1
Molybdenum	ND		5.0	0.47	ug/L		08/09/18 10:37	08/11/18 17:59	1
Lead	ND		1.0	0.094	ug/L		08/09/18 10:37	08/11/18 17:59	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 17:59	1
Selenium	ND		5.0	0.81	ug/L		08/09/18 10:37	08/11/18 17:59	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 17:59	1
Lithium	9.2		5.0	2.6	ug/L		08/09/18 10:37	08/11/18 17:59	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:13	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.4		0.1	0.1	SU			08/08/18 09:00	1
Specific Conductance	3300		1.0	1.0	umhos/cm			08/08/18 09:00	1
Oxidation Reduction Potential	290		10	10	millivolts			08/08/18 09:00	1

## Client Sample ID: SB-1808 (45-57') PH NATURAL

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-33

Matrix: Solid

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.21		0.10	0.026	mg/L			07/31/18 11:36	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	2.8		1.0	0.32	ug/L		08/01/18 12:13	08/03/18 22:38	1
Barium	130		10	0.37	ug/L		08/01/18 12:13	08/03/18 22:38	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 22:38	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 22:38	1
Chromium	2.3		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 22:38	1
Cobalt	0.85		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 22:38	1
Molybdenum	11		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 22:38	1
Lead	0.50	J	1.0	0.094	ug/L		08/01/18 12:13	08/03/18 22:38	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 22:38	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 22:38	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 22:38	1
Lithium	ND		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 22:38	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:55	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	9.0		0.1	0.1	SU			07/26/18 08:10	1
Specific Conductance	61		1.0	1.0	umhos/cm			07/26/18 08:10	1
Oxidation Reduction Potential	210		10	10	millivolts			07/26/18 08:10	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: MB NEUTRAL**

**Lab Sample ID: 180-79415-34**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			07/31/18 11:52	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/01/18 12:13	08/03/18 22:10	1
Barium	ND		10	0.37	ug/L		08/01/18 12:13	08/03/18 22:10	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 22:10	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 22:10	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 22:10	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 22:10	1
Molybdenum	ND		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 22:10	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:13	08/03/18 22:10	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 22:10	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 22:10	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 22:10	1
Lithium	ND		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 22:10	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:45	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	5.9		0.1	0.1	SU			07/26/18 08:10	1
Specific Conductance	ND		1.0	1.0	umhos/cm			07/26/18 08:10	1
Oxidation Reduction Potential	510		10	10	millivolts			07/26/18 08:10	1

**Client Sample ID: MB LOW**

**Lab Sample ID: 180-79415-35**

Date Collected: 06/27/18 12:05

Matrix: Solid

Date Received: 06/29/18 09:20

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/02/18 14:07	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:48	1
Barium	ND		10	0.37	ug/L		08/01/18 12:13	08/03/18 21:48	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:48	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:48	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:48	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:48	1
Molybdenum	ND		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:48	1
Lead	0.10	J	1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:48	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:48	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:48	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:48	1
Lithium	ND		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:48	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: MB LOW

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-35

Matrix: Solid

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/01/18 12:00	08/04/18 13:31	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	2.2		0.1	0.1	SU			07/30/18 11:10	1
Specific Conductance	3100		1.0	1.0	umhos/cm			07/30/18 11:10	1
Oxidation Reduction Potential	450		10	10	millivolts			07/30/18 11:10	1

## Client Sample ID: MB1 LOW

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-36

Matrix: Solid

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		1.0	0.26	mg/L			08/10/18 06:57	10

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/09/18 10:37	08/11/18 18:13	1
Barium	ND		10	0.37	ug/L		08/09/18 10:37	08/11/18 18:13	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 18:13	1
Cadmium	ND		1.0	0.13	ug/L		08/09/18 10:37	08/11/18 18:13	1
Chromium	1.6	J B	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 18:13	1
Cobalt	ND		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 18:13	1
Molybdenum	ND		5.0	0.47	ug/L		08/09/18 10:37	08/11/18 18:13	1
Lead	ND		1.0	0.094	ug/L		08/09/18 10:37	08/11/18 18:13	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 18:13	1
Selenium	ND		5.0	0.81	ug/L		08/09/18 10:37	08/11/18 18:13	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 18:13	1
Lithium	ND		5.0	2.6	ug/L		08/09/18 10:37	08/11/18 18:13	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:16	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	1.7		0.1	0.1	SU			08/08/18 09:00	1
Specific Conductance	12000		1.0	1.0	umhos/cm			08/08/18 09:00	1
Oxidation Reduction Potential	570		10	10	millivolts			08/08/18 09:00	1

## Client Sample ID: MB HIGH

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-37

Matrix: Solid

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/10/18 06:41	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Client Sample ID: MB HIGH

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-37

Matrix: Solid

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/09/18 10:37	08/11/18 18:04	1
Barium	ND		10	0.37	ug/L		08/09/18 10:37	08/11/18 18:04	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 18:04	1
Cadmium	ND		1.0	0.13	ug/L		08/09/18 10:37	08/11/18 18:04	1
<b>Chromium</b>	<b>1.6</b>	<b>J B</b>	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 18:04	1
Cobalt	ND		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 18:04	1
Molybdenum	ND		5.0	0.47	ug/L		08/09/18 10:37	08/11/18 18:04	1
<b>Lead</b>	<b>0.18</b>	<b>J</b>	1.0	0.094	ug/L		08/09/18 10:37	08/11/18 18:04	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 18:04	1
Selenium	ND		5.0	0.81	ug/L		08/09/18 10:37	08/11/18 18:04	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 18:04	1
Lithium	ND		5.0	2.6	ug/L		08/09/18 10:37	08/11/18 18:04	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:15	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>pH</b>	<b>10.8</b>		0.1	0.1	SU			08/08/18 09:00	1
<b>Specific Conductance</b>	<b>130</b>		1.0	1.0	umhos/cm			08/08/18 09:00	1
<b>Oxidation Reduction Potential</b>	<b>150</b>		10	10	millivolts			08/08/18 09:00	1

## Client Sample ID: MB2 LOW

Date Collected: 06/27/18 12:05

Date Received: 06/29/18 09:20

## Lab Sample ID: 180-79415-38

Matrix: Solid

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		5.0	1.3	mg/L			09/06/18 11:18	50

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/20/18 13:33	08/22/18 07:25	1
<b>Barium</b>	<b>0.43</b>	<b>J</b>	10	0.37	ug/L		08/20/18 13:33	08/22/18 07:25	1
Beryllium	ND		1.0	0.057	ug/L		08/20/18 13:33	08/22/18 07:25	1
Cadmium	ND		1.0	0.13	ug/L		08/20/18 13:33	08/22/18 07:25	1
<b>Chromium</b>	<b>1.3</b>	<b>J</b>	2.0	0.63	ug/L		08/20/18 13:33	08/22/18 07:25	1
Cobalt	ND		0.50	0.075	ug/L		08/20/18 13:33	08/22/18 07:25	1
Molybdenum	ND		5.0	0.47	ug/L		08/20/18 13:33	08/22/18 07:25	1
<b>Lead</b>	<b>0.20</b>	<b>J</b>	1.0	0.094	ug/L		08/20/18 13:33	08/22/18 07:25	1
Antimony	ND		2.0	1.1	ug/L		08/20/18 13:33	08/22/18 07:25	1
Selenium	ND		5.0	0.81	ug/L		08/20/18 13:33	08/22/18 07:25	1
Thallium	ND		1.0	0.063	ug/L		08/20/18 13:33	08/22/18 07:25	1
Lithium	ND		5.0	2.6	ug/L		08/20/18 13:33	08/22/18 07:25	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/20/18 10:27	08/21/18 14:49	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Client Sample ID: MB2 LOW**

**Lab Sample ID: 180-79415-38**

**Date Collected: 06/27/18 12:05**

**Matrix: Solid**

**Date Received: 06/29/18 09:20**

## General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	1.0		0.1	0.1	SU			08/17/18 09:55	1
Specific Conductance	53000		1.0	1.0	umhos/cm			08/17/18 09:55	1
Oxidation Reduction Potential	540		10	10	millivolts			08/17/18 09:55	1

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Method: EPA 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 180-252206/6**  
**Matrix: Solid**  
**Analysis Batch: 252206**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			07/31/18 09:24	1

**Lab Sample ID: LCS 180-252206/5**  
**Matrix: Solid**  
**Analysis Batch: 252206**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.14		mg/L		91	80 - 120

**Lab Sample ID: MB 180-252367/6**  
**Matrix: Solid**  
**Analysis Batch: 252367**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/01/18 07:50	1

**Lab Sample ID: LCS 180-252367/5**  
**Matrix: Solid**  
**Analysis Batch: 252367**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.26		mg/L		101	80 - 120

**Lab Sample ID: MB 180-252532/6**  
**Matrix: Solid**  
**Analysis Batch: 252532**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/02/18 05:48	1

**Lab Sample ID: LCS 180-252532/5**  
**Matrix: Solid**  
**Analysis Batch: 252532**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.19		mg/L		95	80 - 120

**Lab Sample ID: MB 180-252670/6**  
**Matrix: Solid**  
**Analysis Batch: 252670**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/03/18 05:41	1

**Lab Sample ID: LCS 180-252670/5**  
**Matrix: Solid**  
**Analysis Batch: 252670**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.16		mg/L		92	80 - 120

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Lab Sample ID: MB 180-253351/6**  
**Matrix: Solid**  
**Analysis Batch: 253351**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/10/18 05:32	1

**Lab Sample ID: LCS 180-253351/5**  
**Matrix: Solid**  
**Analysis Batch: 253351**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.26		mg/L		101	80 - 120

**Lab Sample ID: MB 180-253597/6**  
**Matrix: Solid**  
**Analysis Batch: 253597**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/13/18 05:41	1

**Lab Sample ID: LCS 180-253597/5**  
**Matrix: Solid**  
**Analysis Batch: 253597**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.18		mg/L		94	80 - 120

**Lab Sample ID: MB 180-255975/16**  
**Matrix: Solid**  
**Analysis Batch: 255975**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			09/06/18 09:11	1

**Lab Sample ID: LCS 180-255975/15**  
**Matrix: Solid**  
**Analysis Batch: 255975**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.24		mg/L		99	80 - 120

**Lab Sample ID: 180-79415-11 MS**  
**Matrix: Solid**  
**Analysis Batch: 252367**

**Client Sample ID: SB-1805 (66-78') PH NATURAL**  
**Prep Type: Leach**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	0.17		1.25	1.23		mg/L		84	80 - 120

**Lab Sample ID: 180-79415-11 MSD**  
**Matrix: Solid**  
**Analysis Batch: 252367**

**Client Sample ID: SB-1805 (66-78') PH NATURAL**  
**Prep Type: Leach**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Fluoride	0.17		1.25	1.40		mg/L		98	80 - 120	13	15

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# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Method: EPA 6020A - Metals (ICP/MS)

**Lab Sample ID: MB 180-252470/1-A**  
**Matrix: Solid**  
**Analysis Batch: 252834**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 252470**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/01/18 12:13	08/03/18 21:11	1
Barium	ND		10	0.37	ug/L		08/01/18 12:13	08/03/18 21:11	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:13	08/03/18 21:11	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:13	08/03/18 21:11	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:13	08/03/18 21:11	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:13	08/03/18 21:11	1
Molybdenum	ND		5.0	0.47	ug/L		08/01/18 12:13	08/03/18 21:11	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:13	08/03/18 21:11	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:13	08/03/18 21:11	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:13	08/03/18 21:11	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:13	08/03/18 21:11	1
Lithium	ND		5.0	2.6	ug/L		08/01/18 12:13	08/03/18 21:11	1

**Lab Sample ID: LCS 180-252470/2-A**  
**Matrix: Solid**  
**Analysis Batch: 252834**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 252470**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	40.0	38.8		ug/L		97	80 - 120
Barium	2000	1930		ug/L		96	80 - 120
Beryllium	50.0	57.8		ug/L		116	80 - 120
Cadmium	50.0	54.4		ug/L		109	80 - 120
Chromium	200	186		ug/L		93	80 - 120
Cobalt	500	483		ug/L		97	80 - 120
Molybdenum	1000	1040		ug/L		104	80 - 120
Lead	20.0	20.8		ug/L		104	80 - 120
Antimony	500	528		ug/L		106	80 - 120
Selenium	10.0	10.0		ug/L		100	80 - 120
Thallium	50.0	51.3		ug/L		103	80 - 120
Lithium	50.0	54.4		ug/L		109	80 - 120

**Lab Sample ID: MB 180-253267/1-A**  
**Matrix: Solid**  
**Analysis Batch: 253691**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 253267**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/09/18 10:37	08/11/18 17:26	1
Barium	ND		10	0.37	ug/L		08/09/18 10:37	08/11/18 17:26	1
Beryllium	ND		1.0	0.057	ug/L		08/09/18 10:37	08/11/18 17:26	1
Cadmium	ND		1.0	0.13	ug/L		08/09/18 10:37	08/11/18 17:26	1
Chromium	1.25	J	2.0	0.63	ug/L		08/09/18 10:37	08/11/18 17:26	1
Cobalt	ND		0.50	0.075	ug/L		08/09/18 10:37	08/11/18 17:26	1
Molybdenum	ND		5.0	0.47	ug/L		08/09/18 10:37	08/11/18 17:26	1
Lead	ND		1.0	0.094	ug/L		08/09/18 10:37	08/11/18 17:26	1
Antimony	ND		2.0	1.1	ug/L		08/09/18 10:37	08/11/18 17:26	1
Selenium	ND		5.0	0.81	ug/L		08/09/18 10:37	08/11/18 17:26	1
Thallium	ND		1.0	0.063	ug/L		08/09/18 10:37	08/11/18 17:26	1
Lithium	ND		5.0	2.6	ug/L		08/09/18 10:37	08/11/18 17:26	1

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: LCS 180-253267/2-A**  
**Matrix: Solid**  
**Analysis Batch: 253691**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 253267**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	40.0	38.2		ug/L		96	80 - 120
Barium	2000	2020		ug/L		101	80 - 120
Beryllium	50.0	46.4		ug/L		93	80 - 120
Cadmium	50.0	54.0		ug/L		108	80 - 120
Chromium	200	226		ug/L		113	80 - 120
Cobalt	500	455		ug/L		91	80 - 120
Molybdenum	1000	1020		ug/L		102	80 - 120
Lead	20.0	21.0		ug/L		105	80 - 120
Antimony	500	528		ug/L		106	80 - 120
Thallium	50.0	52.6		ug/L		105	80 - 120
Lithium	50.0	50.3		ug/L		101	80 - 120

**Lab Sample ID: LCS 180-253267/2-A**  
**Matrix: Solid**  
**Analysis Batch: 253812**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 253267**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Selenium	10.0	8.37		ug/L		84	80 - 120

**Lab Sample ID: LCSD 180-253267/3-A**  
**Matrix: Solid**  
**Analysis Batch: 253691**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 253267**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Arsenic	40.0	38.2		ug/L		95	80 - 120	0	20
Barium	2000	2050		ug/L		102	80 - 120	1	20
Beryllium	50.0	44.0		ug/L		88	80 - 120	5	20
Cadmium	50.0	54.8		ug/L		110	80 - 120	1	20
Chromium	200	227		ug/L		114	80 - 120	1	20
Cobalt	500	460		ug/L		92	80 - 120	1	20
Molybdenum	1000	1010		ug/L		101	80 - 120	1	20
Lead	20.0	21.1		ug/L		105	80 - 120	0	20
Antimony	500	523		ug/L		105	80 - 120	1	20
Thallium	50.0	52.2		ug/L		104	80 - 120	1	20
Lithium	50.0	50.1		ug/L		100	80 - 120	0	20

**Lab Sample ID: LCSD 180-253267/3-A**  
**Matrix: Solid**  
**Analysis Batch: 253812**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 253267**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Selenium	10.0	8.46		ug/L		85	80 - 120	1	20

**Lab Sample ID: MB 180-254424/1-A**  
**Matrix: Solid**  
**Analysis Batch: 254734**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 254424**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/20/18 13:33	08/22/18 06:48	1

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: MB 180-254424/1-A**  
**Matrix: Solid**  
**Analysis Batch: 254734**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 254424**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Barium	ND		10	0.37	ug/L		08/20/18 13:33	08/22/18 06:48	1
Beryllium	ND		1.0	0.057	ug/L		08/20/18 13:33	08/22/18 06:48	1
Cadmium	ND		1.0	0.13	ug/L		08/20/18 13:33	08/22/18 06:48	1
Chromium	ND		2.0	0.63	ug/L		08/20/18 13:33	08/22/18 06:48	1
Cobalt	ND		0.50	0.075	ug/L		08/20/18 13:33	08/22/18 06:48	1
Molybdenum	ND		5.0	0.47	ug/L		08/20/18 13:33	08/22/18 06:48	1
Lead	ND		1.0	0.094	ug/L		08/20/18 13:33	08/22/18 06:48	1
Antimony	ND		2.0	1.1	ug/L		08/20/18 13:33	08/22/18 06:48	1
Selenium	ND		5.0	0.81	ug/L		08/20/18 13:33	08/22/18 06:48	1
Thallium	ND		1.0	0.063	ug/L		08/20/18 13:33	08/22/18 06:48	1
Lithium	ND		5.0	2.6	ug/L		08/20/18 13:33	08/22/18 06:48	1

**Lab Sample ID: LCS 180-254424/2-A**  
**Matrix: Solid**  
**Analysis Batch: 254734**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 254424**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Arsenic	40.0	37.7		ug/L		94	80 - 120
Barium	2000	1780		ug/L		89	80 - 120
Beryllium	50.0	55.8		ug/L		112	80 - 120
Cadmium	50.0	54.5		ug/L		109	80 - 120
Chromium	200	184		ug/L		92	80 - 120
Cobalt	500	478		ug/L		96	80 - 120
Molybdenum	1000	1030		ug/L		103	80 - 120
Lead	20.0	20.9		ug/L		105	80 - 120
Antimony	500	508		ug/L		102	80 - 120
Selenium	10.0	9.40		ug/L		94	80 - 120
Thallium	50.0	51.1		ug/L		102	80 - 120
Lithium	50.0	54.6		ug/L		109	80 - 120

**Lab Sample ID: LCSD 180-254424/3-A**  
**Matrix: Solid**  
**Analysis Batch: 254734**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 254424**

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
		Result	Qualifier						
Arsenic	40.0	35.0		ug/L		87	80 - 120	7	20
Barium	2000	1740		ug/L		87	80 - 120	3	20
Beryllium	50.0	54.3		ug/L		109	80 - 120	3	20
Cadmium	50.0	54.3		ug/L		109	80 - 120	0	20
Chromium	200	180		ug/L		90	80 - 120	2	20
Cobalt	500	471		ug/L		94	80 - 120	1	20
Molybdenum	1000	1000		ug/L		100	80 - 120	3	20
Lead	20.0	19.9		ug/L		99	80 - 120	5	20
Antimony	500	502		ug/L		100	80 - 120	1	20
Selenium	10.0	9.57		ug/L		96	80 - 120	2	20
Thallium	50.0	49.2		ug/L		98	80 - 120	4	20
Lithium	50.0	54.2		ug/L		108	80 - 120	1	20

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: 180-79415-34 MS**

**Matrix: Solid**  
**Analysis Batch: 252834**

**Client Sample ID: MB NEUTRAL**

**Prep Type: Leach**  
**Prep Batch: 252470**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS		Unit	D	%Rec	Limits	%Rec.
				Result	Qualifier					
Arsenic	ND		40.0	36.1		ug/L		90	75 - 125	
Barium	ND		2000	1790		ug/L		90	75 - 125	
Beryllium	ND		50.0	49.7		ug/L		99	75 - 125	
Cadmium	ND		50.0	50.7		ug/L		101	75 - 125	
Chromium	ND		200	174		ug/L		87	75 - 125	
Cobalt	ND		500	449		ug/L		90	75 - 125	
Molybdenum	ND		1000	961		ug/L		96	75 - 125	
Lead	ND		20.0	19.3		ug/L		97	75 - 125	
Antimony	ND		500	488		ug/L		98	75 - 125	
Selenium	ND		10.0	8.49		ug/L		85	75 - 125	
Thallium	ND		50.0	47.9		ug/L		96	75 - 125	
Lithium	ND		50.0	46.5		ug/L		93	75 - 125	

**Lab Sample ID: 180-79415-34 MSD**

**Matrix: Solid**  
**Analysis Batch: 252834**

**Client Sample ID: MB NEUTRAL**

**Prep Type: Leach**  
**Prep Batch: 252470**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec	Limits	RPD	Limit
				Result	Qualifier						
Arsenic	ND		40.0	36.3		ug/L		91	75 - 125	0	20
Barium	ND		2000	1860		ug/L		93	75 - 125	4	20
Beryllium	ND		50.0	51.2		ug/L		102	75 - 125	3	20
Cadmium	ND		50.0	51.6		ug/L		103	75 - 125	2	20
Chromium	ND		200	174		ug/L		87	75 - 125	0	20
Cobalt	ND		500	454		ug/L		91	75 - 125	1	20
Molybdenum	ND		1000	985		ug/L		98	75 - 125	2	20
Lead	ND		20.0	19.6		ug/L		98	75 - 125	1	20
Antimony	ND		500	503		ug/L		101	75 - 125	3	20
Selenium	ND		10.0	8.88		ug/L		89	75 - 125	4	20
Thallium	ND		50.0	48.5		ug/L		97	75 - 125	1	20
Lithium	ND		50.0	47.6		ug/L		95	75 - 125	2	20

## Method: EPA 7470A - Mercury (CVAA)

**Lab Sample ID: MB 180-252236/1-A**

**Matrix: Solid**  
**Analysis Batch: 252481**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**  
**Prep Batch: 252236**

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:25	1

**Lab Sample ID: LCS 180-252236/2-A**

**Matrix: Solid**  
**Analysis Batch: 252481**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**  
**Prep Batch: 252236**

Analyte	Spike Added	LCS		Unit	D	%Rec	Limits
		Result	Qualifier				
Mercury	2.50	2.44		ug/L		98	80 - 120

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Method: EPA 7470A - Mercury (CVAA) (Continued)

**Lab Sample ID: MB 180-252436/1-A**  
**Matrix: Solid**  
**Analysis Batch: 252785**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 252436**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/01/18 12:00	08/04/18 13:09	1

**Lab Sample ID: LCS 180-252436/2-A**  
**Matrix: Solid**  
**Analysis Batch: 252785**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 252436**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	2.50	2.46		ug/L		98	80 - 120

**Lab Sample ID: LCSD 180-252436/3-A**  
**Matrix: Solid**  
**Analysis Batch: 252785**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 252436**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	2.50	2.42		ug/L		97	80 - 120	1	20

**Lab Sample ID: MB 180-253225/1-A**  
**Matrix: Solid**  
**Analysis Batch: 253331**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 253225**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/09/18 07:04	08/09/18 15:03	1

**Lab Sample ID: LCS 180-253225/2-A**  
**Matrix: Solid**  
**Analysis Batch: 253331**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 253225**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	2.50	2.66		ug/L		107	80 - 120

**Lab Sample ID: LCSD 180-253225/3-A**  
**Matrix: Solid**  
**Analysis Batch: 253331**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 253225**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	2.50	2.73		ug/L		109	80 - 120	2	20

**Lab Sample ID: MB 180-254383/1-A**  
**Matrix: Solid**  
**Analysis Batch: 254593**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 254383**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/20/18 10:27	08/21/18 14:35	1

**Lab Sample ID: LCS 180-254383/2-A**  
**Matrix: Solid**  
**Analysis Batch: 254593**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 254383**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	2.50	2.61		ug/L		104	80 - 120

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

**Lab Sample ID: LCSD 180-254383/3-A**  
**Matrix: Solid**  
**Analysis Batch: 254593**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 254383**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	2.50	2.52		ug/L		101	80 - 120	3	20

**Lab Sample ID: LB 180-251753/6-C**  
**Matrix: Solid**  
**Analysis Batch: 252481**

**Client Sample ID: Method Blank**  
**Prep Type: Leach**  
**Prep Batch: 252236**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 11:22	1

## Method: 2540G - SM 2540G

**Lab Sample ID: 180-79415-1 DU**  
**Matrix: Solid**  
**Analysis Batch: 249914**

**Client Sample ID: SB-1805 (66-78') PRETEST**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	12.8		11.7		%		8	20
Percent Solids	87.2		88.3		%		1	20

**Lab Sample ID: 180-79415-12 DU**  
**Matrix: Solid**  
**Analysis Batch: 249921**

**Client Sample ID: SB-1806 (64-70') PRETEST**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	7.5		7.6		%		2	20
Percent Solids	92.5		92.4		%		0.2	20

**Lab Sample ID: 180-79415-1 DU**  
**Matrix: Solid**  
**Analysis Batch: 251132**

**Client Sample ID: SB-1805 (66-78') PRETEST**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	0.0		0.2		%		NC	20
Percent Solids	100.0		99.8		%		0.2	20

## Method: EPA 9040C - pH

**Lab Sample ID: LCS 180-252035/1**  
**Matrix: Solid**  
**Analysis Batch: 252035**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

**Lab Sample ID: LCS 180-252414/1**  
**Matrix: Solid**  
**Analysis Batch: 252414**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

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# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Method: EPA 9040C - pH (Continued)

**Lab Sample ID: LCS 180-253315/1**  
**Matrix: Solid**  
**Analysis Batch: 253315**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

**Lab Sample ID: LCS 180-254402/1**  
**Matrix: Solid**  
**Analysis Batch: 254402**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

## Method: SM 2510B - Conductivity, Specific Conductance

**Lab Sample ID: MB 180-252034/2**  
**Matrix: Solid**  
**Analysis Batch: 252034**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			07/26/18 08:10	1

**Lab Sample ID: LCS 180-252034/1**  
**Matrix: Solid**  
**Analysis Batch: 252034**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	86.3		umhos/cm		103	90 - 110

**Lab Sample ID: MB 180-252448/17**  
**Matrix: Solid**  
**Analysis Batch: 252448**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			07/30/18 11:10	1

**Lab Sample ID: LCS 180-252448/16**  
**Matrix: Solid**  
**Analysis Batch: 252448**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	85.8		umhos/cm		102	90 - 110

**Lab Sample ID: MB 180-253317/2**  
**Matrix: Solid**  
**Analysis Batch: 253317**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			08/08/18 09:00	1

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# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Method: SM 2510B - Conductivity, Specific Conductance (Continued)

**Lab Sample ID: LCS 180-253317/1**  
**Matrix: Solid**  
**Analysis Batch: 253317**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	85.6		umhos/cm		102	90 - 110

**Lab Sample ID: MB 180-254404/2**  
**Matrix: Solid**  
**Analysis Batch: 254404**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			08/17/18 09:55	1

**Lab Sample ID: LCS 180-254404/1**  
**Matrix: Solid**  
**Analysis Batch: 254404**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	91.3		umhos/cm		109	90 - 110

## Method: SM 2580B - Reduction-Oxidation (REDOX) Potential

**Lab Sample ID: LCS 180-252033/1**  
**Matrix: Solid**  
**Analysis Batch: 252033**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	474		millivolts		100	90 - 110

**Lab Sample ID: LCS 180-252444/1**  
**Matrix: Solid**  
**Analysis Batch: 252444**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	476		millivolts		100	90 - 110

**Lab Sample ID: LCS 180-253316/1**  
**Matrix: Solid**  
**Analysis Batch: 253316**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	475		millivolts		100	90 - 110

**Lab Sample ID: LCS 180-254403/1**  
**Matrix: Solid**  
**Analysis Batch: 254403**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	479		millivolts		101	90 - 110

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## HPLC/IC

### Leach Batch: 251445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	1313	
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	1313	
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	1313	
180-79415-34	MB NEUTRAL	Leach	Solid	1313	
180-79415-11 MS	SB-1805 (66-78') PH NATURAL	Leach	Solid	1313	
180-79415-11 MSD	SB-1805 (66-78') PH NATURAL	Leach	Solid	1313	

### Leach Batch: 252153

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	1313	
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	1313	
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	1313	
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	1313	
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	1313	
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	1313	
180-79415-35	MB LOW	Leach	Solid	1313	

### Analysis Batch: 252206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	EPA 9056A	251445
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	EPA 9056A	251445
180-79415-34	MB NEUTRAL	Leach	Solid	EPA 9056A	251445
MB 180-252206/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-252206/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

### Analysis Batch: 252367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	EPA 9056A	251445
MB 180-252367/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-252367/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	
180-79415-11 MS	SB-1805 (66-78') PH NATURAL	Leach	Solid	EPA 9056A	251445
180-79415-11 MSD	SB-1805 (66-78') PH NATURAL	Leach	Solid	EPA 9056A	251445

### Analysis Batch: 252532

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	EPA 9056A	252153
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	EPA 9056A	252153
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	EPA 9056A	252153
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	EPA 9056A	252153
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	EPA 9056A	252153
180-79415-35	MB LOW	Leach	Solid	EPA 9056A	252153
MB 180-252532/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-252532/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

### Analysis Batch: 252670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	EPA 9056A	252153
MB 180-252670/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-252670/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## HPLC/IC (Continued)

### Leach Batch: 253180

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78') PH 10.0	Leach	Solid	1313	
180-79415-5	SB-1805 (66-78') PH 6.0	Leach	Solid	1313	
180-79415-13	SB-1806 (64-70') PH 10.0	Leach	Solid	1313	
180-79415-16	SB-1806 (64-70') PH 6.0	Leach	Solid	1313	
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	1313	
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	1313	
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	1313	
180-79415-36	MB1 LOW	Leach	Solid	1313	
180-79415-37	MB HIGH	Leach	Solid	1313	

### Analysis Batch: 253351

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78') PH 10.0	Leach	Solid	EPA 9056A	253180
180-79415-5	SB-1805 (66-78') PH 6.0	Leach	Solid	EPA 9056A	253180
180-79415-13	SB-1806 (64-70') PH 10.0	Leach	Solid	EPA 9056A	253180
180-79415-16	SB-1806 (64-70') PH 6.0	Leach	Solid	EPA 9056A	253180
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	EPA 9056A	253180
180-79415-36	MB1 LOW	Leach	Solid	EPA 9056A	253180
180-79415-37	MB HIGH	Leach	Solid	EPA 9056A	253180
MB 180-253351/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-253351/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

### Analysis Batch: 253597

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	EPA 9056A	253180
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	EPA 9056A	253180
MB 180-253597/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-253597/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

### Leach Batch: 253650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	1313	
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	1313	
180-79415-38	MB2 LOW	Leach	Solid	1313	

### Analysis Batch: 255975

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	EPA 9056A	253650
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	EPA 9056A	253650
180-79415-38	MB2 LOW	Leach	Solid	EPA 9056A	253650
MB 180-255975/16	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-255975/15	Lab Control Sample	Total/NA	Solid	EPA 9056A	

## Metals

### Leach Batch: 251445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	1313	
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	1313	
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	1313	

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Metals (Continued)

### Leach Batch: 251445 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-34	MB NEUTRAL	Leach	Solid	1313	
180-79415-34 MS	MB NEUTRAL	Leach	Solid	1313	
180-79415-34 MSD	MB NEUTRAL	Leach	Solid	1313	

### Leach Batch: 251753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 180-251753/6-C	Method Blank	Leach	Solid	1311	

### Leach Batch: 252153

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	1313	
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	1313	
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	1313	
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	1313	
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	1313	
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	1313	
180-79415-35	MB LOW	Leach	Solid	1313	

### Prep Batch: 252236

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	7470A	251445
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	7470A	251445
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	7470A	251445
180-79415-34	MB NEUTRAL	Leach	Solid	7470A	251445
LB 180-251753/6-C	Method Blank	Leach	Solid	7470A	251753
MB 180-252236/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 180-252236/2-A	Lab Control Sample	Total/NA	Solid	7470A	

### Prep Batch: 252436

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	7470A	252153
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	7470A	252153
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	7470A	252153
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	7470A	252153
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	7470A	252153
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	7470A	252153
180-79415-35	MB LOW	Leach	Solid	7470A	252153
MB 180-252436/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 180-252436/2-A	Lab Control Sample	Total/NA	Solid	7470A	
LCSD 180-252436/3-A	Lab Control Sample Dup	Total/NA	Solid	7470A	

### Prep Batch: 252470

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	3010A	252153
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	3010A	252153
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	3010A	251445
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	3010A	252153
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	3010A	252153
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	3010A	251445
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	3010A	252153
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	3010A	252153

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Metals (Continued)

### Prep Batch: 252470 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	3010A	251445
180-79415-34	MB NEUTRAL	Leach	Solid	3010A	251445
180-79415-35	MB LOW	Leach	Solid	3010A	252153
MB 180-252470/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-252470/2-A	Lab Control Sample	Total/NA	Solid	3010A	
180-79415-34 MS	MB NEUTRAL	Leach	Solid	3010A	251445
180-79415-34 MSD	MB NEUTRAL	Leach	Solid	3010A	251445

### Analysis Batch: 252481

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	EPA 7470A	252236
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	EPA 7470A	252236
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	EPA 7470A	252236
180-79415-34	MB NEUTRAL	Leach	Solid	EPA 7470A	252236
LB 180-251753/6-C	Method Blank	Leach	Solid	EPA 7470A	252236
MB 180-252236/1-A	Method Blank	Total/NA	Solid	EPA 7470A	252236
LCS 180-252236/2-A	Lab Control Sample	Total/NA	Solid	EPA 7470A	252236

### Analysis Batch: 252785

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	EPA 7470A	252436
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	EPA 7470A	252436
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	EPA 7470A	252436
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	EPA 7470A	252436
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	EPA 7470A	252436
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	EPA 7470A	252436
180-79415-35	MB LOW	Leach	Solid	EPA 7470A	252436
MB 180-252436/1-A	Method Blank	Total/NA	Solid	EPA 7470A	252436
LCS 180-252436/2-A	Lab Control Sample	Total/NA	Solid	EPA 7470A	252436
LCSD 180-252436/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 7470A	252436

### Analysis Batch: 252834

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	EPA 6020A	252470
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	EPA 6020A	252470
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	EPA 6020A	252470
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	EPA 6020A	252470
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	EPA 6020A	252470
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	EPA 6020A	252470
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	EPA 6020A	252470
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	EPA 6020A	252470
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	EPA 6020A	252470
180-79415-34	MB NEUTRAL	Leach	Solid	EPA 6020A	252470
180-79415-35	MB LOW	Leach	Solid	EPA 6020A	252470
MB 180-252470/1-A	Method Blank	Total/NA	Solid	EPA 6020A	252470
LCS 180-252470/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	252470
180-79415-34 MS	MB NEUTRAL	Leach	Solid	EPA 6020A	252470
180-79415-34 MSD	MB NEUTRAL	Leach	Solid	EPA 6020A	252470

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Metals (Continued)

### Leach Batch: 253180

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78') PH 10.0	Leach	Solid	1313	
180-79415-5	SB-1805 (66-78') PH 6.0	Leach	Solid	1313	
180-79415-13	SB-1806 (64-70') PH 10.0	Leach	Solid	1313	
180-79415-16	SB-1806 (64-70') PH 6.0	Leach	Solid	1313	
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	1313	
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	1313	
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	1313	
180-79415-36	MB1 LOW	Leach	Solid	1313	
180-79415-37	MB HIGH	Leach	Solid	1313	

### Prep Batch: 253225

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78') PH 10.0	Leach	Solid	7470A	253180
180-79415-5	SB-1805 (66-78') PH 6.0	Leach	Solid	7470A	253180
180-79415-13	SB-1806 (64-70') PH 10.0	Leach	Solid	7470A	253180
180-79415-16	SB-1806 (64-70') PH 6.0	Leach	Solid	7470A	253180
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	7470A	253180
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	7470A	253180
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	7470A	253180
180-79415-36	MB1 LOW	Leach	Solid	7470A	253180
180-79415-37	MB HIGH	Leach	Solid	7470A	253180
MB 180-253225/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 180-253225/2-A	Lab Control Sample	Total/NA	Solid	7470A	
LCSD 180-253225/3-A	Lab Control Sample Dup	Total/NA	Solid	7470A	

### Prep Batch: 253267

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78') PH 10.0	Leach	Solid	3010A	253180
180-79415-5	SB-1805 (66-78') PH 6.0	Leach	Solid	3010A	253180
180-79415-13	SB-1806 (64-70') PH 10.0	Leach	Solid	3010A	253180
180-79415-16	SB-1806 (64-70') PH 6.0	Leach	Solid	3010A	253180
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	3010A	253180
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	3010A	253180
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	3010A	253180
180-79415-36	MB1 LOW	Leach	Solid	3010A	253180
180-79415-37	MB HIGH	Leach	Solid	3010A	253180
MB 180-253267/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-253267/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 180-253267/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	

### Analysis Batch: 253331

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78') PH 10.0	Leach	Solid	EPA 7470A	253225
180-79415-5	SB-1805 (66-78') PH 6.0	Leach	Solid	EPA 7470A	253225
180-79415-13	SB-1806 (64-70') PH 10.0	Leach	Solid	EPA 7470A	253225
180-79415-16	SB-1806 (64-70') PH 6.0	Leach	Solid	EPA 7470A	253225
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	EPA 7470A	253225
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	EPA 7470A	253225
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	EPA 7470A	253225
180-79415-36	MB1 LOW	Leach	Solid	EPA 7470A	253225
180-79415-37	MB HIGH	Leach	Solid	EPA 7470A	253225

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Metals (Continued)

### Analysis Batch: 253331 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-253225/1-A	Method Blank	Total/NA	Solid	EPA 7470A	253225
LCS 180-253225/2-A	Lab Control Sample	Total/NA	Solid	EPA 7470A	253225
LCSD 180-253225/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 7470A	253225

### Leach Batch: 253650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	1313	
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	1313	
180-79415-38	MB2 LOW	Leach	Solid	1313	

### Analysis Batch: 253691

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78') PH 10.0	Leach	Solid	EPA 6020A	253267
180-79415-5	SB-1805 (66-78') PH 6.0	Leach	Solid	EPA 6020A	253267
180-79415-13	SB-1806 (64-70') PH 10.0	Leach	Solid	EPA 6020A	253267
180-79415-16	SB-1806 (64-70') PH 6.0	Leach	Solid	EPA 6020A	253267
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	EPA 6020A	253267
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	EPA 6020A	253267
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	EPA 6020A	253267
180-79415-36	MB1 LOW	Leach	Solid	EPA 6020A	253267
180-79415-37	MB HIGH	Leach	Solid	EPA 6020A	253267
MB 180-253267/1-A	Method Blank	Total/NA	Solid	EPA 6020A	253267
LCS 180-253267/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	253267
LCSD 180-253267/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	253267

### Analysis Batch: 253812

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 180-253267/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	253267
LCSD 180-253267/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	253267

### Prep Batch: 254383

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	7470A	253650
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	7470A	253650
180-79415-38	MB2 LOW	Leach	Solid	7470A	253650
MB 180-254383/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 180-254383/2-A	Lab Control Sample	Total/NA	Solid	7470A	
LCSD 180-254383/3-A	Lab Control Sample Dup	Total/NA	Solid	7470A	

### Prep Batch: 254424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	3010A	253650
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	3010A	253650
180-79415-38	MB2 LOW	Leach	Solid	3010A	253650
MB 180-254424/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-254424/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 180-254424/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	

### Analysis Batch: 254593

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	EPA 7470A	254383

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## Metals (Continued)

### Analysis Batch: 254593 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	EPA 7470A	254383
180-79415-38	MB2 LOW	Leach	Solid	EPA 7470A	254383
MB 180-254383/1-A	Method Blank	Total/NA	Solid	EPA 7470A	254383
LCS 180-254383/2-A	Lab Control Sample	Total/NA	Solid	EPA 7470A	254383
LCSD 180-254383/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 7470A	254383

### Analysis Batch: 254734

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	EPA 6020A	254424
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	EPA 6020A	254424
180-79415-38	MB2 LOW	Leach	Solid	EPA 6020A	254424
MB 180-254424/1-A	Method Blank	Total/NA	Solid	EPA 6020A	254424
LCS 180-254424/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	254424
LCSD 180-254424/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	254424

## General Chemistry

### Analysis Batch: 249914

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-1	SB-1805 (66-78') PRETEST	Total/NA	Solid	2540G	
180-79415-1 DU	SB-1805 (66-78') PRETEST	Total/NA	Solid	2540G	

### Analysis Batch: 249921

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-12	SB-1806 (64-70') PRETEST	Total/NA	Solid	2540G	
180-79415-23	SB-1808 (45-57') PRETEST	Total/NA	Solid	2540G	
180-79415-12 DU	SB-1806 (64-70') PRETEST	Total/NA	Solid	2540G	

### Analysis Batch: 251132

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-1	SB-1805 (66-78') PRETEST	Total/NA	Solid	2540G	
180-79415-12	SB-1806 (64-70') PRETEST	Total/NA	Solid	2540G	
180-79415-23	SB-1808 (45-57') PRETEST	Total/NA	Solid	2540G	
180-79415-1 DU	SB-1805 (66-78') PRETEST	Total/NA	Solid	2540G	

### Leach Batch: 251445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	1313	
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	1313	
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	1313	
180-79415-34	MB NEUTRAL	Leach	Solid	1313	

### Analysis Batch: 252033

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	SM 2580B	251445
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	SM 2580B	251445
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	SM 2580B	251445
180-79415-34	MB NEUTRAL	Leach	Solid	SM 2580B	251445
LCS 180-252033/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## General Chemistry (Continued)

### Analysis Batch: 252034

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	SM 2510B	251445
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	SM 2510B	251445
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	SM 2510B	251445
180-79415-34	MB NEUTRAL	Leach	Solid	SM 2510B	251445
MB 180-252034/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-252034/1	Lab Control Sample	Total/NA	Solid	SM 2510B	

### Analysis Batch: 252035

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-11	SB-1805 (66-78') PH NATURAL	Leach	Solid	EPA 9040C	251445
180-79415-22	SB-1806 (64-70') PH NATURAL	Leach	Solid	EPA 9040C	251445
180-79415-33	SB-1808 (45-57') PH NATURAL	Leach	Solid	EPA 9040C	251445
180-79415-34	MB NEUTRAL	Leach	Solid	EPA 9040C	251445
LCS 180-252035/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Leach Batch: 252153

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-1	SB-1805 (66-78') PRETEST	Leach	Solid	1313	
180-79415-1	SB-1805 (66-78') PRETEST	Leach	Solid	1313	
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	1313	
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	1313	
180-79415-12	SB-1806 (64-70') PRETEST	Leach	Solid	1313	
180-79415-12	SB-1806 (64-70') PRETEST	Leach	Solid	1313	
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	1313	
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	1313	
180-79415-23	SB-1808 (45-57') PRETEST	Leach	Solid	1313	
180-79415-23	SB-1808 (45-57') PRETEST	Leach	Solid	1313	
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	1313	
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	1313	
180-79415-35	MB LOW	Leach	Solid	1313	

### Analysis Batch: 252414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-1	SB-1805 (66-78') PRETEST	Leach	Solid	EPA 9040C	252153
180-79415-1	SB-1805 (66-78') PRETEST	Leach	Solid	EPA 9040C	252153
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	EPA 9040C	252153
180-79415-4	SB-1805 (66-78') PH 7.0	Leach	Solid	EPA 9040C	252153
180-79415-12	SB-1806 (64-70') PRETEST	Leach	Solid	EPA 9040C	252153
180-79415-12	SB-1806 (64-70') PRETEST	Leach	Solid	EPA 9040C	252153
180-79415-14	SB-1806 (64-70') PH 8.0	Leach	Solid	EPA 9040C	252153
180-79415-15	SB-1806 (64-70') PH 7.0	Leach	Solid	EPA 9040C	252153
180-79415-23	SB-1808 (45-57') PRETEST	Leach	Solid	EPA 9040C	252153
180-79415-23	SB-1808 (45-57') PRETEST	Leach	Solid	EPA 9040C	252153
180-79415-25	SB-1808 (45-57') PH 8.0	Leach	Solid	EPA 9040C	252153
180-79415-26	SB-1808 (45-57') PH 7.0	Leach	Solid	EPA 9040C	252153
180-79415-35	MB LOW	Leach	Solid	EPA 9040C	252153
LCS 180-252414/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 252444

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78') PH 8.0	Leach	Solid	SM 2580B	252153

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## General Chemistry (Continued)

### Analysis Batch: 252444 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-4	SB-1805 (66-78") PH 7.0	Leach	Solid	SM 2580B	252153
180-79415-14	SB-1806 (64-70") PH 8.0	Leach	Solid	SM 2580B	252153
180-79415-15	SB-1806 (64-70") PH 7.0	Leach	Solid	SM 2580B	252153
180-79415-25	SB-1808 (45-57") PH 8.0	Leach	Solid	SM 2580B	252153
180-79415-26	SB-1808 (45-57") PH 7.0	Leach	Solid	SM 2580B	252153
180-79415-35	MB LOW	Leach	Solid	SM 2580B	252153
LCS 180-252444/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

### Analysis Batch: 252448

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-3	SB-1805 (66-78") PH 8.0	Leach	Solid	SM 2510B	252153
180-79415-4	SB-1805 (66-78") PH 7.0	Leach	Solid	SM 2510B	252153
180-79415-14	SB-1806 (64-70") PH 8.0	Leach	Solid	SM 2510B	252153
180-79415-15	SB-1806 (64-70") PH 7.0	Leach	Solid	SM 2510B	252153
180-79415-25	SB-1808 (45-57") PH 8.0	Leach	Solid	SM 2510B	252153
180-79415-26	SB-1808 (45-57") PH 7.0	Leach	Solid	SM 2510B	252153
180-79415-35	MB LOW	Leach	Solid	SM 2510B	252153
MB 180-252448/17	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-252448/16	Lab Control Sample	Total/NA	Solid	SM 2510B	

### Leach Batch: 253180

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78") PH 10.0	Leach	Solid	1313	
180-79415-5	SB-1805 (66-78") PH 6.0	Leach	Solid	1313	
180-79415-13	SB-1806 (64-70") PH 10.0	Leach	Solid	1313	
180-79415-16	SB-1806 (64-70") PH 6.0	Leach	Solid	1313	
180-79415-24	SB-1808 (45-57") PH 10.0	Leach	Solid	1313	
180-79415-27	SB-1808 (45-57") PH 6.0	Leach	Solid	1313	
180-79415-28	SB-1808 (45-57") PH 5.0	Leach	Solid	1313	
180-79415-36	MB1 LOW	Leach	Solid	1313	
180-79415-37	MB HIGH	Leach	Solid	1313	

### Analysis Batch: 253315

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78") PH 10.0	Leach	Solid	EPA 9040C	253180
180-79415-5	SB-1805 (66-78") PH 6.0	Leach	Solid	EPA 9040C	253180
180-79415-13	SB-1806 (64-70") PH 10.0	Leach	Solid	EPA 9040C	253180
180-79415-16	SB-1806 (64-70") PH 6.0	Leach	Solid	EPA 9040C	253180
180-79415-24	SB-1808 (45-57") PH 10.0	Leach	Solid	EPA 9040C	253180
180-79415-27	SB-1808 (45-57") PH 6.0	Leach	Solid	EPA 9040C	253180
180-79415-28	SB-1808 (45-57") PH 5.0	Leach	Solid	EPA 9040C	253180
180-79415-36	MB1 LOW	Leach	Solid	EPA 9040C	253180
180-79415-37	MB HIGH	Leach	Solid	EPA 9040C	253180
LCS 180-253315/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 253316

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78") PH 10.0	Leach	Solid	SM 2580B	253180
180-79415-5	SB-1805 (66-78") PH 6.0	Leach	Solid	SM 2580B	253180
180-79415-13	SB-1806 (64-70") PH 10.0	Leach	Solid	SM 2580B	253180
180-79415-16	SB-1806 (64-70") PH 6.0	Leach	Solid	SM 2580B	253180

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# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79415-1

## General Chemistry (Continued)

### Analysis Batch: 253316 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	SM 2580B	253180
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	SM 2580B	253180
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	SM 2580B	253180
180-79415-36	MB1 LOW	Leach	Solid	SM 2580B	253180
180-79415-37	MB HIGH	Leach	Solid	SM 2580B	253180
LCS 180-253316/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

### Analysis Batch: 253317

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-2	SB-1805 (66-78') PH 10.0	Leach	Solid	SM 2510B	253180
180-79415-5	SB-1805 (66-78') PH 6.0	Leach	Solid	SM 2510B	253180
180-79415-13	SB-1806 (64-70') PH 10.0	Leach	Solid	SM 2510B	253180
180-79415-16	SB-1806 (64-70') PH 6.0	Leach	Solid	SM 2510B	253180
180-79415-24	SB-1808 (45-57') PH 10.0	Leach	Solid	SM 2510B	253180
180-79415-27	SB-1808 (45-57') PH 6.0	Leach	Solid	SM 2510B	253180
180-79415-28	SB-1808 (45-57') PH 5.0	Leach	Solid	SM 2510B	253180
180-79415-36	MB1 LOW	Leach	Solid	SM 2510B	253180
180-79415-37	MB HIGH	Leach	Solid	SM 2510B	253180
MB 180-253317/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-253317/1	Lab Control Sample	Total/NA	Solid	SM 2510B	

### Leach Batch: 253650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	1313	
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	1313	
180-79415-38	MB2 LOW	Leach	Solid	1313	

### Analysis Batch: 254402

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	EPA 9040C	253650
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	EPA 9040C	253650
180-79415-38	MB2 LOW	Leach	Solid	EPA 9040C	253650
LCS 180-254402/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 254403

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	SM 2580B	253650
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	SM 2580B	253650
180-79415-38	MB2 LOW	Leach	Solid	SM 2580B	253650
LCS 180-254403/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

### Analysis Batch: 254404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79415-6	SB-1805 (66-78') PH 5.0	Leach	Solid	SM 2510B	253650
180-79415-17	SB-1806 (64-70') PH 5.0	Leach	Solid	SM 2510B	253650
180-79415-38	MB2 LOW	Leach	Solid	SM 2510B	253650
MB 180-254404/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-254404/1	Lab Control Sample	Total/NA	Solid	SM 2510B	

pus

**TestAmerica Pittsburgh**  
 301 Alpha Drive  
 RIDC Park  
 Pittsburgh, PA 15238-2907  
 phone 412.963.7058 fax 412.963.2468

# Chain of Custody Record

**TestAmerica**  
 THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

Regulatory Program:  DW  NPDES  RCRA  USEPA CCR

Client Contact: **Sanborn, Head & Associates, Inc.**  
 20 Foundry Street  
 Concord, NH 03301  
 (603) 229-1900 Phone  
 (603) 229-1919 FAX  
 Project Name: Mountaineer  
 Site: New Haven, West Virginia  
 P O #: 4345.00

Project Manager: Andrew Ashton  
 Tel/Fax: (603) 415-6173

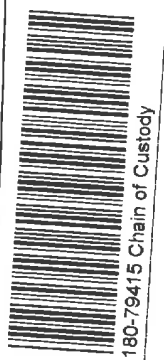
Site Contact: **Lab Contact: Carrie Gamber**  
 Date: \_\_\_\_\_ Carrier: \_\_\_\_\_

Analysis Turnaround Time  
 CALENDAR DAYS  WORKING DAYS  
 TAT if different from Below Standard \_\_\_\_\_  
 2 weeks  
 1 week  
 2 days  
 1 day

Site Contact: \_\_\_\_\_  
 Lab Contact: \_\_\_\_\_  
 Date: \_\_\_\_\_ Carrier: \_\_\_\_\_

Sample Identification

Sample ID	Sample Date	Sample Time	Sample Type (C-Comp, G-Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Form MS / MSD (Y/N)	% moisture/solids (2540G)	CCR App III/IV Metals (6020A)	Mercury (747B)	C, F, S, O4 (9056A, DI Leach)	pH (9045D)	Radium-226 (9315)	Radium-228 (9320)	LEAF Method 1313 (see comment)	ASTM D4646 (see comments)
SB-1802 (10-12')	6/26/18	0930	C	Soil	2	N										
SB-1802 (60-66')	6/26/18	1130	C		2											
SB-1802 (66-72')	6/26/18	1210	C		2											
SB-1805 (9-11')	6/18/18	1350	C		2											
SB-1805 (50-60')	6/19/18	1600	C		2											
SB-1805 (60-66')	6/19/18	1715	C		2											
SB-1805 (60-78')	6/19/18	1910	C		4											
SB-1806 (46-60')	6/25/18	1135	C		4											
SB-1806 (64-70')	6/25/18	1320	C		4											
SB-1806 (70-76')	6/25/18	1505	C		4											
SB-1806 (45-57')	6/29/18	1265	C		6											



Preservation Used: 1=Ice, 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Special Instructions/QC Requirements & Comments: ASTM D4646 modified to three concentration points (Co: 20 ug/l, 40 ug/l, and spike; Li: 130 ug/l, 250 ug/l, and spike; Mo: 110 ug/l, 220 ug/l, and two pH points (6.0 and 7.5))

Custody Seal Intact:  Yes  No

Relinquished by: Lilly Central

Relinquished by: Sanborn Head & Associates Date/Time: 6/28/18 0945

Relinquished by: Lilly Central Date/Time: 6/29-18 9:20

Received in Laboratory by: Sanborn Head & Associates Date/Time: 6/28/18 0945

Received by: FedEx Date/Time: 6/28/18 0945

Received in Laboratory by: Sanborn Head & Associates Date/Time: 6/29-18 9:20







- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

PT-WI-SR-001 effective 7/26/13

CF 0  
 Initials JS  
 Thermometer ID 4.6  
 Uncorrected temp 4.6 °C

PA-US  
 PIT 15238

**XH AGCA**

FRI - 29 JUN 10:30A  
 PRIORITY OVERNIGHT  
 AHS 15238

MPS# 7816 2476 7050  
 Mat# 7816 2476 7039  
 0263



TEST AMERICA  
 301 ALPHA DR  
 RIDC PARK  
 PITTSBURGH PA 15238  
 REF: (412) 963-7068  
 INVT: 101  
 DEPT: 1

Part # 1565043485EXP 05/18

SHIP DATE: 28JUN18  
 ACTWGT: 53.30 LB  
 CAD: 6996935/SSF01904  
 DIMS: 25x14x14 IN  
 BILL THIRD PARTY  
 ORIGIN ID:CRMA (603) 415-6128  
 LILLY CORENTHAL  
 20 FOUNDRY ST.  
 CONCORD, NH,03301  
 UNITED STATES US

Do Not Lift Using This Tag



# Login Sample Receipt Checklist

Client: Sanborn Head & Associates Inc

Job Number: 180-79415-1

**Login Number: 79415**

**List Number: 1**

**Creator: Watson, Debbie**

**List Source: TestAmerica Pittsburgh**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



**APPENDIX H.5**

**PERCOLATION COLUMN  
LEACHING TEST REPORT**

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Pittsburgh

301 Alpha Drive

RIDC Park

Pittsburgh, PA 15238

Tel: (412)963-7058

TestAmerica Job ID: 180-79212-1

Client Project/Site: LEAF Metals and CCR Constituent Analysis

For:

Sanborn Head & Associates Inc

20 Foundry Street

Concord, New Hampshire 03301

Attn: Andrew Ashton



Authorized for release by:

8/14/2018 12:14:06 PM

Julie Unger, Project Management Assistant I

[julie.unger@testamericainc.com](mailto:julie.unger@testamericainc.com)

Designee for

Carrie Gamber, Senior Project Manager

(412)963-2428

[carrie.gamber@testamericainc.com](mailto:carrie.gamber@testamericainc.com)

### LINKS

Review your project  
results through

TotalAccess

Have a Question?



Visit us at:

[www.testamericainc.com](http://www.testamericainc.com)

PA Lab ID: 02-00416

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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13



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Case Narrative . . . . .	3
Definitions/Glossary . . . . .	4
Certification Summary . . . . .	5
Sample Summary . . . . .	6
Method Summary . . . . .	7
Lab Chronicle . . . . .	8
Client Sample Results . . . . .	15
QC Sample Results . . . . .	22
QC Association Summary . . . . .	31
Chain of Custody . . . . .	39
Receipt Checklists . . . . .	44

# Case Narrative

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Job ID: 180-79212-1**

**Laboratory: TestAmerica Pittsburgh**

**Narrative**

## CASE NARRATIVE

**Client: Sanborn Head & Associates Inc**

**Project: LEAF Metals and CCR Constituent Analysis**

**Report Number: 180-79212-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

### **RECEIPT**

The samples were received on 6/23/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 4 coolers at receipt time were 8.1° C, 8.3° C, 8.4° C and 9.0° C.

The following samples were received at the laboratory outside the required temperature criteria: BA-01 T01 (180-79212-1), BAP-OUT (180-79212-2), BA-01 T02 (180-79212-3), BA-01 T03 (180-79212-4), BA-01 T04 (180-79212-5), BA-01 T05 (180-79212-6), BA-01 T06 (180-79212-7), BA-01 T07 (180-79212-8), BA-01 T08 (180-79212-9), BA-01 T09 (180-79212-10) and B01 (180-79212-11). There was melted ice/water, but they were out of temp. The client was contacted regarding this issue, and the laboratory was instructed to proceed with analysis.

### **IC**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **METALS**

Barium and Chromium were detected in method blank MB 180-251776/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Arsenic and Chromium were detected in method blank MB 180-252923/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 180-251382, 180-251636, 180-251647 and 180-251776.

### **GENERAL CHEMISTRY**

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

# Definitions/Glossary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Qualifiers

### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Accreditation/Certification Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Laboratory: TestAmerica Pittsburgh

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
West Virginia DEP	State Program	3	142	01-31-19

The following analytes are included in this report, but are not accredited/certified under this accreditation/certification:

Analysis Method	Prep Method	Matrix	Analyte
2540G		Solid	Percent Moisture
2540G		Solid	Percent Solids
SM 2510B		Solid	Specific Conductance
SM 2580B		Solid	Oxidation Reduction Potential



# Sample Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
180-79212-1	BA-01 T01	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-3	BA-01 T02	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-4	BA-01 T03	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-5	BA-01 T04	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-6	BA-01 T05	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-7	BA-01 T06	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-8	BA-01 T07	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-9	BA-01 T08	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-10	BA-01 T09	Solid	06/20/18 07:50	06/23/18 09:30
180-79212-11	B01	Solid	06/20/18 07:50	06/23/18 09:30



# Method Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

Method	Method Description	Protocol	Laboratory
EPA 9056A	Anions, Ion Chromatography	SW846	TAL PIT
EPA 6020A	Metals (ICP/MS)	SW846	TAL PIT
EPA 7470A	Mercury (CVAA)	SW846	TAL PIT
2540G	SM 2540G	SM22	TAL PIT
EPA 9040C	pH	SW846	TAL PIT
SM 2510B	Conductivity, Specific Conductance	SM	TAL PIT
SM 2580B	Reduction-Oxidation (REDOX) Potential	SM	TAL PIT
1314	Up-Flow Percolation Column Leach Procedure	SW846	TAL PIT
3010A	Preparation, Total Metals	SW846	TAL PIT
7470A	Preparation, Mercury	SW846	TAL PIT

#### Protocol References:

SM = "Standard Methods For The Examination Of Water And Wastewater"

SM22 = Standard Methods For The Examination Of Water And Wastewater, 22nd Edition

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: BA-01 T01**  
**Date Collected: 06/20/18 07:50**  
**Date Received: 06/23/18 09:30**

**Lab Sample ID: 180-79212-1**  
**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	123.8 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			251669	07/26/18 11:40	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Leach	Leach	1314			797.5 g	123.8 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251776	07/26/18 13:23	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 15:44	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	1314			797.5 g	123.8 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 10:35	RSK	TAL PIT
		Instrument ID: K								
Total/NA	Analysis	2540G		1			249576	07/03/18 15:19	TAM	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1314			797.5 g	123.8 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252017	07/25/18 11:17	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1314			797.5 g	123.8 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			251644	07/25/18 11:17	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1314			797.5 g	123.8 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252018	07/25/18 11:17	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: BA-01 T02**  
**Date Collected: 06/20/18 07:50**  
**Date Received: 06/23/18 09:30**

**Lab Sample ID: 180-79212-3**  
**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	209.8 mL	251636	07/25/18 11:17	MTW	TAL PIT
Leach	Analysis	EPA 9056A		1			252367	08/01/18 08:53	MJH	TAL PIT
		Instrument ID: CHICS2000								
Leach	Leach	1314			797.5 g	209.8 mL	251636	07/25/18 11:17	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251776	07/26/18 13:23	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 15:47	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	1314			797.5 g	209.8 mL	251636	07/25/18 11:17	MTW	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 11:05	RSK	TAL PIT
		Instrument ID: K								
Leach	Leach	1314			797.5 g	209.8 mL	251636	07/25/18 11:17	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			252017	07/25/18 18:29	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1314			797.5 g	209.8 mL	251636	07/25/18 11:17	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			251644	07/25/18 18:29	MTW	TAL PIT
		Instrument ID: NOEQUIP								

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	209.8 mL	251636	07/25/18 11:17	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			252018	07/25/18 18:39	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: BA-01 T03**

**Lab Sample ID: 180-79212-4**

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	345.1 mL	251647	07/25/18 18:29	MTW	TAL PIT
Leach	Analysis	EPA 9056A		1			251669	07/26/18 12:12	MJH	TAL PIT
Instrument ID: CHICS2100B										
Leach	Leach	1314			797.5 g	345.1 mL	251647	07/25/18 18:29	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251776	07/26/18 13:23	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 15:50	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	1314			797.5 g	345.1 mL	251647	07/25/18 18:29	MTW	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 11:03	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1314			797.5 g	345.1 mL	251647	07/25/18 18:29	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			252019	07/26/18 07:30	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1314			797.5 g	345.1 mL	251647	07/25/18 18:29	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			252022	07/26/18 07:30	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1314			797.5 g	345.1 mL	251647	07/25/18 18:29	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			252020	07/26/18 07:30	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: BA-01 T04**

**Lab Sample ID: 180-79212-5**

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	362.5 mL	251718	07/26/18 06:29	MTW	TAL PIT
Leach	Analysis	EPA 9056A		1			252206	07/31/18 10:16	MJH	TAL PIT
Instrument ID: CHICS2000										
Leach	Leach	1314			797.5 g	362.5 mL	251718	07/26/18 06:29	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252467	08/01/18 12:05	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 20:20	WTR	TAL PIT
Instrument ID: M										
Leach	Leach	1314			797.5 g	362.5 mL	251718	07/26/18 06:29	MTW	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 11:01	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1314			797.5 g	362.5 mL	251718	07/26/18 06:29	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			252030	07/27/18 07:40	MTW	TAL PIT
Instrument ID: NOEQUIP										

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: BA-01 T04**

**Lab Sample ID: 180-79212-5**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	362.5 mL	251718	07/26/18 06:29	MTW	TAL PIT
Leach	Analysis	SM 2510B Instrument ID: NOEQUIP		1			252032	07/27/18 07:40	MTW	TAL PIT
Leach	Leach	1314			797.5 g	362.5 mL	251718	07/26/18 06:29	MTW	TAL PIT
Leach	Analysis	SM 2580B Instrument ID: NOEQUIP		1			252031	07/27/18 07:40	MTW	TAL PIT

**Client Sample ID: BA-01 T05**

**Lab Sample ID: 180-79212-6**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	343.8 mL	251788	07/26/18 18:29	MTW	TAL PIT
Leach	Analysis	EPA 9056A Instrument ID: CHICS2000		1			252206	07/31/18 10:32	MJH	TAL PIT
Leach	Leach	1314			797.5 g	343.8 mL	251788	07/26/18 18:29	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252467	08/01/18 12:05	NAM	TAL PIT
Leach	Analysis	EPA 6020A Instrument ID: M		1	1.0 mL	1.0 mL	252834	08/03/18 20:25	WTR	TAL PIT
Leach	Leach	1314			797.5 g	343.8 mL	251788	07/26/18 18:29	MTW	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A Instrument ID: K		1			252481	08/01/18 10:59	RSK	TAL PIT
Leach	Leach	1314			797.5 g	343.8 mL	251788	07/26/18 18:29	MTW	TAL PIT
Leach	Analysis	EPA 9040C Instrument ID: NOEQUIP		1			252030	07/27/18 07:40	MTW	TAL PIT
Leach	Leach	1314			797.5 g	343.8 mL	251788	07/26/18 18:29	MTW	TAL PIT
Leach	Analysis	SM 2510B Instrument ID: NOEQUIP		1			252032	07/27/18 07:40	MTW	TAL PIT
Leach	Leach	1314			797.5 g	343.8 mL	251788	07/26/18 18:29	MTW	TAL PIT
Leach	Analysis	SM 2580B Instrument ID: NOEQUIP		1			252031	07/27/18 07:40	MTW	TAL PIT

**Client Sample ID: BA-01 T06**

**Lab Sample ID: 180-79212-7**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	1944.2 mL	251896	07/27/18 06:29	MTW	TAL PIT
Leach	Analysis	EPA 9056A Instrument ID: CHICS2000		1			252206	07/31/18 10:48	MJH	TAL PIT
Leach	Leach	1314			797.5 g	1944.2 mL	251896	07/27/18 06:29	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252467	08/01/18 12:05	NAM	TAL PIT

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: BA-01 T06**

**Lab Sample ID: 180-79212-7**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 20:30	WTR	TAL PIT
	Instrument ID: M									
Leach	Leach	1314			797.5 g	1944.2 mL	251896	07/27/18 06:29	MTW	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 10:57	RSK	TAL PIT
	Instrument ID: K									
Leach	Leach	1314			797.5 g	1944.2 mL	251896	07/27/18 06:29	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			252060	07/29/18 18:29	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1314			797.5 g	1944.2 mL	251896	07/27/18 06:29	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			252062	07/29/18 18:29	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1314			797.5 g	1944.2 mL	251896	07/27/18 06:29	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			252061	07/29/18 18:29	MTW	TAL PIT
	Instrument ID: NOEQUIP									

**Client Sample ID: BA-01 T07**

**Lab Sample ID: 180-79212-8**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	416.6 mL	251971	07/29/18 18:29	MTW	TAL PIT
Leach	Analysis	EPA 9056A		1			252206	07/31/18 11:04	MJH	TAL PIT
	Instrument ID: CHICS2000									
Leach	Leach	1314			797.5 g	416.6 mL	251971	07/29/18 18:29	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252467	08/01/18 12:05	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1	1.0 mL	1.0 mL	252834	08/03/18 20:53	WTR	TAL PIT
	Instrument ID: M									
Leach	Leach	1314			797.5 g	416.6 mL	251971	07/29/18 18:29	MTW	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 11:07	RSK	TAL PIT
	Instrument ID: K									
Leach	Leach	1314			797.5 g	416.6 mL	251971	07/29/18 18:29	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			252179	07/30/18 07:30	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1314			797.5 g	416.6 mL	251971	07/29/18 18:29	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			252184	07/30/18 07:30	MTW	TAL PIT
	Instrument ID: NOEQUIP									
Leach	Leach	1314			797.5 g	416.6 mL	251971	07/29/18 18:29	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			252183	07/30/18 07:30	MTW	TAL PIT
	Instrument ID: NOEQUIP									

TestAmerica Pittsburgh

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: BA-01 T08**

**Lab Sample ID: 180-79212-9**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	3524.9 mL	252094	07/30/18 06:29	MTW	TAL PIT
Leach	Analysis	EPA 9056A		1	1 mL	1.0 mL	252855	08/06/18 06:57	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Leach	Leach	1314			797.5 g	3524.9 mL	252094	07/30/18 06:29	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252923	08/06/18 12:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253224	08/08/18 13:26	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	1314			797.5 g	3524.9 mL	252094	07/30/18 06:29	MTW	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	252872	08/06/18 08:22	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			252650	08/06/18 16:25	RJR	TAL PIT
		Instrument ID: HGZ								
Leach	Leach	1314			797.5 g	3524.9 mL	252094	07/30/18 06:29	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			252812	08/04/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1314			797.5 g	3524.9 mL	252094	07/30/18 06:29	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			252814	08/04/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1314			797.5 g	3524.9 mL	252094	07/30/18 06:29	MTW	TAL PIT
Leach	Analysis	SM 2580B		1			252813	08/04/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								

**Client Sample ID: BA-01 T09**

**Lab Sample ID: 180-79212-10**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			797.5 g	360.8 mL	252485	08/03/18 18:39	MTW	TAL PIT
Leach	Analysis	EPA 9056A		1			252855	08/06/18 07:13	MJH	TAL PIT
		Instrument ID: CHICS2100B								
Leach	Leach	1314			797.5 g	360.8 mL	252485	08/03/18 18:39	MTW	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	252923	08/06/18 12:27	NAM	TAL PIT
Leach	Analysis	EPA 6020A		1			253224	08/08/18 13:40	RSK	TAL PIT
		Instrument ID: A								
Leach	Leach	1314			797.5 g	360.8 mL	252485	08/03/18 18:39	MTW	TAL PIT
Leach	Prep	7470A			50 mL	50 mL	252872	08/06/18 08:22	RJR	TAL PIT
Leach	Analysis	EPA 7470A		1			252650	08/06/18 16:30	RJR	TAL PIT
		Instrument ID: HGZ								
Leach	Leach	1314			797.5 g	360.8 mL	252485	08/03/18 18:39	MTW	TAL PIT
Leach	Analysis	EPA 9040C		1			252812	08/04/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1314			797.5 g	360.8 mL	252485	08/03/18 18:39	MTW	TAL PIT
Leach	Analysis	SM 2510B		1			252814	08/04/18 09:00	MTW	TAL PIT
		Instrument ID: NOEQUIP								
Leach	Leach	1314			797.5 g	360.8 mL	252485	08/03/18 18:39	MTW	TAL PIT

TestAmerica Pittsburgh



# Lab Chronicle

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: BA-01 T09**

**Lab Sample ID: 180-79212-10**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Analysis	SM 2580B		1			252813	08/04/18 09:00	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Client Sample ID: B01**

**Lab Sample ID: 180-79212-11**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Leach	Leach	1314			1.0 g	1.0 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Analysis	EPA 9056A		1			251669	07/26/18 11:56	MJH	TAL PIT
Instrument ID: CHICS2100B										
Leach	Leach	1314			1.0 g	1.0 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Prep	3010A			50 mL	50 mL	251776	07/26/18 13:23	KA	TAL PIT
Leach	Analysis	EPA 6020A		1			251997	07/27/18 15:41	RSK	TAL PIT
Instrument ID: A										
Leach	Leach	1314			1.0 g	1.0 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Prep	7470A			50.0 mL	50.0 mL	252236	07/31/18 08:04	RSK	TAL PIT
Leach	Analysis	EPA 7470A		1			252481	08/01/18 10:33	RSK	TAL PIT
Instrument ID: K										
Leach	Leach	1314			1.0 g	1.0 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Analysis	EPA 9040C		1			252017	07/25/18 11:17	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1314			1.0 g	1.0 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Analysis	SM 2510B		1			251644	07/25/18 11:17	MTW	TAL PIT
Instrument ID: NOEQUIP										
Leach	Leach	1314			1.0 g	1.0 mL	251382	07/25/18 06:30	LWM	TAL PIT
Leach	Analysis	SM 2580B		1			252018	07/25/18 11:17	MTW	TAL PIT
Instrument ID: NOEQUIP										

**Laboratory References:**

TAL PIT = TestAmerica Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

# Lab Chronicle

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Analyst References:

Lab: TAL PIT

Batch Type: Leach

LWM = Larry Matko

MTW = Michael Wesoloski

Batch Type: Prep

KA = Kayla Kalamasz

NAM = Nicole Marfisi

RJR = Ron Rosenbaum

RSK = Robert Kurtz

Batch Type: Analysis

MJH = Matthew Hartman

MTW = Michael Wesoloski

RJR = Ron Rosenbaum

RSK = Robert Kurtz

TAM = Tessa Mastalski

WTR = Bill Reinheimer

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# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: BA-01 T01**

**Date Collected: 06/20/18 07:50**

**Date Received: 06/23/18 09:30**

**Lab Sample ID: 180-79212-1**

**Matrix: Solid**

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.38		0.10	0.026	mg/L			07/26/18 11:40	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	5.7		1.0	0.32	ug/L		07/26/18 13:23	07/27/18 15:44	1
Barium	140	B	10	0.37	ug/L		07/26/18 13:23	07/27/18 15:44	1
Beryllium	ND		1.0	0.057	ug/L		07/26/18 13:23	07/27/18 15:44	1
Cadmium	ND		1.0	0.13	ug/L		07/26/18 13:23	07/27/18 15:44	1
Chromium	3.9	B	2.0	0.63	ug/L		07/26/18 13:23	07/27/18 15:44	1
Cobalt	0.20	J	0.50	0.075	ug/L		07/26/18 13:23	07/27/18 15:44	1
Molybdenum	39		5.0	0.47	ug/L		07/26/18 13:23	07/27/18 15:44	1
Lead	ND		1.0	0.094	ug/L		07/26/18 13:23	07/27/18 15:44	1
Antimony	1.1	J	2.0	1.1	ug/L		07/26/18 13:23	07/27/18 15:44	1
Selenium	12		5.0	0.81	ug/L		07/26/18 13:23	07/27/18 15:44	1
Thallium	0.41	J	1.0	0.063	ug/L		07/26/18 13:23	07/27/18 15:44	1
Lithium	15		5.0	2.6	ug/L		07/26/18 13:23	07/27/18 15:44	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:35	1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	8.9		0.1	0.1	%			07/03/18 15:19	1
Percent Solids	91.1		0.1	0.1	%			07/03/18 15:19	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.7		0.1	0.1	SU			07/25/18 11:17	1
Specific Conductance	1100		1.0	1.0	umhos/cm			07/25/18 11:17	1
Oxidation Reduction Potential	210		10	10	millivolts			07/25/18 11:17	1

**Client Sample ID: BA-01 T02**

**Date Collected: 06/20/18 07:50**

**Date Received: 06/23/18 09:30**

**Lab Sample ID: 180-79212-3**

**Matrix: Solid**

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.35		0.10	0.026	mg/L			08/01/18 08:53	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.9		1.0	0.32	ug/L		07/26/18 13:23	07/27/18 15:47	1
Barium	140	B	10	0.37	ug/L		07/26/18 13:23	07/27/18 15:47	1
Beryllium	ND		1.0	0.057	ug/L		07/26/18 13:23	07/27/18 15:47	1
Cadmium	ND		1.0	0.13	ug/L		07/26/18 13:23	07/27/18 15:47	1
Chromium	2.4	B	2.0	0.63	ug/L		07/26/18 13:23	07/27/18 15:47	1
Cobalt	0.14	J	0.50	0.075	ug/L		07/26/18 13:23	07/27/18 15:47	1
Molybdenum	26		5.0	0.47	ug/L		07/26/18 13:23	07/27/18 15:47	1
Lead	ND		1.0	0.094	ug/L		07/26/18 13:23	07/27/18 15:47	1
Antimony	ND		2.0	1.1	ug/L		07/26/18 13:23	07/27/18 15:47	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Client Sample ID: BA-01 T02

Date Collected: 06/20/18 07:50

Date Received: 06/23/18 09:30

## Lab Sample ID: 180-79212-3

Matrix: Solid

### Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Selenium	9.2		5.0	0.81	ug/L		07/26/18 13:23	07/27/18 15:47	1
Thallium	0.66	J	1.0	0.063	ug/L		07/26/18 13:23	07/27/18 15:47	1
Lithium	17		5.0	2.6	ug/L		07/26/18 13:23	07/27/18 15:47	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 11:05	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.7		0.1	0.1	SU			07/25/18 18:29	1
Specific Conductance	1100		1.0	1.0	umhos/cm			07/25/18 18:29	1
Oxidation Reduction Potential	210		10	10	millivolts			07/25/18 18:39	1

## Client Sample ID: BA-01 T03

Date Collected: 06/20/18 07:50

Date Received: 06/23/18 09:30

## Lab Sample ID: 180-79212-4

Matrix: Solid

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.61		0.10	0.026	mg/L			07/26/18 12:12	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.6		1.0	0.32	ug/L		07/26/18 13:23	07/27/18 15:50	1
Barium	140	B	10	0.37	ug/L		07/26/18 13:23	07/27/18 15:50	1
Beryllium	ND		1.0	0.057	ug/L		07/26/18 13:23	07/27/18 15:50	1
Cadmium	ND		1.0	0.13	ug/L		07/26/18 13:23	07/27/18 15:50	1
Chromium	1.8	J B	2.0	0.63	ug/L		07/26/18 13:23	07/27/18 15:50	1
Cobalt	0.13	J	0.50	0.075	ug/L		07/26/18 13:23	07/27/18 15:50	1
Molybdenum	25		5.0	0.47	ug/L		07/26/18 13:23	07/27/18 15:50	1
Lead	ND		1.0	0.094	ug/L		07/26/18 13:23	07/27/18 15:50	1
Antimony	ND		2.0	1.1	ug/L		07/26/18 13:23	07/27/18 15:50	1
Selenium	8.1		5.0	0.81	ug/L		07/26/18 13:23	07/27/18 15:50	1
Thallium	0.80	J	1.0	0.063	ug/L		07/26/18 13:23	07/27/18 15:50	1
Lithium	23		5.0	2.6	ug/L		07/26/18 13:23	07/27/18 15:50	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 11:03	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.8		0.1	0.1	SU			07/26/18 07:30	1
Specific Conductance	1100		1.0	1.0	umhos/cm			07/26/18 07:30	1
Oxidation Reduction Potential	190		10	10	millivolts			07/26/18 07:30	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: BA-01 T04**

**Lab Sample ID: 180-79212-5**

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.41		0.10	0.026	mg/L			07/31/18 10:16	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.7		1.0	0.32	ug/L		08/01/18 12:05	08/03/18 20:20	1
Barium	110		10	0.37	ug/L		08/01/18 12:05	08/03/18 20:20	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:05	08/03/18 20:20	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:05	08/03/18 20:20	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:05	08/03/18 20:20	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:05	08/03/18 20:20	1
Molybdenum	23		5.0	0.47	ug/L		08/01/18 12:05	08/03/18 20:20	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:05	08/03/18 20:20	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:05	08/03/18 20:20	1
Selenium	5.4		5.0	0.81	ug/L		08/01/18 12:05	08/03/18 20:20	1
Thallium	0.73 J		1.0	0.063	ug/L		08/01/18 12:05	08/03/18 20:20	1
Lithium	23		5.0	2.6	ug/L		08/01/18 12:05	08/03/18 20:20	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 11:01	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.8		0.1	0.1	SU			07/27/18 07:40	1
Specific Conductance	1100		1.0	1.0	umhos/cm			07/27/18 07:40	1
Oxidation Reduction Potential	150		10	10	millivolts			07/27/18 07:40	1

**Client Sample ID: BA-01 T05**

**Lab Sample ID: 180-79212-6**

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.40		0.10	0.026	mg/L			07/31/18 10:32	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.4		1.0	0.32	ug/L		08/01/18 12:05	08/03/18 20:25	1
Barium	120		10	0.37	ug/L		08/01/18 12:05	08/03/18 20:25	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:05	08/03/18 20:25	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:05	08/03/18 20:25	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:05	08/03/18 20:25	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:05	08/03/18 20:25	1
Molybdenum	24		5.0	0.47	ug/L		08/01/18 12:05	08/03/18 20:25	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:05	08/03/18 20:25	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:05	08/03/18 20:25	1
Selenium	4.6 J		5.0	0.81	ug/L		08/01/18 12:05	08/03/18 20:25	1
Thallium	0.76 J		1.0	0.063	ug/L		08/01/18 12:05	08/03/18 20:25	1
Lithium	28		5.0	2.6	ug/L		08/01/18 12:05	08/03/18 20:25	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Client Sample ID: BA-01 T05

Date Collected: 06/20/18 07:50

Date Received: 06/23/18 09:30

## Lab Sample ID: 180-79212-6

Matrix: Solid

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:59	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.8		0.1	0.1	SU			07/27/18 07:40	1
Specific Conductance	1100		1.0	1.0	umhos/cm			07/27/18 07:40	1
Oxidation Reduction Potential	150		10	10	millivolts			07/27/18 07:40	1

## Client Sample ID: BA-01 T06

Date Collected: 06/20/18 07:50

Date Received: 06/23/18 09:30

## Lab Sample ID: 180-79212-7

Matrix: Solid

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.42		0.10	0.026	mg/L			07/31/18 10:48	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.8		1.0	0.32	ug/L		08/01/18 12:05	08/03/18 20:30	1
Barium	95		10	0.37	ug/L		08/01/18 12:05	08/03/18 20:30	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:05	08/03/18 20:30	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:05	08/03/18 20:30	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:05	08/03/18 20:30	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:05	08/03/18 20:30	1
Molybdenum	24		5.0	0.47	ug/L		08/01/18 12:05	08/03/18 20:30	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:05	08/03/18 20:30	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:05	08/03/18 20:30	1
Selenium	3.0	J	5.0	0.81	ug/L		08/01/18 12:05	08/03/18 20:30	1
Thallium	0.93	J	1.0	0.063	ug/L		08/01/18 12:05	08/03/18 20:30	1
Lithium	28		5.0	2.6	ug/L		08/01/18 12:05	08/03/18 20:30	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:57	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.8		0.1	0.1	SU			07/29/18 18:29	1
Specific Conductance	1100		1.0	1.0	umhos/cm			07/29/18 18:29	1
Oxidation Reduction Potential	560		10	10	millivolts			07/29/18 18:29	1

## Client Sample ID: BA-01 T07

Date Collected: 06/20/18 07:50

Date Received: 06/23/18 09:30

## Lab Sample ID: 180-79212-8

Matrix: Solid

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.44		0.10	0.026	mg/L			07/31/18 11:04	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: BA-01 T07**

**Lab Sample ID: 180-79212-8**

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	13		1.0	0.32	ug/L		08/01/18 12:05	08/03/18 20:53	1
Barium	96		10	0.37	ug/L		08/01/18 12:05	08/03/18 20:53	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:05	08/03/18 20:53	1
Cadmium	0.13	J	1.0	0.13	ug/L		08/01/18 12:05	08/03/18 20:53	1
Chromium	0.71	J	2.0	0.63	ug/L		08/01/18 12:05	08/03/18 20:53	1
Cobalt	0.80		0.50	0.075	ug/L		08/01/18 12:05	08/03/18 20:53	1
Molybdenum	27		5.0	0.47	ug/L		08/01/18 12:05	08/03/18 20:53	1
Lead	0.16	J	1.0	0.094	ug/L		08/01/18 12:05	08/03/18 20:53	1
Antimony	2.6		2.0	1.1	ug/L		08/01/18 12:05	08/03/18 20:53	1
Selenium	2.0	J	5.0	0.81	ug/L		08/01/18 12:05	08/03/18 20:53	1
Thallium	0.68	J	1.0	0.063	ug/L		08/01/18 12:05	08/03/18 20:53	1
Lithium	29		5.0	2.6	ug/L		08/01/18 12:05	08/03/18 20:53	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 11:07	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.7		0.1	0.1	SU			07/30/18 07:30	1
Specific Conductance	1100		1.0	1.0	umhos/cm			07/30/18 07:30	1
Oxidation Reduction Potential	120		10	10	millivolts			07/30/18 07:30	1

**Client Sample ID: BA-01 T08**

**Lab Sample ID: 180-79212-9**

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

**Method: EPA 9056A - Anions, Ion Chromatography - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.51		0.10	0.026	mg/L			08/06/18 06:57	1

**Method: EPA 6020A - Metals (ICP/MS) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	4.5	B	1.0	0.32	ug/L		08/06/18 12:27	08/08/18 13:26	1
Barium	120		10	0.37	ug/L		08/06/18 12:27	08/08/18 13:26	1
Beryllium	ND		1.0	0.057	ug/L		08/06/18 12:27	08/08/18 13:26	1
Cadmium	ND		1.0	0.13	ug/L		08/06/18 12:27	08/08/18 13:26	1
Chromium	1.1	J B	2.0	0.63	ug/L		08/06/18 12:27	08/08/18 13:26	1
Cobalt	2.1		0.50	0.075	ug/L		08/06/18 12:27	08/08/18 13:26	1
Molybdenum	29		5.0	0.47	ug/L		08/06/18 12:27	08/08/18 13:26	1
Lead	ND		1.0	0.094	ug/L		08/06/18 12:27	08/08/18 13:26	1
Antimony	ND		2.0	1.1	ug/L		08/06/18 12:27	08/08/18 13:26	1
Selenium	ND		5.0	0.81	ug/L		08/06/18 12:27	08/08/18 13:26	1
Thallium	0.12	J	1.0	0.063	ug/L		08/06/18 12:27	08/08/18 13:26	1
Lithium	29		5.0	2.6	ug/L		08/06/18 12:27	08/08/18 13:26	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/06/18 08:22	08/06/18 16:25	1

TestAmerica Pittsburgh



# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Client Sample ID: BA-01 T08

## Lab Sample ID: 180-79212-9

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.7		0.1	0.1	SU			08/04/18 09:00	1
Specific Conductance	1100		1.0	1.0	umhos/cm			08/04/18 09:00	1
Oxidation Reduction Potential	120		10	10	millivolts			08/04/18 09:00	1

## Client Sample ID: BA-01 T09

## Lab Sample ID: 180-79212-10

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.23		0.10	0.026	mg/L			08/06/18 07:13	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	11	B	1.0	0.32	ug/L		08/06/18 12:27	08/08/18 13:40	1
Barium	120		10	0.37	ug/L		08/06/18 12:27	08/08/18 13:40	1
Beryllium	ND		1.0	0.057	ug/L		08/06/18 12:27	08/08/18 13:40	1
Cadmium	ND		1.0	0.13	ug/L		08/06/18 12:27	08/08/18 13:40	1
Chromium	1.3	J B	2.0	0.63	ug/L		08/06/18 12:27	08/08/18 13:40	1
Cobalt	0.56		0.50	0.075	ug/L		08/06/18 12:27	08/08/18 13:40	1
Molybdenum	29		5.0	0.47	ug/L		08/06/18 12:27	08/08/18 13:40	1
Lead	ND		1.0	0.094	ug/L		08/06/18 12:27	08/08/18 13:40	1
Antimony	ND		2.0	1.1	ug/L		08/06/18 12:27	08/08/18 13:40	1
Selenium	1.1	J	5.0	0.81	ug/L		08/06/18 12:27	08/08/18 13:40	1
Thallium	ND		1.0	0.063	ug/L		08/06/18 12:27	08/08/18 13:40	1
Lithium	28		5.0	2.6	ug/L		08/06/18 12:27	08/08/18 13:40	1

### Method: EPA 7470A - Mercury (CVAA) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/06/18 08:22	08/06/18 16:30	1

### General Chemistry - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.4		0.1	0.1	SU			08/04/18 09:00	1
Specific Conductance	1100		1.0	1.0	umhos/cm			08/04/18 09:00	1
Oxidation Reduction Potential	88		10	10	millivolts			08/04/18 09:00	1

## Client Sample ID: B01

## Lab Sample ID: 180-79212-11

Date Collected: 06/20/18 07:50

Matrix: Solid

Date Received: 06/23/18 09:30

### Method: EPA 9056A - Anions, Ion Chromatography - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	0.57		0.10	0.026	mg/L			07/26/18 11:56	1

### Method: EPA 6020A - Metals (ICP/MS) - Leach

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	4.4		1.0	0.32	ug/L		07/26/18 13:23	07/27/18 15:41	1
Barium	95	B	10	0.37	ug/L		07/26/18 13:23	07/27/18 15:41	1
Beryllium	ND		1.0	0.057	ug/L		07/26/18 13:23	07/27/18 15:41	1
Cadmium	0.30	J	1.0	0.13	ug/L		07/26/18 13:23	07/27/18 15:41	1

TestAmerica Pittsburgh

# Client Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

**Client Sample ID: B01**

**Lab Sample ID: 180-79212-11**

**Date Collected: 06/20/18 07:50**

**Matrix: Solid**

**Date Received: 06/23/18 09:30**

**Method: EPA 6020A - Metals (ICP/MS) - Leach (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	2.6	B	2.0	0.63	ug/L	-	07/26/18 13:23	07/27/18 15:41	1
Cobalt	0.44	J	0.50	0.075	ug/L	-	07/26/18 13:23	07/27/18 15:41	1
Molybdenum	25		5.0	0.47	ug/L	-	07/26/18 13:23	07/27/18 15:41	1
Lead	ND		1.0	0.094	ug/L	-	07/26/18 13:23	07/27/18 15:41	1
Antimony	ND		2.0	1.1	ug/L	-	07/26/18 13:23	07/27/18 15:41	1
Selenium	2.0	J	5.0	0.81	ug/L	-	07/26/18 13:23	07/27/18 15:41	1
Thallium	0.32	J	1.0	0.063	ug/L	-	07/26/18 13:23	07/27/18 15:41	1
Lithium	31		5.0	2.6	ug/L	-	07/26/18 13:23	07/27/18 15:41	1

**Method: EPA 7470A - Mercury (CVAA) - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L	-	07/31/18 08:04	08/01/18 10:33	1

**General Chemistry - Leach**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.1		0.1	0.1	SU	-		07/25/18 11:17	1
Specific Conductance	1100		1.0	1.0	umhos/cm	-		07/25/18 11:17	1
Oxidation Reduction Potential	180		10	10	millivolts	-		07/25/18 11:17	1

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: EPA 9056A - Anions, Ion Chromatography

**Lab Sample ID: MB 180-251669/6**  
**Matrix: Solid**  
**Analysis Batch: 251669**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			07/26/18 10:39	1

**Lab Sample ID: LCS 180-251669/5**  
**Matrix: Solid**  
**Analysis Batch: 251669**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.17		mg/L		94	80 - 120

**Lab Sample ID: MB 180-252206/6**  
**Matrix: Solid**  
**Analysis Batch: 252206**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			07/31/18 09:24	1

**Lab Sample ID: LCS 180-252206/5**  
**Matrix: Solid**  
**Analysis Batch: 252206**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.14		mg/L		91	80 - 120

**Lab Sample ID: MB 180-252367/6**  
**Matrix: Solid**  
**Analysis Batch: 252367**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/01/18 07:50	1

**Lab Sample ID: LCS 180-252367/5**  
**Matrix: Solid**  
**Analysis Batch: 252367**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.26		mg/L		101	80 - 120

**Lab Sample ID: MB 180-252855/6**  
**Matrix: Solid**  
**Analysis Batch: 252855**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoride	ND		0.10	0.026	mg/L			08/06/18 05:21	1

**Lab Sample ID: LCS 180-252855/5**  
**Matrix: Solid**  
**Analysis Batch: 252855**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Fluoride	1.25	1.09		mg/L		87	80 - 120

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: EPA 6020A - Metals (ICP/MS)

**Lab Sample ID: MB 180-251776/1-A**  
**Matrix: Solid**  
**Analysis Batch: 251997**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 251776**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		07/26/18 13:23	07/27/18 15:33	1
Barium	0.406	J	10	0.37	ug/L		07/26/18 13:23	07/27/18 15:33	1
Beryllium	ND		1.0	0.057	ug/L		07/26/18 13:23	07/27/18 15:33	1
Cadmium	ND		1.0	0.13	ug/L		07/26/18 13:23	07/27/18 15:33	1
Chromium	0.946	J	2.0	0.63	ug/L		07/26/18 13:23	07/27/18 15:33	1
Cobalt	ND		0.50	0.075	ug/L		07/26/18 13:23	07/27/18 15:33	1
Molybdenum	ND		5.0	0.47	ug/L		07/26/18 13:23	07/27/18 15:33	1
Lead	ND		1.0	0.094	ug/L		07/26/18 13:23	07/27/18 15:33	1
Antimony	ND		2.0	1.1	ug/L		07/26/18 13:23	07/27/18 15:33	1
Selenium	ND		5.0	0.81	ug/L		07/26/18 13:23	07/27/18 15:33	1
Thallium	ND		1.0	0.063	ug/L		07/26/18 13:23	07/27/18 15:33	1
Lithium	ND		5.0	2.6	ug/L		07/26/18 13:23	07/27/18 15:33	1

**Lab Sample ID: LCS 180-251776/2-A**  
**Matrix: Solid**  
**Analysis Batch: 251997**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 251776**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	40.0	38.4		ug/L		96	80 - 120
Barium	2000	2150		ug/L		107	80 - 120
Beryllium	50.0	43.4		ug/L		87	80 - 120
Cadmium	50.0	56.5		ug/L		113	80 - 120
Chromium	200	235		ug/L		117	80 - 120
Cobalt	500	464		ug/L		93	80 - 120
Molybdenum	1000	999		ug/L		100	80 - 120
Lead	20.0	21.4		ug/L		107	80 - 120
Antimony	500	532		ug/L		106	80 - 120
Selenium	10.0	11.1		ug/L		111	80 - 120
Thallium	50.0	51.9		ug/L		104	80 - 120
Lithium	50.0	52.5		ug/L		105	80 - 120

**Lab Sample ID: LCSD 180-251776/3-A**  
**Matrix: Solid**  
**Analysis Batch: 251997**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 251776**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	40.0	38.3		ug/L		96	80 - 120	0	20
Barium	2000	2170		ug/L		108	80 - 120	1	20
Beryllium	50.0	43.6		ug/L		87	80 - 120	0	20
Cadmium	50.0	57.5		ug/L		115	80 - 120	2	20
Chromium	200	236		ug/L		118	80 - 120	0	20
Cobalt	500	473		ug/L		95	80 - 120	2	20
Molybdenum	1000	1010		ug/L		101	80 - 120	1	20
Lead	20.0	21.2		ug/L		106	80 - 120	1	20
Antimony	500	542		ug/L		108	80 - 120	2	20
Selenium	10.0	11.0		ug/L		110	80 - 120	1	20
Thallium	50.0	51.7		ug/L		103	80 - 120	0	20
Lithium	50.0	53.2		ug/L		106	80 - 120	1	20

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: MB 180-252467/1-A**  
**Matrix: Solid**  
**Analysis Batch: 252834**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 252467**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		1.0	0.32	ug/L		08/01/18 12:05	08/03/18 20:11	1
Barium	ND		10	0.37	ug/L		08/01/18 12:05	08/03/18 20:11	1
Beryllium	ND		1.0	0.057	ug/L		08/01/18 12:05	08/03/18 20:11	1
Cadmium	ND		1.0	0.13	ug/L		08/01/18 12:05	08/03/18 20:11	1
Chromium	ND		2.0	0.63	ug/L		08/01/18 12:05	08/03/18 20:11	1
Cobalt	ND		0.50	0.075	ug/L		08/01/18 12:05	08/03/18 20:11	1
Molybdenum	ND		5.0	0.47	ug/L		08/01/18 12:05	08/03/18 20:11	1
Lead	ND		1.0	0.094	ug/L		08/01/18 12:05	08/03/18 20:11	1
Antimony	ND		2.0	1.1	ug/L		08/01/18 12:05	08/03/18 20:11	1
Selenium	ND		5.0	0.81	ug/L		08/01/18 12:05	08/03/18 20:11	1
Thallium	ND		1.0	0.063	ug/L		08/01/18 12:05	08/03/18 20:11	1
Lithium	ND		5.0	2.6	ug/L		08/01/18 12:05	08/03/18 20:11	1

**Lab Sample ID: LCS 180-252467/2-A**  
**Matrix: Solid**  
**Analysis Batch: 252834**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 252467**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	40.0	35.6		ug/L		89	80 - 120
Barium	2000	1780		ug/L		89	80 - 120
Beryllium	50.0	51.4		ug/L		103	80 - 120
Cadmium	50.0	47.8		ug/L		96	80 - 120
Chromium	200	197		ug/L		98	80 - 120
Cobalt	500	425		ug/L		85	80 - 120
Molybdenum	1000	943		ug/L		94	80 - 120
Lead	20.0	18.8		ug/L		94	80 - 120
Antimony	500	470		ug/L		94	80 - 120
Selenium	10.0	8.67		ug/L		87	80 - 120
Thallium	50.0	46.3		ug/L		93	80 - 120
Lithium	50.0	47.4		ug/L		95	80 - 120

**Lab Sample ID: MB 180-252923/1-A**  
**Matrix: Solid**  
**Analysis Batch: 253224**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 252923**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.364	J	1.0	0.32	ug/L		08/06/18 12:27	08/08/18 13:05	1
Barium	ND		10	0.37	ug/L		08/06/18 12:27	08/08/18 13:05	1
Beryllium	ND		1.0	0.057	ug/L		08/06/18 12:27	08/08/18 13:05	1
Cadmium	ND		1.0	0.13	ug/L		08/06/18 12:27	08/08/18 13:05	1
Chromium	0.991	J	2.0	0.63	ug/L		08/06/18 12:27	08/08/18 13:05	1
Cobalt	ND		0.50	0.075	ug/L		08/06/18 12:27	08/08/18 13:05	1
Molybdenum	ND		5.0	0.47	ug/L		08/06/18 12:27	08/08/18 13:05	1
Lead	ND		1.0	0.094	ug/L		08/06/18 12:27	08/08/18 13:05	1
Antimony	ND		2.0	1.1	ug/L		08/06/18 12:27	08/08/18 13:05	1
Selenium	ND		5.0	0.81	ug/L		08/06/18 12:27	08/08/18 13:05	1
Thallium	ND		1.0	0.063	ug/L		08/06/18 12:27	08/08/18 13:05	1
Lithium	ND		5.0	2.6	ug/L		08/06/18 12:27	08/08/18 13:05	1

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: LCS 180-252923/2-A**  
**Matrix: Solid**  
**Analysis Batch: 253224**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 252923**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	40.0	45.0		ug/L		113	80 - 120
Barium	2000	2100		ug/L		105	80 - 120
Beryllium	50.0	46.9		ug/L		94	80 - 120
Cadmium	50.0	53.3		ug/L		107	80 - 120
Chromium	200	222		ug/L		111	80 - 120
Cobalt	500	478		ug/L		96	80 - 120
Molybdenum	1000	1000		ug/L		100	80 - 120
Lead	20.0	20.9		ug/L		104	80 - 120
Antimony	500	520		ug/L		104	80 - 120
Selenium	10.0	10.5		ug/L		105	80 - 120
Thallium	50.0	54.1		ug/L		108	80 - 120
Lithium	50.0	45.6		ug/L		91	80 - 120

**Lab Sample ID: 180-79212-7 MS**  
**Matrix: Solid**  
**Analysis Batch: 252834**

**Client Sample ID: BA-01 T06**  
**Prep Type: Leach**  
**Prep Batch: 252467**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	6.8		40.0	45.6		ug/L		97	75 - 125
Barium	95		2000	1980		ug/L		94	75 - 125
Beryllium	ND		50.0	54.6		ug/L		109	75 - 125
Cadmium	ND		50.0	52.8		ug/L		106	75 - 125
Chromium	ND		200	184		ug/L		92	75 - 125
Cobalt	ND		500	470		ug/L		94	75 - 125
Molybdenum	24		1000	1060		ug/L		103	75 - 125
Lead	ND		20.0	20.2		ug/L		101	75 - 125
Antimony	ND		500	517		ug/L		103	75 - 125
Selenium	3.0	J	10.0	11.4		ug/L		84	75 - 125
Thallium	0.93	J	50.0	51.2		ug/L		101	75 - 125
Lithium	28		50.0	77.7		ug/L		99	75 - 125

**Lab Sample ID: 180-79212-7 MSD**  
**Matrix: Solid**  
**Analysis Batch: 252834**

**Client Sample ID: BA-01 T06**  
**Prep Type: Leach**  
**Prep Batch: 252467**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	6.8		40.0	43.1		ug/L		91	75 - 125	6	20
Barium	95		2000	1900		ug/L		90	75 - 125	4	20
Beryllium	ND		50.0	53.2		ug/L		106	75 - 125	3	20
Cadmium	ND		50.0	50.4		ug/L		101	75 - 125	5	20
Chromium	ND		200	174		ug/L		87	75 - 125	5	20
Cobalt	ND		500	447		ug/L		89	75 - 125	5	20
Molybdenum	24		1000	1020		ug/L		100	75 - 125	3	20
Lead	ND		20.0	19.3		ug/L		97	75 - 125	5	20
Antimony	ND		500	495		ug/L		99	75 - 125	4	20
Selenium	3.0	J	10.0	10.9		ug/L		79	75 - 125	4	20
Thallium	0.93	J	50.0	49.2		ug/L		97	75 - 125	4	20
Lithium	28		50.0	74.9		ug/L		93	75 - 125	4	20

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# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: EPA 6020A - Metals (ICP/MS) (Continued)

**Lab Sample ID: 180-79212-9 MS**

**Matrix: Solid**

**Analysis Batch: 253224**

**Client Sample ID: BA-01 T08**

**Prep Type: Leach**

**Prep Batch: 252923**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS		Unit	D	%Rec	Limits	%Rec.
				Result	Qualifier					
Arsenic	4.5	B	40.0	50.5		ug/L		115	75 - 125	
Barium	120		2000	2240		ug/L		106	75 - 125	
Beryllium	ND		50.0	46.8		ug/L		94	75 - 125	
Cadmium	ND		50.0	53.4		ug/L		107	75 - 125	
Chromium	1.1	J B	200	223		ug/L		111	75 - 125	
Cobalt	2.1		500	477		ug/L		95	75 - 125	
Molybdenum	29		1000	1090		ug/L		106	75 - 125	
Lead	ND		20.0	21.1		ug/L		106	75 - 125	
Antimony	ND		500	533		ug/L		107	75 - 125	
Selenium	ND		10.0	11.8		ug/L		118	75 - 125	
Thallium	0.12	J	50.0	54.7		ug/L		109	75 - 125	
Lithium	29		50.0	75.9		ug/L		93	75 - 125	

**Lab Sample ID: 180-79212-9 MSD**

**Matrix: Solid**

**Analysis Batch: 253224**

**Client Sample ID: BA-01 T08**

**Prep Type: Leach**

**Prep Batch: 252923**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD		Unit	D	%Rec	Limits	RPD	Limit
				Result	Qualifier						
Arsenic	4.5	B	40.0	50.5		ug/L		115	75 - 125	0	20
Barium	120		2000	2240		ug/L		106	75 - 125	0	20
Beryllium	ND		50.0	45.6		ug/L		91	75 - 125	3	20
Cadmium	ND		50.0	53.2		ug/L		106	75 - 125	0	20
Chromium	1.1	J B	200	223		ug/L		111	75 - 125	0	20
Cobalt	2.1		500	483		ug/L		96	75 - 125	1	20
Molybdenum	29		1000	1070		ug/L		104	75 - 125	2	20
Lead	ND		20.0	21.0		ug/L		105	75 - 125	1	20
Antimony	ND		500	533		ug/L		107	75 - 125	0	20
Selenium	ND		10.0	11.1		ug/L		111	75 - 125	6	20
Thallium	0.12	J	50.0	53.8		ug/L		107	75 - 125	2	20
Lithium	29		50.0	76.3		ug/L		94	75 - 125	1	20

## Method: EPA 7470A - Mercury (CVAA)

**Lab Sample ID: MB 180-252236/1-A**

**Matrix: Solid**

**Analysis Batch: 252481**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

**Prep Batch: 252236**

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 10:25	1

**Lab Sample ID: LCS 180-252236/2-A**

**Matrix: Solid**

**Analysis Batch: 252481**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 252236**

Analyte	Spike Added	LCS		Unit	D	%Rec	Limits
		Result	Qualifier				
Mercury	2.50	2.44		ug/L		98	80 - 120

TestAmerica Pittsburgh



# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: EPA 7470A - Mercury (CVAA) (Continued)

**Lab Sample ID: MB 180-252872/1-A**  
**Matrix: Solid**  
**Analysis Batch: 252650**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 252872**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		08/06/18 08:22	08/06/18 16:13	1

**Lab Sample ID: LCS 180-252872/2-A**  
**Matrix: Solid**  
**Analysis Batch: 252650**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 252872**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	2.50	2.62		ug/L		105	80 - 120

**Lab Sample ID: LB 180-251753/6-C**  
**Matrix: Solid**  
**Analysis Batch: 252481**

**Client Sample ID: Method Blank**  
**Prep Type: Leach**  
**Prep Batch: 252236**

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.20	0.065	ug/L		07/31/18 08:04	08/01/18 11:22	1

**Lab Sample ID: 180-79212-9 MS**  
**Matrix: Solid**  
**Analysis Batch: 252650**

**Client Sample ID: BA-01 T08**  
**Prep Type: Leach**  
**Prep Batch: 252872**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		1.00	1.07		ug/L		107	75 - 125

**Lab Sample ID: 180-79212-9 MSD**  
**Matrix: Solid**  
**Analysis Batch: 252650**

**Client Sample ID: BA-01 T08**  
**Prep Type: Leach**  
**Prep Batch: 252872**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		1.00	1.06		ug/L		106	75 - 125	1	20

## Method: 2540G - SM 2540G

**Lab Sample ID: 180-79212-1 DU**  
**Matrix: Solid**  
**Analysis Batch: 249576**

**Client Sample ID: BA-01 T01**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	8.9		9.1		%		3	20
Percent Solids	91.1		90.9		%		0.3	20

## Method: EPA 9040C - pH

**Lab Sample ID: LCS 180-252017/1**  
**Matrix: Solid**  
**Analysis Batch: 252017**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: EPA 9040C - pH (Continued)

**Lab Sample ID: LCS 180-252019/1**  
**Matrix: Solid**  
**Analysis Batch: 252019**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

**Lab Sample ID: LCS 180-252030/1**  
**Matrix: Solid**  
**Analysis Batch: 252030**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

**Lab Sample ID: LCS 180-252060/1**  
**Matrix: Solid**  
**Analysis Batch: 252060**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

**Lab Sample ID: LCS 180-252179/1**  
**Matrix: Solid**  
**Analysis Batch: 252179**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

**Lab Sample ID: LCS 180-252812/1**  
**Matrix: Solid**  
**Analysis Batch: 252812**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
pH	7.00	7.0		SU		100	99 - 101

## Method: SM 2510B - Conductivity, Specific Conductance

**Lab Sample ID: MB 180-252022/2**  
**Matrix: Solid**  
**Analysis Batch: 252022**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			07/26/18 07:30	1

**Lab Sample ID: LCS 180-252022/1**  
**Matrix: Solid**  
**Analysis Batch: 252022**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	85.0		umhos/cm		101	90 - 110

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: SM 2510B - Conductivity, Specific Conductance (Continued)

**Lab Sample ID: MB 180-252032/2**  
**Matrix: Solid**  
**Analysis Batch: 252032**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			07/27/18 07:40	1

**Lab Sample ID: LCS 180-252032/1**  
**Matrix: Solid**  
**Analysis Batch: 252032**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	85.9		umhos/cm		102	90 - 110

**Lab Sample ID: MB 180-252062/2**  
**Matrix: Solid**  
**Analysis Batch: 252062**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			07/29/18 18:29	1

**Lab Sample ID: LCS 180-252062/1**  
**Matrix: Solid**  
**Analysis Batch: 252062**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	85.8		umhos/cm		102	90 - 110

**Lab Sample ID: MB 180-252184/2**  
**Matrix: Solid**  
**Analysis Batch: 252184**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			07/30/18 07:30	1

**Lab Sample ID: LCS 180-252184/1**  
**Matrix: Solid**  
**Analysis Batch: 252184**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	85.8		umhos/cm		102	90 - 110

**Lab Sample ID: MB 180-252814/2**  
**Matrix: Solid**  
**Analysis Batch: 252814**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			08/04/18 09:00	1

**Lab Sample ID: LCS 180-252814/1**  
**Matrix: Solid**  
**Analysis Batch: 252814**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	84.0	84.6		umhos/cm		101	90 - 110

TestAmerica Pittsburgh

# QC Sample Results

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Method: SM 2580B - Reduction-Oxidation (REDOX) Potential

**Lab Sample ID: LCS 180-252018/1**  
**Matrix: Solid**  
**Analysis Batch: 252018**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	476		millivolts		100	90 - 110

**Lab Sample ID: LCS 180-252020/1**  
**Matrix: Solid**  
**Analysis Batch: 252020**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	477		millivolts		100	90 - 110

**Lab Sample ID: LCS 180-252031/1**  
**Matrix: Solid**  
**Analysis Batch: 252031**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	477		millivolts		100	90 - 110

**Lab Sample ID: LCS 180-252061/1**  
**Matrix: Solid**  
**Analysis Batch: 252061**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	477		millivolts		100	90 - 110

**Lab Sample ID: LCS 180-252183/1**  
**Matrix: Solid**  
**Analysis Batch: 252183**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	478		millivolts		101	90 - 110

**Lab Sample ID: LCS 180-252813/1**  
**Matrix: Solid**  
**Analysis Batch: 252813**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Oxidation Reduction Potential	475	477		millivolts		100	90 - 110

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## HPLC/IC

### Leach Batch: 251382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	1314	
180-79212-11	B01	Leach	Solid	1314	

### Leach Batch: 251636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-3	BA-01 T02	Leach	Solid	1314	

### Leach Batch: 251647

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-4	BA-01 T03	Leach	Solid	1314	

### Analysis Batch: 251669

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	EPA 9056A	251382
180-79212-4	BA-01 T03	Leach	Solid	EPA 9056A	251647
180-79212-11	B01	Leach	Solid	EPA 9056A	251382
MB 180-251669/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-251669/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

### Leach Batch: 251718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	1314	

### Leach Batch: 251788

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-6	BA-01 T05	Leach	Solid	1314	

### Leach Batch: 251896

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-7	BA-01 T06	Leach	Solid	1314	

### Leach Batch: 251971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-8	BA-01 T07	Leach	Solid	1314	

### Leach Batch: 252094

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	1314	

### Analysis Batch: 252206

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	EPA 9056A	251718
180-79212-6	BA-01 T05	Leach	Solid	EPA 9056A	251788
180-79212-7	BA-01 T06	Leach	Solid	EPA 9056A	251896
180-79212-8	BA-01 T07	Leach	Solid	EPA 9056A	251971
MB 180-252206/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-252206/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

### Analysis Batch: 252367

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-3	BA-01 T02	Leach	Solid	EPA 9056A	251636

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## HPLC/IC (Continued)

### Analysis Batch: 252367 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 180-252367/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-252367/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

### Leach Batch: 252485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-10	BA-01 T09	Leach	Solid	1314	

### Analysis Batch: 252855

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	EPA 9056A	252094
180-79212-10	BA-01 T09	Leach	Solid	EPA 9056A	252485
MB 180-252855/6	Method Blank	Total/NA	Solid	EPA 9056A	
LCS 180-252855/5	Lab Control Sample	Total/NA	Solid	EPA 9056A	

## Metals

### Leach Batch: 251382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	1314	
180-79212-11	B01	Leach	Solid	1314	

### Leach Batch: 251636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-3	BA-01 T02	Leach	Solid	1314	

### Leach Batch: 251647

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-4	BA-01 T03	Leach	Solid	1314	

### Leach Batch: 251718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	1314	

### Leach Batch: 251753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 180-251753/6-C	Method Blank	Leach	Solid	1311	

### Prep Batch: 251776

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	3010A	251382
180-79212-3	BA-01 T02	Leach	Solid	3010A	251636
180-79212-4	BA-01 T03	Leach	Solid	3010A	251647
180-79212-11	B01	Leach	Solid	3010A	251382
MB 180-251776/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-251776/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 180-251776/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	

### Leach Batch: 251788

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-6	BA-01 T05	Leach	Solid	1314	

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Metals (Continued)

### Leach Batch: 251896

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-7	BA-01 T06	Leach	Solid	1314	
180-79212-7 MS	BA-01 T06	Leach	Solid	1314	
180-79212-7 MSD	BA-01 T06	Leach	Solid	1314	

### Leach Batch: 251971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-8	BA-01 T07	Leach	Solid	1314	

### Analysis Batch: 251997

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	EPA 6020A	251776
180-79212-3	BA-01 T02	Leach	Solid	EPA 6020A	251776
180-79212-4	BA-01 T03	Leach	Solid	EPA 6020A	251776
180-79212-11	B01	Leach	Solid	EPA 6020A	251776
MB 180-251776/1-A	Method Blank	Total/NA	Solid	EPA 6020A	251776
LCS 180-251776/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	251776
LCSD 180-251776/3-A	Lab Control Sample Dup	Total/NA	Solid	EPA 6020A	251776

### Leach Batch: 252094

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	1314	
180-79212-9 MS	BA-01 T08	Leach	Solid	1314	
180-79212-9 MSD	BA-01 T08	Leach	Solid	1314	

### Prep Batch: 252236

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	7470A	251382
180-79212-3	BA-01 T02	Leach	Solid	7470A	251636
180-79212-4	BA-01 T03	Leach	Solid	7470A	251647
180-79212-5	BA-01 T04	Leach	Solid	7470A	251718
180-79212-6	BA-01 T05	Leach	Solid	7470A	251788
180-79212-7	BA-01 T06	Leach	Solid	7470A	251896
180-79212-8	BA-01 T07	Leach	Solid	7470A	251971
180-79212-11	B01	Leach	Solid	7470A	251382
LB 180-251753/6-C	Method Blank	Leach	Solid	7470A	251753
MB 180-252236/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 180-252236/2-A	Lab Control Sample	Total/NA	Solid	7470A	

### Prep Batch: 252467

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	3010A	251718
180-79212-6	BA-01 T05	Leach	Solid	3010A	251788
180-79212-7	BA-01 T06	Leach	Solid	3010A	251896
180-79212-8	BA-01 T07	Leach	Solid	3010A	251971
MB 180-252467/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-252467/2-A	Lab Control Sample	Total/NA	Solid	3010A	
180-79212-7 MS	BA-01 T06	Leach	Solid	3010A	251896
180-79212-7 MSD	BA-01 T06	Leach	Solid	3010A	251896

TestAmerica Pittsburgh



# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Metals (Continued)

### Analysis Batch: 252481

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	EPA 7470A	252236
180-79212-3	BA-01 T02	Leach	Solid	EPA 7470A	252236
180-79212-4	BA-01 T03	Leach	Solid	EPA 7470A	252236
180-79212-5	BA-01 T04	Leach	Solid	EPA 7470A	252236
180-79212-6	BA-01 T05	Leach	Solid	EPA 7470A	252236
180-79212-7	BA-01 T06	Leach	Solid	EPA 7470A	252236
180-79212-8	BA-01 T07	Leach	Solid	EPA 7470A	252236
180-79212-11	B01	Leach	Solid	EPA 7470A	252236
LB 180-251753/6-C	Method Blank	Leach	Solid	EPA 7470A	252236
MB 180-252236/1-A	Method Blank	Total/NA	Solid	EPA 7470A	252236
LCS 180-252236/2-A	Lab Control Sample	Total/NA	Solid	EPA 7470A	252236

### Leach Batch: 252485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-10	BA-01 T09	Leach	Solid	1314	

### Analysis Batch: 252650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	EPA 7470A	252872
180-79212-10	BA-01 T09	Leach	Solid	EPA 7470A	252872
MB 180-252872/1-A	Method Blank	Total/NA	Solid	EPA 7470A	252872
LCS 180-252872/2-A	Lab Control Sample	Total/NA	Solid	EPA 7470A	252872
180-79212-9 MS	BA-01 T08	Leach	Solid	EPA 7470A	252872
180-79212-9 MSD	BA-01 T08	Leach	Solid	EPA 7470A	252872

### Analysis Batch: 252834

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	EPA 6020A	252467
180-79212-6	BA-01 T05	Leach	Solid	EPA 6020A	252467
180-79212-7	BA-01 T06	Leach	Solid	EPA 6020A	252467
180-79212-8	BA-01 T07	Leach	Solid	EPA 6020A	252467
MB 180-252467/1-A	Method Blank	Total/NA	Solid	EPA 6020A	252467
LCS 180-252467/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	252467
180-79212-7 MS	BA-01 T06	Leach	Solid	EPA 6020A	252467
180-79212-7 MSD	BA-01 T06	Leach	Solid	EPA 6020A	252467

### Prep Batch: 252872

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	7470A	252094
180-79212-10	BA-01 T09	Leach	Solid	7470A	252485
MB 180-252872/1-A	Method Blank	Total/NA	Solid	7470A	
LCS 180-252872/2-A	Lab Control Sample	Total/NA	Solid	7470A	
180-79212-9 MS	BA-01 T08	Leach	Solid	7470A	252094
180-79212-9 MSD	BA-01 T08	Leach	Solid	7470A	252094

### Prep Batch: 252923

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	3010A	252094
180-79212-10	BA-01 T09	Leach	Solid	3010A	252485
MB 180-252923/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 180-252923/2-A	Lab Control Sample	Total/NA	Solid	3010A	

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## Metals (Continued)

### Prep Batch: 252923 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9 MS	BA-01 T08	Leach	Solid	3010A	252094
180-79212-9 MSD	BA-01 T08	Leach	Solid	3010A	252094

### Analysis Batch: 253224

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	EPA 6020A	252923
180-79212-10	BA-01 T09	Leach	Solid	EPA 6020A	252923
MB 180-252923/1-A	Method Blank	Total/NA	Solid	EPA 6020A	252923
LCS 180-252923/2-A	Lab Control Sample	Total/NA	Solid	EPA 6020A	252923
180-79212-9 MS	BA-01 T08	Leach	Solid	EPA 6020A	252923
180-79212-9 MSD	BA-01 T08	Leach	Solid	EPA 6020A	252923

## General Chemistry

### Analysis Batch: 249576

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Total/NA	Solid	2540G	
180-79212-1 DU	BA-01 T01	Total/NA	Solid	2540G	

### Leach Batch: 251382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	1314	
180-79212-11	B01	Leach	Solid	1314	

### Leach Batch: 251636

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-3	BA-01 T02	Leach	Solid	1314	

### Analysis Batch: 251644

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	SM 2510B	251382
180-79212-3	BA-01 T02	Leach	Solid	SM 2510B	251636
180-79212-11	B01	Leach	Solid	SM 2510B	251382

### Leach Batch: 251647

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-4	BA-01 T03	Leach	Solid	1314	

### Leach Batch: 251718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	1314	

### Leach Batch: 251788

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-6	BA-01 T05	Leach	Solid	1314	

### Leach Batch: 251896

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-7	BA-01 T06	Leach	Solid	1314	

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
 Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## General Chemistry (Continued)

### Leach Batch: 251971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-8	BA-01 T07	Leach	Solid	1314	

### Analysis Batch: 252017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	EPA 9040C	251382
180-79212-3	BA-01 T02	Leach	Solid	EPA 9040C	251636
180-79212-11	B01	Leach	Solid	EPA 9040C	251382
LCS 180-252017/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 252018

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-1	BA-01 T01	Leach	Solid	SM 2580B	251382
180-79212-3	BA-01 T02	Leach	Solid	SM 2580B	251636
180-79212-11	B01	Leach	Solid	SM 2580B	251382
LCS 180-252018/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

### Analysis Batch: 252019

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-4	BA-01 T03	Leach	Solid	EPA 9040C	251647
LCS 180-252019/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 252020

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-4	BA-01 T03	Leach	Solid	SM 2580B	251647
LCS 180-252020/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

### Analysis Batch: 252022

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-4	BA-01 T03	Leach	Solid	SM 2510B	251647
MB 180-252022/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-252022/1	Lab Control Sample	Total/NA	Solid	SM 2510B	

### Analysis Batch: 252030

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	EPA 9040C	251718
180-79212-6	BA-01 T05	Leach	Solid	EPA 9040C	251788
LCS 180-252030/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 252031

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	SM 2580B	251718
180-79212-6	BA-01 T05	Leach	Solid	SM 2580B	251788
LCS 180-252031/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

### Analysis Batch: 252032

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-5	BA-01 T04	Leach	Solid	SM 2510B	251718
180-79212-6	BA-01 T05	Leach	Solid	SM 2510B	251788
MB 180-252032/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-252032/1	Lab Control Sample	Total/NA	Solid	SM 2510B	

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## General Chemistry (Continued)

### Analysis Batch: 252060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-7	BA-01 T06	Leach	Solid	EPA 9040C	251896
LCS 180-252060/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 252061

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-7	BA-01 T06	Leach	Solid	SM 2580B	251896
LCS 180-252061/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

### Analysis Batch: 252062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-7	BA-01 T06	Leach	Solid	SM 2510B	251896
MB 180-252062/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-252062/1	Lab Control Sample	Total/NA	Solid	SM 2510B	

### Leach Batch: 252094

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	1314	

### Analysis Batch: 252179

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-8	BA-01 T07	Leach	Solid	EPA 9040C	251971
LCS 180-252179/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 252183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-8	BA-01 T07	Leach	Solid	SM 2580B	251971
LCS 180-252183/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

### Analysis Batch: 252184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-8	BA-01 T07	Leach	Solid	SM 2510B	251971
MB 180-252184/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-252184/1	Lab Control Sample	Total/NA	Solid	SM 2510B	

### Leach Batch: 252485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-10	BA-01 T09	Leach	Solid	1314	

### Analysis Batch: 252812

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	EPA 9040C	252094
180-79212-10	BA-01 T09	Leach	Solid	EPA 9040C	252485
LCS 180-252812/1	Lab Control Sample	Total/NA	Solid	EPA 9040C	

### Analysis Batch: 252813

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	SM 2580B	252094
180-79212-10	BA-01 T09	Leach	Solid	SM 2580B	252485
LCS 180-252813/1	Lab Control Sample	Total/NA	Solid	SM 2580B	

TestAmerica Pittsburgh

# QC Association Summary

Client: Sanborn Head & Associates Inc  
Project/Site: LEAF Metals and CCR Constituent Analysis

TestAmerica Job ID: 180-79212-1

## General Chemistry (Continued)

### Analysis Batch: 252814

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
180-79212-9	BA-01 T08	Leach	Solid	SM 2510B	252094
180-79212-10	BA-01 T09	Leach	Solid	SM 2510B	252485
MB 180-252814/2	Method Blank	Total/NA	Solid	SM 2510B	
LCS 180-252814/1	Lab Control Sample	Total/NA	Solid	SM 2510B	

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13









180-79212 Waybill

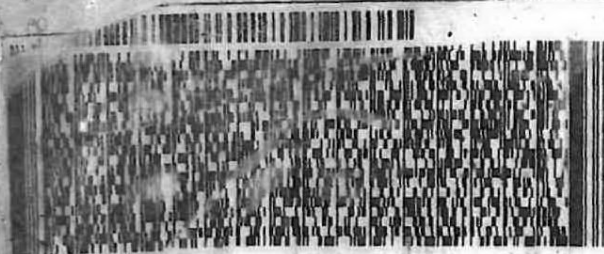
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RANDY BROWN FOR LILLY CORENTHAL  
AEP MOUNTAINEER PLANT  
1347 GRAHAM STATION ROAD  
NEW HAVEN, WV 25265  
UNITED STATES US

SHIP DATE: 21 JUN 18  
ACTWGT: 60.00 LB  
CAD: 111656035/NET3980  
DIMS: 25x20x15 IN

BILL SENDER

TO ATTN: SAMPLE RECEIVING DEPARTMENT  
TEST AMERICA  
301 ALPHA DRIVE  
RIDC PARK  
PITTSBURGH PA 15238

582,2930FDC045



FedEx Express



4181181287111

1 of 4

FRI - 22 JUN 3:00P  
STANDARD OVERNIGHT

TRK# 7725 2492 6677

## MASTER ##

15238  
DIT

XH AGCA

Uncorrected temp 1.4 °C  
Thermometer ID 9

CF 0 Initials TJ

PT-WI-SR-001 effective 7/26/13

TestAme  
THE LEADER IN ENVIRONMENT  
48479



- 1
- 2
- 3
- 4
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- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13

Uncorrected temp : 8.1 °C Melted  
Thermometer ID : 9  
CF 0 Initials JB ICC

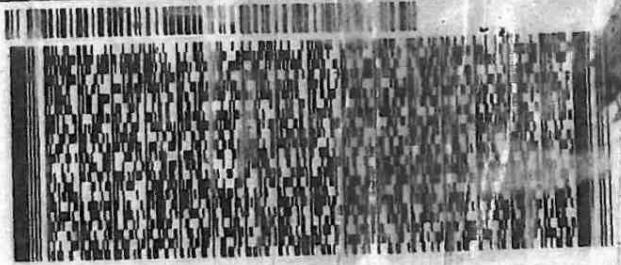
PT-WI-SR-001 effective 7/26/13

ORIGIN ID: CRWA (304) 682-4150  
RANDY BROWN FC: LILLY CORPENTHAL  
AEP MOUNTAINEER PLANT  
1347 GRAHAM STATION ROAD  
NEW HAVEN, WV 25265  
UNITED STATES US

SHIP DATE: 21JUN18  
ACTWG: 10.00 LB  
CAD: 11100035 NET 980  
DIMS: 25x20x15 IN  
PALLENDER

TO ATTN: SAMPLE RECEIVING DEPARTMENT  
TEST AMERICA  
301 ALPHA DRIVE  
RIDC PARK  
PITTSBURGH PA 15238

(412) 963-7058 REF: 43-500 1020  
INV P3 DEPT



3 of 4

FRI - 22 JUN 3:00P  
STANDARD OVERNIGHT

MPS# 7725 2492 7754  
0263  
Mstr# 7725 2492 6677

**XH AGCA**

15238  
PA-US PIT

Uncorrected temp 9.0 °C  
Thermometer ID 9

CF 0 Initials JS

PT-WI-SR-001 effective 7/26/13

**TestAmerica**  
THE LEADER IN ENVIRONMENTAL TESTING

SHIP DATE: 11  
ACTIVITY: 10.0  
CAD: 50820P  
DIMS: 28x15

ORIGIN ID: MIFA (201) 484-37  
URS SHIP/REC ATTN: DAVIS  
TVA GALLATIN FOSSIL  
1499 GALLATIN FOSSIL

*If delay to  
store refrigerate  
2° to 8° C*

**TestAmerica**  
THE LEADER IN ENVIRONMENTAL TESTING

484792

*Temperature  
Controlled*

Uncorrected  
Thermom  
CF 0



ORIGIN ID: CRWA (304) 682-4150  
RANDY BROWN FOR LILLY CORENTHAL  
AEP MOUNTAINEER PLANT  
1347 GRAHAM STATION ROAD  
NEW HAVEN, WV 25265  
UNITED STATES US

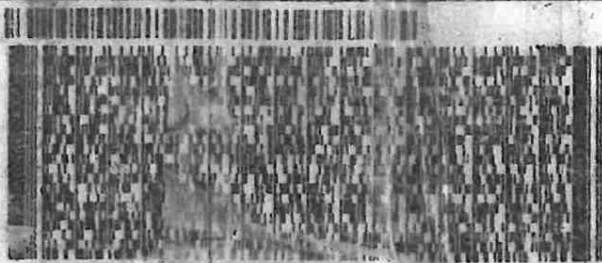
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WEIGHT: 1.00 LB  
CAD: 111638835/NET.3000  
DIMS: 25.00 x 15.00 IN  
CLASS: BULKY

TO **ATTN: SAMPLE RECEIVING DEPARTMENT**  
**TEST AMERICA**  
**301 ALPHA DRIVE**  
**RIDC PARK**  
**PITTSBURGH PA 15238**

56212930FDC 5

8408  
06.23

FZ  
0  
RT  
0



FRI - 22 JUN 3:00

4 of 1  
AMT# 7725 2492 8408  
Mstr# 7725 2492 6677

STANDARD OVERNIGHT

**XH AGCA**

15238

Uncorrected temp  
Thermometer ID

8.3 °C

Melted  
Ice

CF 0 Initials TJ

PT-VI-SR-001 effective 7/26/13

TestAmerica

estAmerica  
THE LEADER IN ENVIRONMENTAL TESTING  
84793

Uncorrected  
Thermometer

Initials TJ

CF -0.1

# Login Sample Receipt Checklist

Client: Sanborn Head & Associates Inc

Job Number: 180-79212-1

**Login Number: 79212**  
**List Number: 1**  
**Creator: Say, Thomas C**

**List Source: TestAmerica Pittsburgh**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



**APPENDIX H.6**  
**MINERALOGY REPORTS**



## Clay Speciation by X-Ray Diffraction

**Report Prepared for:** Sanborn, Head & Associates.Inc

**Project Number/ LIMS No.** 16774-01/MI5007-AUG18

**Sample Receipt:** August 8, 2018

**Sample Analysis:** August 21, 2018

**Reporting Date:** August 31, 2018

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**Instrument:** BRUKER AXS D8 Advance Diffractometer

**Test Conditions:** Co radiation, 40 kV, 35 mA  
Regular Scanning: Step: 0.02°, Step time:0.2s, 2θ range: 3-70°  
Clay Section Scanning: Step: 0.01°, Step time:0.2s, 2θ range: 3-40°

**Interpretations :** PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva software.

**Detection Limit :** 0.5-2%. Strongly dependent on crystallinity.

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**Contents:**

- 1) Method Summary
- 2) Summary of Mineral Asemblages
- 3) Semi-Quantitative XRD Results
- 4) Chemical Balance(s)
- 5) XRD Pattern(s)

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Kim Gibbs, H.B.Sc., P.Geo.  
Senior Mineralogist

---

Huyun Zhou, Ph.D.  
Senior Mineralogist

**ACCREDITATION:** SGS Minerals Services Lakefield is accredited to the requirements of ISO/IEC 17025 for specific tests as listed on our scope of accreditation, including geochemical, mineralogical and trade mineral tests. To view a list of the accredited methods, please visit the following website and search SGS Canada - Minerals Services - Lakefield: <http://palcan.scc.ca/SpecsSearch/GLSearchForm.do>.



## Method Summary

The Clay Speciation by XRD by XRD (ME-LR-MIN-MET-MN-D04) method used by SGS Minerals Services is accredited to the requirements of ISO/IEC 17025.

### ***Mineral Identification and Interpretation:***

Mineral identification and interpretation involve matching the diffraction pattern of a test sample material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) and released on software as a database of Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds. Mineral proportions are based on relative peak heights and may be strongly influenced by crystallinity, structural group or preferred orientations. Interpretations and relative proportions should be accompanied by supporting petrographic and geochemical data (Whole Rock Analysis, Inductively Coupled Plasma - Optical Emission Spectroscopy, etc.).

### **Clay Mineral Separation and Identification:**

Clay minerals are typically fine-grained (<2 µm) phyllosilicates in sedimentary rock. Due to the poor crystallinity and fine size of clay minerals, separation of the clay fraction from bulk samples by centrifuge is required. A slide of the oriented clay fraction is prepared and scanned followed by a series of procedures (the addition of ethylene glycol and high temperature heating). Clay minerals are identified by their individual diffraction patterns and changes in their diffraction pattern after different treatments.

### ***Bulk Sample Semi-Quantitative Analysis:***

The Semi-Quantitative analysis (RIR method) is performed based on each mineral's relative peak heights and of their respective  $I/I_{cor}$  values, which are available from the PDF database. Mineral abundances for the bulk sample (in weight %) are generated by Bruker-EVA Software. These data are reconciled with a bulk chemistry (e.g. whole rock analysis including  $SiO_2$ ,  $Al_2O_3$ ,  $Na_2O$ ,  $K_2O$ ,  $CaO$ ,  $MgO$ ,  $Fe_2O_3$ ,  $Cr_2O_3$ ,  $MnO$ ,  $TiO_2$ ,  $P_2O_5$ ,  $V_2O_5$  or other chemical data). A chemical balance table shows the difference between the assay results and elemental concentrations determined by XRD.

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**WARNING:** The sample(s) to which the findings recorded herein (the "Findings") relate was(were) drawn and / or provided by the Client or by a third party acting at the Client's direction. The Findings constitute no warranty of the sample's representativeness of any goods and strictly relate to the sample(s). The Company accepts no liability with regard to the origin or source from which the sample(s) is/are said to be extracted.



## Summary of Semi-Quantitative X-Ray Diffraction Results

### Crystalline Mineral Assemblage (relative proportions based on peak height)

Sample	Major (>30% Wt)	Moderate (10% -30% Wt)	Minor (2% -10% Wt)	Trace (<2% Wt)
SB-1802(10-12) 6/26/18 0930 Bulk	quartz	-	mica, plagioclase, illite, potassium-feldspar, maghemite	*chlorite, *amphibole, *kaolinite, *anatase
Clay Fraction	illite	kaolinite	chlorite	-
SB-1805(10-11) 6/18/18 1750 Bulk	quartz	-	mica, plagioclase, chlorite, illite, illite- montmorillonite, potassium-feldspar	*kaolinite, *goethite, *hematite, *anatase
Clay Fraction	-	illite, kaolinite	illite-montmorillonite, chlorite	-
SB-1806(10-13) 6/22/18 1445 Bulk	quartz	-	illite, plagioclase, potassium-feldspar, mica, kaolinite, chlorite	*pyroxene, *goethite, *magnetite, *anatase, *hematite
Clay Fraction	illite	kaolinite	chlorite	-
SGS-1 6/28/18 1330 Bulk	quartz	plagioclase	potassium-feldspar, mica, calcite	*amphibole, *chlorite, *tennantite, *dolomite, *kaolinite, *ankerite

\* tentative identification due to low concentrations, diffraction line overlap or poor crystallinity  
brackets indicate non-clay minerals present in the clay fraction.

Mineral	Composition
Amphibole	(Na,K)Ca <sub>2</sub> (Fe,Mg) <sub>5</sub> (Al,Si) <sub>8</sub> O <sub>22</sub> (OH) <sub>2</sub>
Anatase	TiO <sub>2</sub>
Ankerite	CaFe(CO <sub>3</sub> ) <sub>2</sub>
Calcite	CaCO <sub>3</sub>
Chlorite	(Fe,(Mg,Mn) <sub>5</sub> ,Al)(Si <sub>3</sub> Al)O <sub>10</sub> (OH) <sub>8</sub>
Dolomite	CaMg(CO <sub>3</sub> ) <sub>2</sub>
Goethite	αFeO·OH
Hematite	Fe <sub>2</sub> O <sub>3</sub>
Illite	(K,H <sub>3</sub> O)(Al,Mg,Fe) <sub>2</sub> (Si,Al) <sub>4</sub> O <sub>10</sub> [(OH) <sub>2</sub> ,(H <sub>2</sub> O)]
Kaolinite	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
Maghemite	γ-Fe <sub>2</sub> O <sub>3</sub>
Magnetite	Fe <sub>3</sub> O <sub>4</sub>
Mica	K(Mg,Fe)Al <sub>2</sub> Si <sub>3</sub> AlO <sub>10</sub> (OH) <sub>2</sub>
Plagioclase	(NaSi,CaAl)AlSi <sub>2</sub> O <sub>8</sub>
Potassium-Feldspar	KAlSi <sub>3</sub> O <sub>8</sub>
Pyroxene	(Ca,Na)(Mg,Fe,Al,Ti)(Si,Al) <sub>2</sub> O <sub>6</sub>
Quartz	SiO <sub>2</sub>
Tennantite	Cu <sub>12</sub> As <sub>4</sub> S <sub>13</sub>

### Semi-Quantitative X-ray Diffraction Results

Mineral	SB-1802(10-12) 6/26/18 0930 (wt %)	SB-1805(10-11) 6/18/18 1750 (wt %)	SB-1806(10-13) 6/22/18 1445 (wt %)	SGS-1 6/28/18 1330 (wt %)
Quartz	68.0	66.1	63.2	72.4
Albite	8.2	6.4	6.1	10.3
Muscovite	10.0	7.2	4.5	3.5
Illite	4.0	4.1	8.0	-
Microcline	3.0	2.8	6.0	3.8
Clinochlore	1.6	4.8	-	1.8
Kaolinite	0.6	1.6	3.6	0.7
Illite-montmorillonite	-	3.5	-	-
Chamosite	-	-	3.5	-
Magnesiohornblende	1.5	-	-	1.8
Maghemite	2.7	-	-	-
Calcite	-	-	-	2.5
Goethite	-	1.3	1.1	-
Anatase	0.5	1.0	0.9	-
Cummingtonite	-	-	1.8	-
Tennantite	-	-	-	1.7
Hematite	-	1.2	0.4	-
Dolomite	-	-	-	1.0
Magnetite	-	-	0.9	0.2
Ankerite	-	-	-	0.2
TOTAL	100	100	100	100

## Chemical Balance

### SB-1802(10-12) 6/26/18 0930

Name	Assay <sup>1</sup>	SQD <sup>2</sup>	Delta	Status
Oxygen	48.8	50.9	-2.03	Both
Silicon	37.3	38.4	-1.07	Both
Aluminum	4.24	4.35	-0.11	Both
Iron	3.06	3.06	0.00	Both
Potassium	1.39	1.56	-0.17	Both
Sodium	0.72	0.73	-0.01	Both
Titanium	0.42	0.27	0.15	Both
Magnesium	0.34	0.51	-0.17	Both
Calcium	0.20	0.13	0.07	Both
Phosphorus	0.05	-	0.05	XRF
Manganese	0.03	-	0.03	XRF
Chromium	0.02	-	0.02	XRF
Hydrogen	-	0.10	0.10	SQD

### SB-1805(10-11) 6/18/18 1750

Name	Assay <sup>1</sup>	SQD <sup>2</sup>	Delta	Status
Oxygen	48.0	50.7	-2.70	Both
Silicon	35.9	37.2	-1.38	Both
Aluminum	5.09	5.04	0.06	Both
Iron	3.27	3.40	-0.13	Both
Potassium	1.49	1.47	0.02	Both
Sodium	0.49	0.57	-0.08	Both
Titanium	0.48	0.60	-0.12	Both
Magnesium	0.40	0.77	-0.38	Both
Calcium	0.19	-	0.19	XRF
Manganese	0.07	-	0.07	XRF
Phosphorus	0.04	-	0.04	XRF
Chromium	0.02	-	0.02	XRF
Hydrogen	-	0.22	0.22	SQD

1. Values measured by chemical assay.

2. Values calculated based on mineral/compound formulas and quantites identified by semi-quantitative XRD.

## Chemical Balance

### SB-1806(10-13) 6/22/18 1445

Name	Assay <sup>1</sup>	SQD <sup>2</sup>	Delta	Status
Oxygen	47.9	50.6	-2.71	Both
Silicon	35.5	37.0	-1.48	Both
Aluminium	5.35	4.76	0.58	Both
Iron	3.44	3.77	-0.33	Both
Potassium	1.50	1.61	-0.11	Both
Sodium	0.48	0.56	-0.08	Both
Titanium	0.47	0.54	-0.06	Both
Magnesium	0.43	0.95	-0.52	Both
Calcium	0.09	0.01	0.09	Both
Manganese	0.06	-	0.06	XRF
Phosphorus	0.05	-	0.05	XRF
Chromium	0.01	-	0.01	XRF
Hydrogen	-	0.18	0.18	SQD

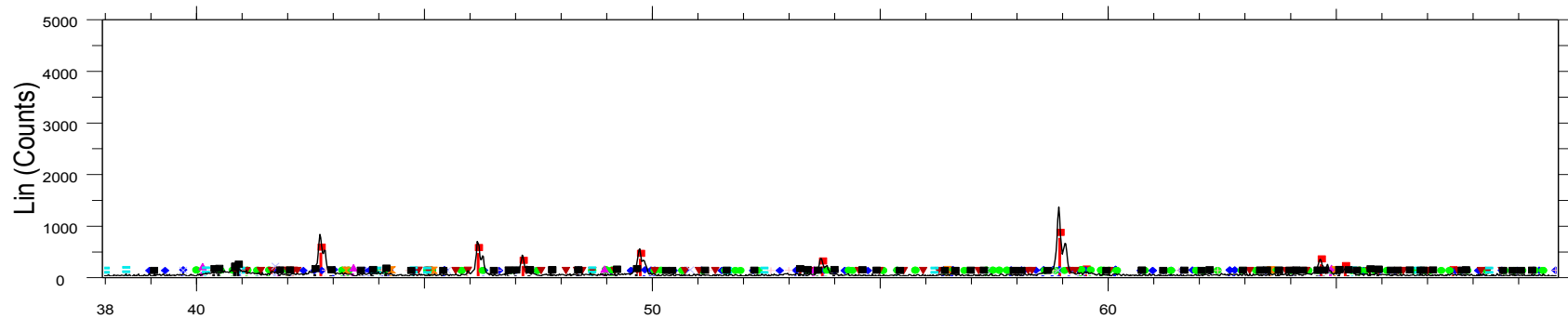
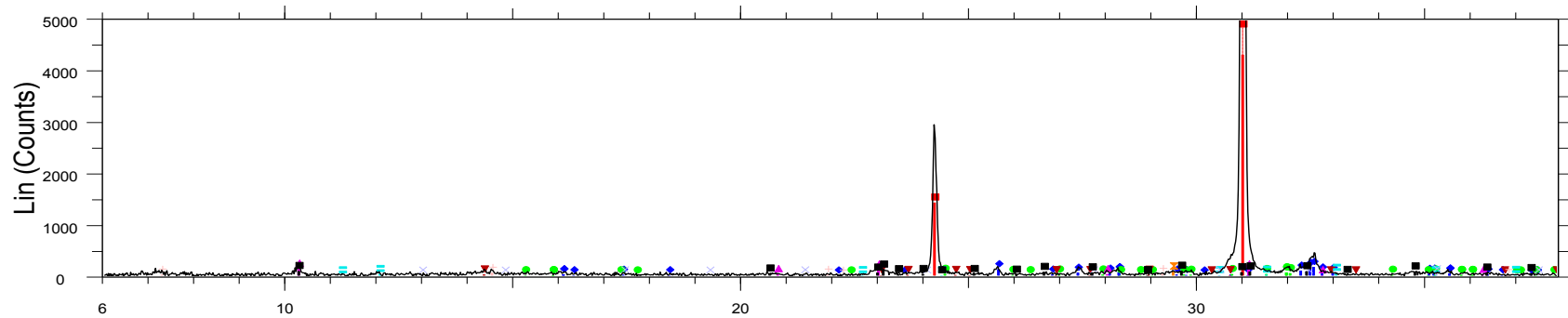
### SGS-1 6/28/18 1330

Name	Assay <sup>1</sup>	SQD <sup>2</sup>	Delta	Status
Oxygen	50.2	50.9	-0.68	Both
Silicon	40.6	39.6	1.01	Both
Aluminium	2.36	2.66	-0.30	Both
Iron	1.61	1.37	0.23	Both
Calcium	1.16	1.41	-0.26	Both
Potassium	0.81	0.85	-0.05	Both
Sodium	0.56	0.92	-0.35	Both
Magnesium	0.27	0.47	-0.21	Both
Titanium	0.16	-	0.16	XRF
Manganese	0.03	-	0.03	XRF
Phosphorus	0.03	-	0.03	XRF
Chromium	0.02	-	0.02	XRF
Sulfur	0.02	0.49	0.47	Both
Hydrogen	-	0.06	0.06	SQD
Carbon	-	0.45	0.45	SQD
Copper	-	0.45	0.45	SQD
Arsenic	-	0.35	0.35	SQD

1. Values measured by chemical assay. Reported in weight percent.

2. Values calculated based on mineral/compound formulas and quantites identified by semi-quantitative XRD.

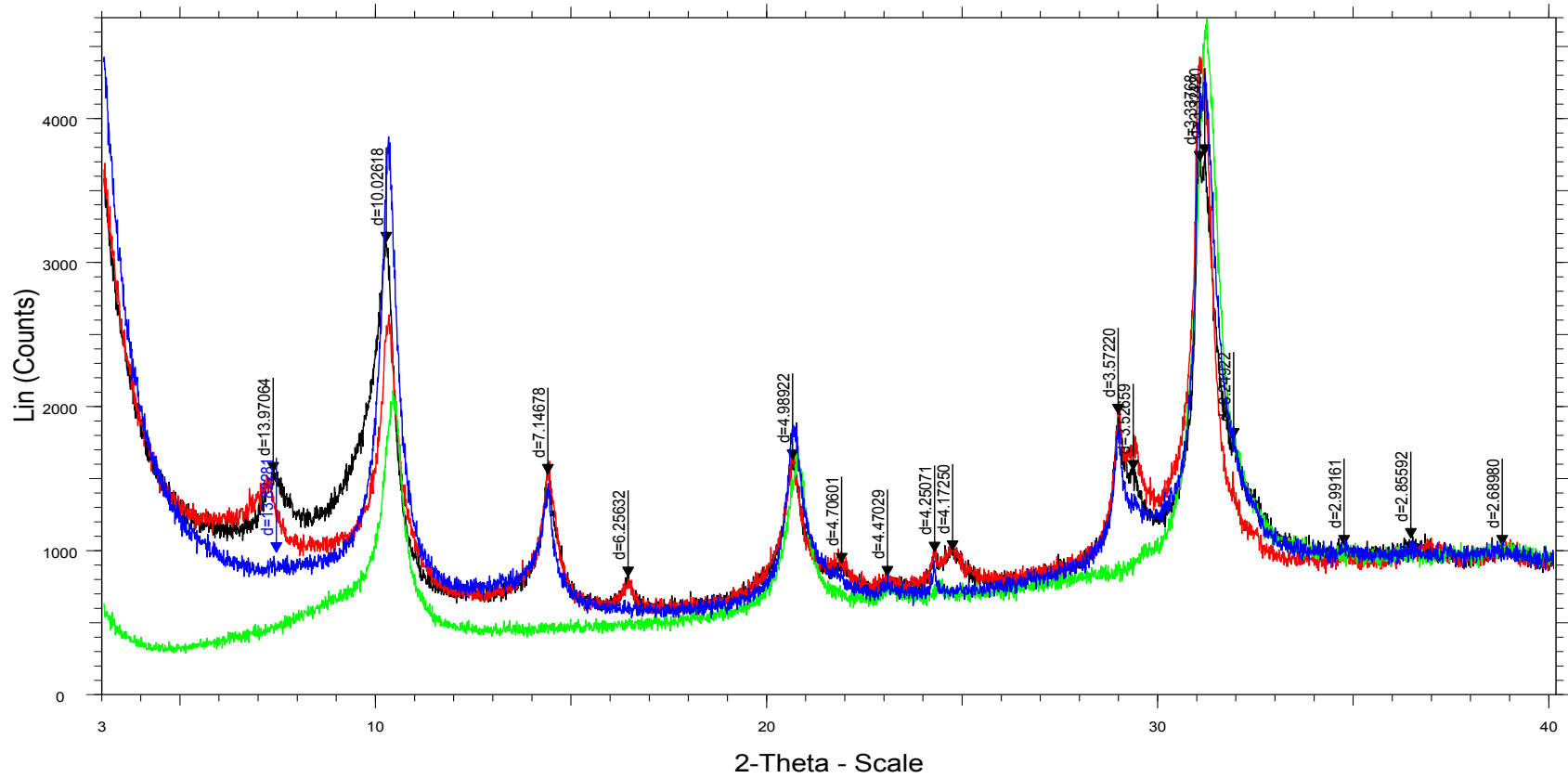
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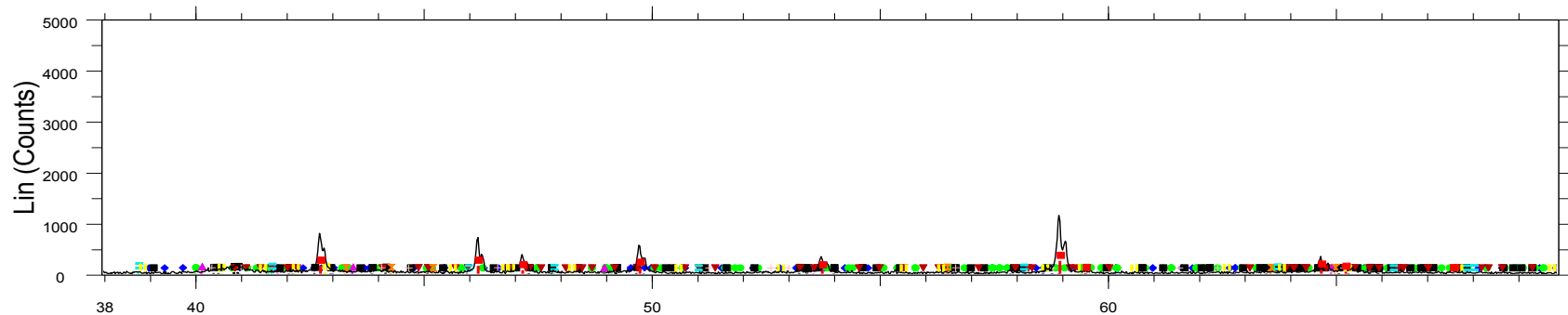
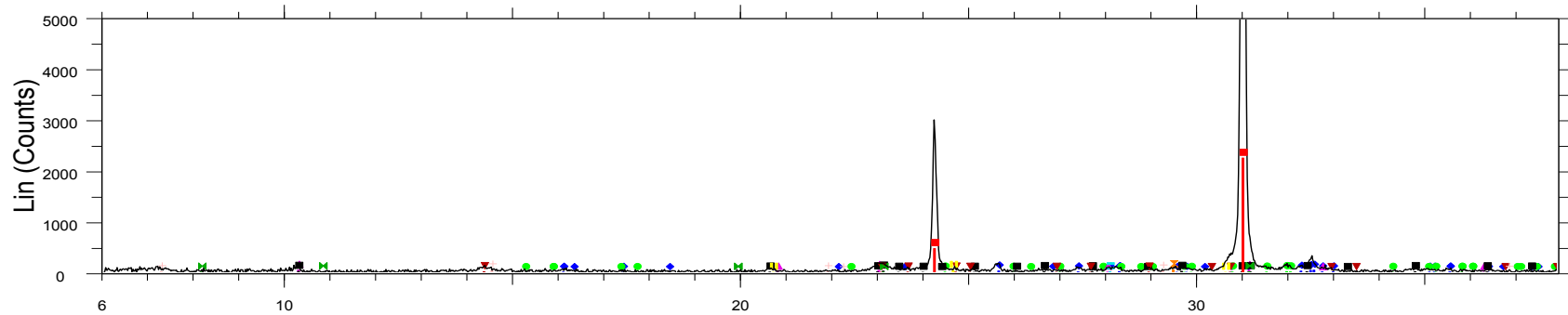
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|--|--|

# SB-1802(10-12) 6/26/18 0930



- ▲ SB-1802(10-12) 6/26/18 0930 - File: Aug5007-1 untrd.raw
- ▲ SB-1802(10-12) 6/26/18 0930 - File: Aug5007-1 glc.raw
- ▲ SB-1802(10-12) 6/26/18 0930 - File: Aug5007-1 400.raw
- ▲ SB-1802(10-12) 6/26/18 0930 - File: Aug5007-1 550.raw

# SB-1805(10-11) 6/18/18 1750

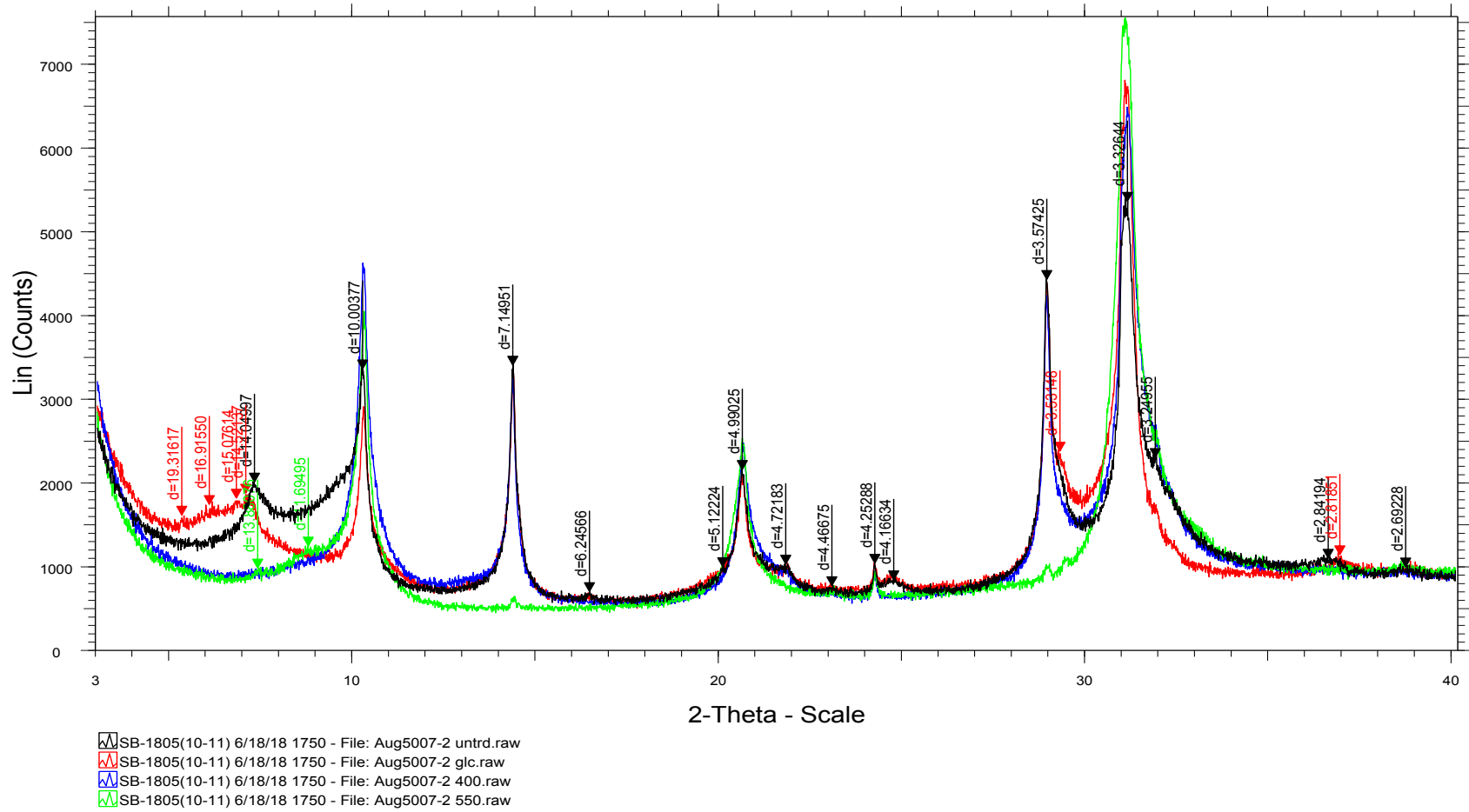


2-Theta - Scale

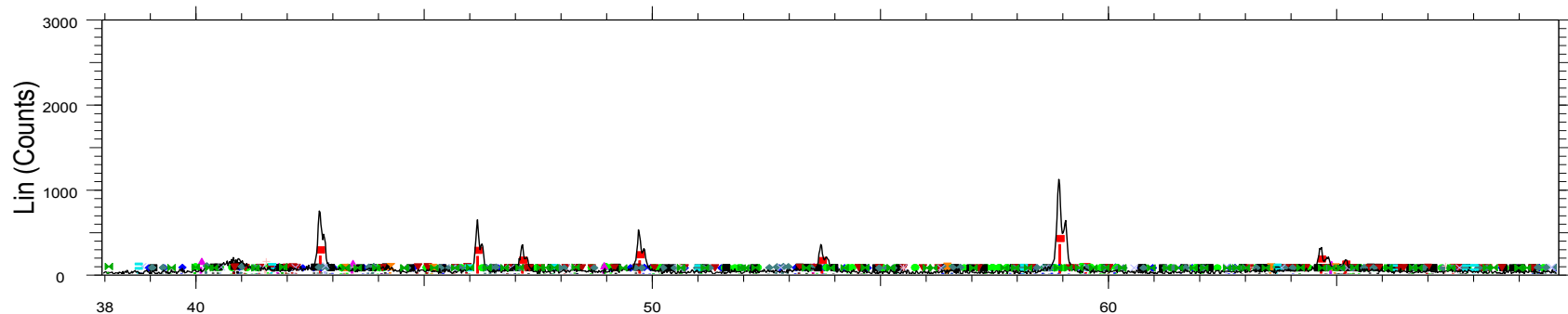
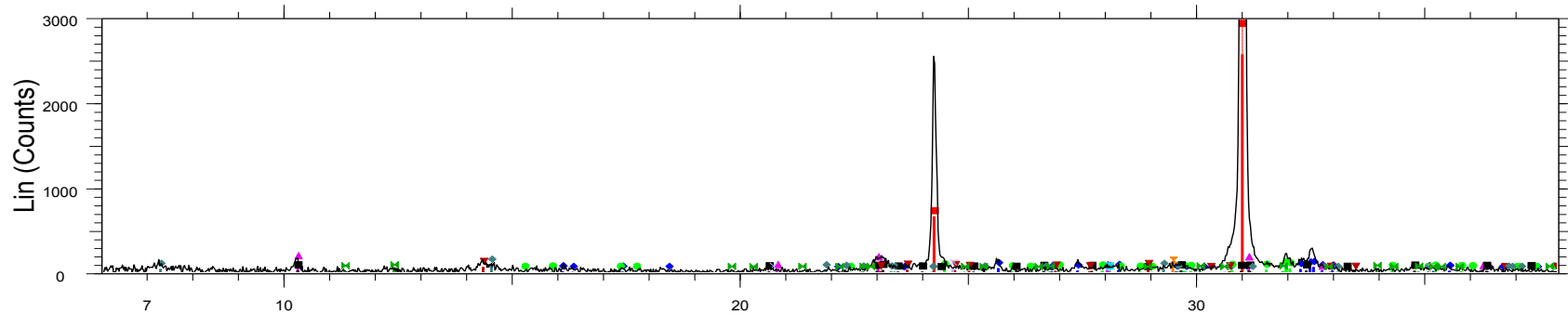
- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>▲ SB-1805(10-11) 6/18/18 1750 - File: Aug5007-2.raw - Type: 2Th/Th locked - Start: 6.000 ° -</li> <li>■ 01-079-1910 (C) - Quartz - SiO<sub>2</sub></li> <li>◆ 01-084-0752 (C) - Albite low - Na(AlSi<sub>3</sub>O<sub>8</sub>)</li> <li>● 01-084-1455 (C) - Microcline Pellotsalo - K-rich phase - (K<sub>0.95</sub>Na<sub>0.05</sub>)AlSi<sub>3</sub>O<sub>8</sub></li> <li>▲ 00-009-0343 (D) - Illite, trioctahedral - K<sub>0.5</sub>(Al,Fe,Mg)<sub>3</sub>(Si,Al)<sub>4</sub>O<sub>10</sub>(OH)<sub>2</sub></li> <li>■ 01-084-1302 (C) - Muscovite - KAl<sub>3</sub>Si<sub>3</sub>O<sub>10</sub>(OH)<sub>2</sub></li> <li>▼ 01-080-0885 (C) - Kaolinite - Al<sub>2</sub>(Si<sub>2</sub>O<sub>5</sub>)(OH)<sub>4</sub></li> <li>⊠ 01-084-1286 (C) - Anatase, syn - TiO<sub>2</sub></li> </ul> | <ul style="list-style-type: none"> <li>⊠ 00-029-0701 (I) - Clinocllore-1MIIb, ferroan - (Mg,Fe)<sub>6</sub>(Si,Al)<sub>4</sub>O<sub>10</sub>(OH)<sub>8</sub></li> <li>⊠ 01-087-1165 (C) - Hematite - Fe<sub>2</sub>O<sub>3</sub></li> <li>⊠ 01-081-0462 (C) - Goethite, syn - FeO(OH)</li> <li>⊠ 00-035-0652 (N) - Illite-montmorillonite - KAl<sub>4</sub>(Si,Al)<sub>8</sub>O<sub>10</sub>(OH)<sub>4</sub>·4H<sub>2</sub>O</li> </ul> |
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# SB-1805(10-11) 6/18/18 1750



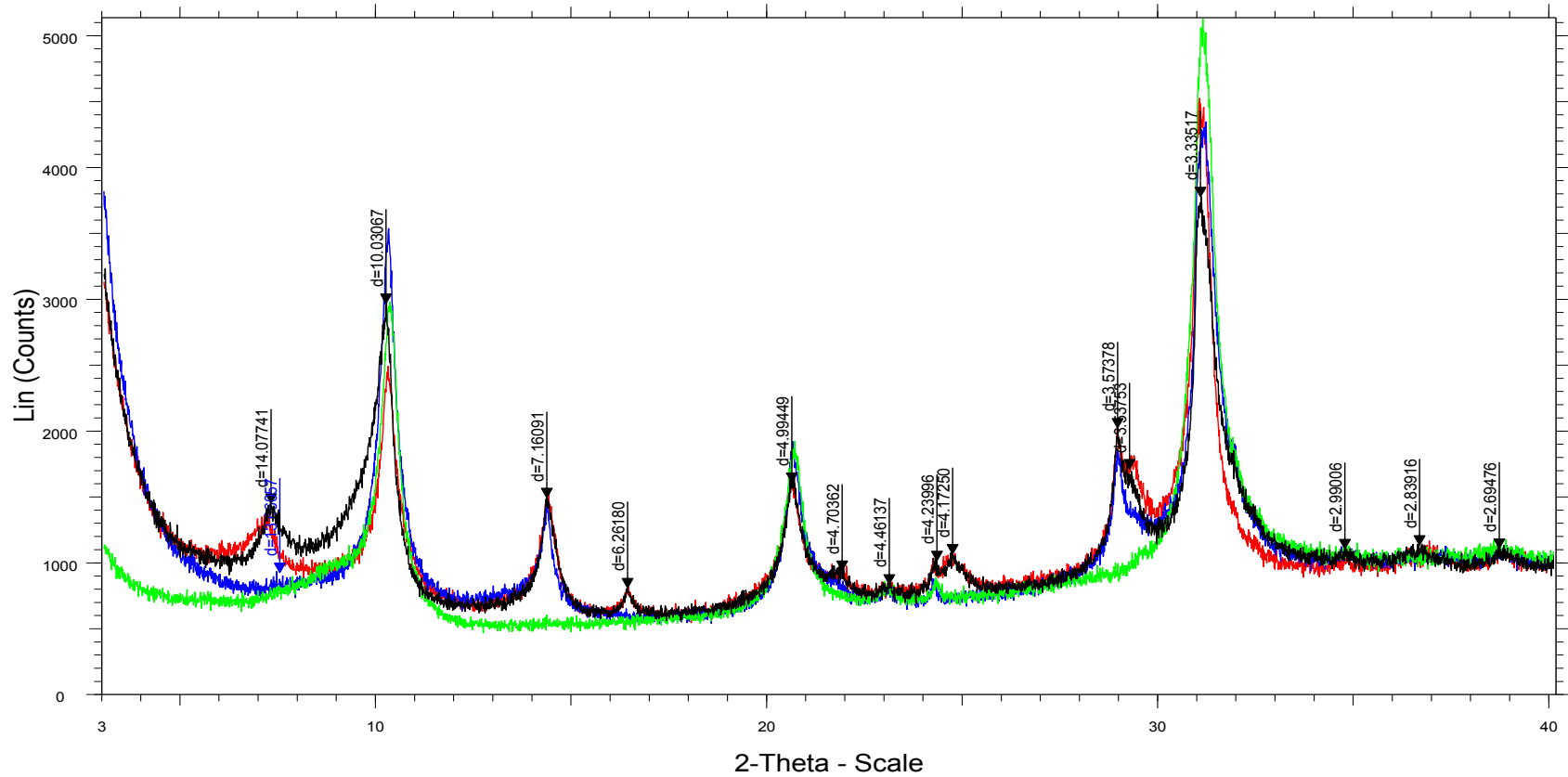
# SB-1806(10-13) 6/22/18 1445



2-Theta - Scale

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| <ul style="list-style-type: none"> <li>SB-1806(10-13) 6/22/18 1445 - File: Aug5007-3.raw - Type: 2Th/Th locked - Start: 6.000 ° -</li> <li>01-079-1910 (C) - Quartz - SiO<sub>2</sub></li> <li>01-084-0752 (C) - Albite low - Na(AlSi<sub>3</sub>O<sub>8</sub>)</li> <li>01-084-1455 (C) - Microcline Pellotsalo - K-rich phase - (K<sub>0.95</sub>Na<sub>0.05</sub>)AlSi<sub>3</sub>O<sub>8</sub></li> <li>00-009-0343 (D) - Illite, trioctahedral - K<sub>0.5</sub>(Al,Fe,Mg)<sub>3</sub>(Si,Al)<sub>4</sub>O<sub>10</sub>(OH)<sub>2</sub></li> <li>01-084-1302 (C) - Muscovite - KAl<sub>3</sub>Si<sub>3</sub>O<sub>10</sub>(OH)<sub>2</sub></li> <li>01-080-0885 (C) - Kaolinite - Al<sub>2</sub>(Si<sub>2</sub>O<sub>5</sub>)(OH)<sub>4</sub></li> <li>01-085-2163 (C) - Chamosite - (Mg<sub>5.036</sub>Fe<sub>4.964</sub>)Al<sub>2.724</sub>(Si<sub>5.70</sub>Al<sub>2.30</sub>O<sub>20</sub>)(OH)<sub>16</sub></li> </ul> | <ul style="list-style-type: none"> <li>01-084-1286 (C) - Anatase, syn - TiO<sub>2</sub></li> <li>01-081-0462 (C) - Goethite, syn - FeO(OH)</li> <li>01-087-1165 (C) - Hematite - Fe<sub>2</sub>O<sub>3</sub></li> <li>01-088-0315 (C) - Magnetite - synthetic - Fe<sub>3</sub>O<sub>4</sub></li> <li>01-088-1211 (C) - Cummingtonite - (Ca<sub>0.076</sub>Mg<sub>3.445</sub>Fe<sub>3.471</sub>)(Si<sub>7.983</sub>Al<sub>0.018</sub>)O<sub>22</sub>(OH)<sub>2</sub></li> </ul> |
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# SB-1806(10-13) 6/22/18 1445



- ▲ SB-1806(10-13) 6/22/18 1445 - File: Aug5007-3 untrd.raw
- ▲ SB-1806(10-13) 6/22/18 1445 - File: Aug5007-3 glc.raw
- ▲ SB-1806(10-13) 6/22/18 1445 - File: Aug5007-3 400.raw
- ▲ SB-1806(10-13) 6/22/18 1445 - File: Aug5007-3 550.raw



SGS Canada Inc.

P.O. Box 4300 - 185 Concession St.  
Lakefield - Ontario - KOL 2H0  
Phone: 705-652-2000 FAX: 705-652-6365

LR Internal Dept 14  
Attn : Chris Gunning

24-August-2018

Date Rec. : 10 August 2018  
LR Report : CA02345-AUG18  
Project : CA20I-00000-110-16774-01  
Client Ref : MI5007-AUG18

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Phone: ---  
Fax:---

# CERTIFICATE OF ANALYSIS

## Final Report

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %	MnO %	Cr2O3 %	V2O5 %
1: SB-1802(10-12) 6/26/18 0930	79.9	8.02	4.37	0.56	0.28	0.97	1.68	0.70	0.11	0.04	0.03	< 0.01
2: SB-1805(10-11) 6/18/18 1750	76.7	9.62	4.67	0.66	0.26	0.66	1.79	0.80	0.10	0.09	0.03	< 0.01
3: SB-1806(10-13) 6/22/18 1445	76.0	10.1	4.92	0.71	0.13	0.65	1.81	0.79	0.11	0.08	0.02	0.01

Sample ID	LOI %	Sum %	Ag g/t	As g/t	Ba g/t	Be g/t	Bi g/t	Cd g/t	Co g/t	Cu g/t	Li g/t	Mo g/t
1: SB-1802(10-12) 6/26/18 0930	3.06	99.8	---	---	---	---	---	---	---	---	---	---
2: SB-1805(10-11) 6/18/18 1750	4.19	99.6	---	---	---	---	---	---	---	---	---	---
3: SB-1806(10-13) 6/22/18 1445	4.44	99.9	---	---	---	---	---	---	---	---	---	---

Sample ID	Ni g/t	Pb g/t	Sb g/t	Se g/t	Sn g/t	Sr g/t	Tl g/t	U g/t	Y g/t	Zn g/t	Hg g/t	F %	S %
1: SB-1802(10-12) 6/26/18 0930	---	---	---	---	---	---	---	---	---	---	---	---	---
2: SB-1805(10-11) 6/18/18 1750	---	---	---	---	---	---	---	---	---	---	---	---	---
3: SB-1806(10-13) 6/22/18 1445	---	---	---	---	---	---	---	---	---	---	---	---	---

OnLine LIMS

0001485627



SGS Canada Inc.

P.O. Box 4300 - 185 Concession St.  
Lakefield - Ontario - KOL 2H0  
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : CA02345-AUG18

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %	MnO %	Cr2O3 %	V2O5 %
4: SGS-1 6/28/18 1330	86.9	4.46	2.30	0.44	1.62	0.76	0.97	0.27	0.06	0.04	0.03	< 0.01

Sample ID	LOI %	Sum %	Ag g/t	As g/t	Ba g/t	Be g/t	Bi g/t	Cd g/t	Co g/t	Cu g/t	Li g/t	Mo g/t
4: SGS-1 6/28/18 1330	2.59	100.4	< 2	< 70	216	< 0.7	< 20	< 5	< 9	11.8	11	< 5

Sample ID	Ni g/t	Pb g/t	Sb g/t	Se g/t	Sn g/t	Sr g/t	Tl g/t	U g/t	Y g/t	Zn g/t	Hg g/t	F %	S %
4: SGS-1 6/28/18 1330	< 20	< 30	< 20	< 40	< 50	87.2	< 30	< 20	9.6	< 30	< 0.3	0.015	0.02

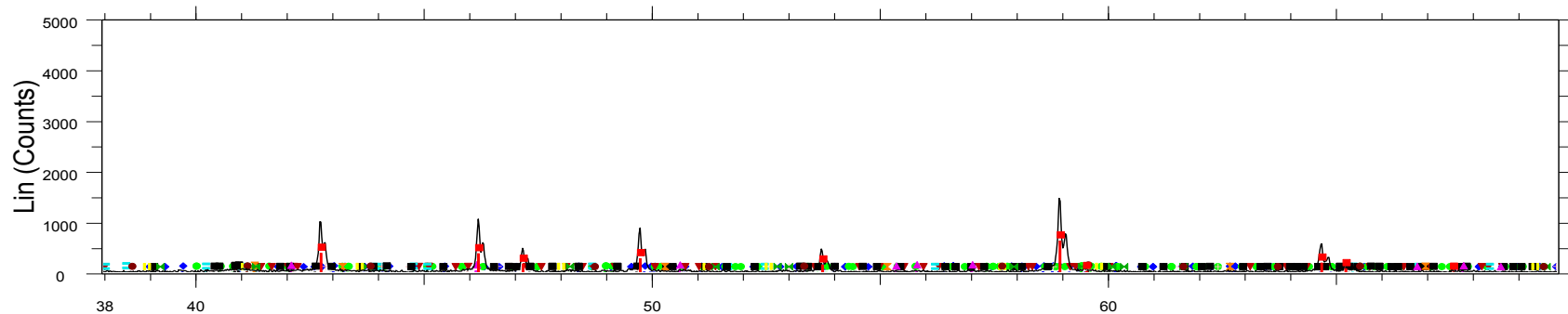
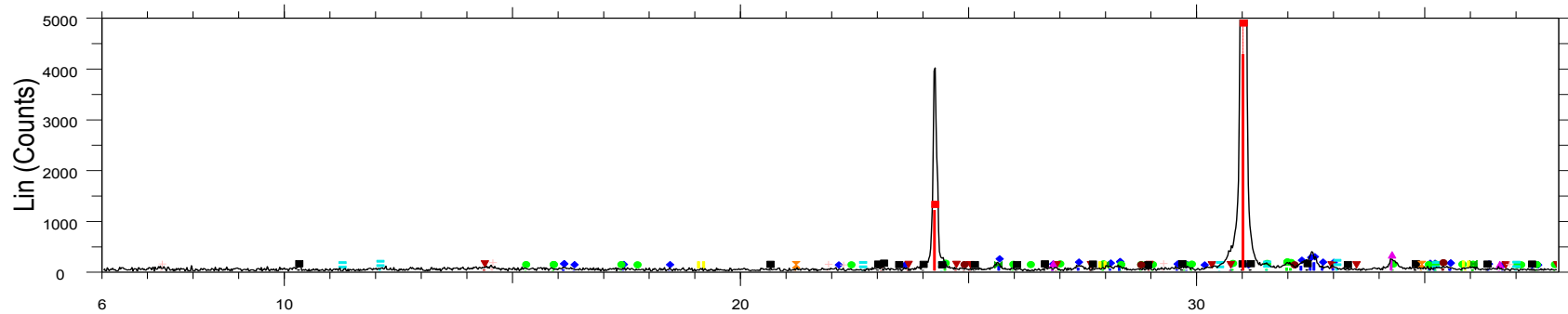
Control Quality Assay  
Not Suitable for Commercial Exchange



Tom Watt  
Project Coordinator



# SGS-1 6/28/18 1330



## 2-Theta - Scale

- ▲ SGS-1 6/28/18 1330 - File: Aug5007-4.raw
- 01-079-1910 (C) - Quartz - SiO<sub>2</sub>
- ◆ 01-084-0752 (C) - Albite low - Na(AlSi<sub>3</sub>O<sub>8</sub>)
- 01-084-1455 (C) - Microcline Pellotsalo - K-rich phase - (K<sub>0.95</sub>Na<sub>0.05</sub>)AlSi<sub>3</sub>O<sub>8</sub>
- ▼ 01-080-0885 (C) - Kaolinite - Al<sub>2</sub>(Si<sub>2</sub>O<sub>5</sub>)(OH)<sub>4</sub>
- 00-021-0149 (D) - Magnesiohornblende, ferroan - Ca<sub>2</sub>(Mg,Fe)<sub>5</sub>(Si,Al)<sub>8</sub>O<sub>22</sub>(OH)<sub>2</sub>
- 00-029-0701 (I) - Clinocllore-1Mllb, ferroan - (Mg,Fe)<sub>6</sub>(Si,Al)<sub>4</sub>O<sub>10</sub>(OH)<sub>8</sub>
- 01-084-1302 (C) - Muscovite - KAl<sub>3</sub>Si<sub>3</sub>O<sub>10</sub>(OH)<sub>2</sub>
- ▲ 01-086-2334 (C) - Calcite - Ca(CO<sub>3</sub>)
- 01-086-1355 (C) - Magnetite - Fe<sub>2.942</sub>O<sub>4</sub>
- 00-036-0426 (\*) - Dolomite - CaMg(CO<sub>3</sub>)<sub>2</sub>
- 00-033-0282 (D) - Ankerite - Ca(Fe+2,Mg)(CO<sub>3</sub>)<sub>2</sub>
- 00-011-0102 (D) - Tennantite - (Cu,Fe)<sub>12</sub>As<sub>4</sub>S<sub>13</sub>



## Semi-Quantitative X-Ray Diffraction

**Report Prepared for:** Sanborn, Head & Associates.Inc

**Project Number/ LIMS No.** 16774-01/MI5022-OCT18

**Sample Receipt:** October 10, 2018

**Sample Analysis:** October 22, 2018

**Reporting Date:** November 6, 2018

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**Instrument:** BRUKER AXS D8 Advance Diffractometer

**Test Conditions:** Co radiation, 40 kV, 35 mA  
Regular Scanning: Step: 0.02°, Step time:0.2s, 2θ range: 3-70°

**Interpretations :** PDF2/PDF4 powder diffraction databases issued by the International Center for Diffraction Data (ICDD). DiffracPlus Eva software.

**Detection Limit :** 0.5-2%. Strongly dependent on crystallinity.

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**Contents:**

- 1) Method Summary
- 2) Summary of Mineral Assemblages
- 3) Semi-Quantitative XRD Results
- 4) Chemical Balance(s)
- 5) XRD Pattern(s)

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Kim Gibbs, H.B.Sc., P.Geo.  
Senior Mineralogist

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Huyun Zhou, Ph.D., P.Geo.  
Senior Mineralogist

**ACCREDITATION:** SGS Minerals Services Lakefield is accredited to the requirements of ISO/IEC 17025 for specific tests as listed on our scope of accreditation, including geochemical, mineralogical and trade mineral tests. To view a list of the accredited methods, please visit the following website and search SGS Canada - Minerals Services - Lakefield: <http://palcan.scc.ca/SpecsSearch/GLSearchForm.do>.





## Method Summary

The Semi-Quantitative Mineral Identification by XRD (ME-LR-MIN-MET-MN-D03) method used by SGS Minerals Services is accredited to the requirements of ISO/IEC 17025.

### ***Mineral Identification and Interpretation:***

Mineral identification and interpretation involve matching the diffraction pattern of a test sample material to patterns of single-phase reference materials. The reference patterns are compiled by the Joint Committee on Powder Diffraction Standards - International Center for Diffraction Data (JCPDS-ICDD) and released on software as a database of Powder Diffraction Files (PDF).

Interpretations do not reflect the presence of non-crystalline and/or amorphous compounds. Mineral proportions are based on relative peak heights and may be strongly influenced by crystallinity, structural group or preferred orientations. Interpretations and relative proportions should be accompanied by supporting petrographic and geochemical data (Whole Rock Analysis, Inductively Coupled Plasma - Optical Emission Spectroscopy, etc.).

### ***Semi-Quantitative Analysis:***

The Semi-Quantitative analysis (RIR method) is performed based on each mineral's relative peak heights and of their respective  $I/I_{cor}$  values, which are available from the PDF database. Mineral abundances for the bulk sample (in weight %) are generated by Bruker-EVA Software. These data are reconciled with a bulk chemistry (e.g. whole rock analysis including  $SiO_2$ ,  $Al_2O_3$ ,  $Na_2O$ ,  $K_2O$ ,  $CaO$ ,  $MgO$ ,  $Fe_2O_3$ ,  $Cr_2O_3$ ,  $MnO$ ,  $TiO_2$ ,  $P_2O_5$ ,  $V_2O_5$  or other chemical data). A chemical balance table shows the difference between the assay results and elemental concentrations determined by XRD.

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## Summary of Semi-Quantitative X-Ray Diffraction Results

### ***Crystalline Mineral Assemblage (relative proportions based on peak height)***

Sample	Major (>30% Wt)	Moderate (10% -30% Wt)	Minor (2% -10% Wt)	Trace (<2% Wt)
(1) SGS-1 6/28/18 1330 2.0 Float	quartz	-	plagioclase, potassium-feldspar, mica, illite, kaolinite, calcite, dolomite, chlorite, montmorillonite	*goethite, *ankerite, *pyrite
(2) SGS-1 6/28/18 1330 3.3 Sink	garnet	goethite	quartz, rutile, pyroxene, amphibole, hematite, magnetite, ilmenite, plagioclase	*chlorite, *mica

\* tentative identification due to low concentrations, diffraction line overlap or poor crystallinity

Mineral	Composition
Amphibole	$(\text{Na,K})\text{Ca}_2(\text{Fe,Mg})_5(\text{Al,Si})_8\text{O}_{22}(\text{OH})_2$
Ankerite	$\text{CaFe}(\text{CO}_3)_2$
Calcite	$\text{CaCO}_3$
Chlorite	$(\text{Fe,Mg,Mn})_5(\text{Al})(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH})_8$
Dolomite	$\text{CaMg}(\text{CO}_3)_2$
Garnet	$(\text{Ca,Mg,Mn}^{2+})_3(\text{V,Al,Fe}^{3+})_2(\text{SiO}_4)_3$
Goethite	$\alpha\text{FeO}\cdot\text{OH}$
Hematite	$\text{Fe}_2\text{O}_3$
Illite	$(\text{K,H}_3\text{O})(\text{Al,Mg,Fe})_2(\text{Si,Al})_4\text{O}_{10}[(\text{OH})_2\cdot(\text{H}_2\text{O})]$
Ilmenite	$\text{FeTiO}_3$
Kaolinite	$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$
Magnetite	$\text{Fe}_3\text{O}_4$
Mica	$\text{K}(\text{Mg,Fe})\text{Al}_2\text{Si}_3\text{AlO}_{10}(\text{OH})_2$
Montmorillonite	$(\text{Na,Ca})_{0.3}(\text{Al,Mg})_2\text{Si}_2\text{O}_{10}(\text{OH})_2\cdot 10\text{H}_2\text{O}$
Plagioclase	$(\text{NaSi,CaAl})\text{AlSi}_2\text{O}_8$
Potassium-Feldspar	$\text{KAlSi}_3\text{O}_8$
Pyrite	$\text{FeS}_2$
Pyroxene	$(\text{Ca,Na})(\text{Mg,Fe,Al,Ti})(\text{Si,Al})_2\text{O}_6$
Quartz	$\text{SiO}_2$
Rutile	$\text{TiO}_2$

### Semi-Quantitative X-ray Diffraction Results

Mineral	SGS-1 6/28/18 1330 2.0 Float (wt %)	SGS-1 6/28/18 1330 3.3 Sink (wt %)
Quartz	54.4	3.3
Almandine	-	20.6
Goethite	0.6	18.5
Pyrope	-	15.6
Anorthite	5.8	8.2
Kaolinite	7.5	-
Hematite	-	7.3
Ilmenite	-	6.0
Magnetite	-	5.4
Clinochlore	5.0	1.3
Diopside	-	4.7
Montmorillonite	10.5	-
Calcite	4.5	-
Muscovite	2.4	1.8
Actinolite	-	4.0
Microcline	3.2	-
Rutile	-	3.1
Illite	2.7	-
Dolomite	2.1	-
Ankerite	0.9	-
Pyrite	0.4	-
TOTAL	100	100

*The weight percent quantities indicated have been normalized to a sum of 100%. The quantity of amorphous material has not been determined.*

## Chemical Balance

### SGS-1 6/28/18 1330 2.0 Float

Name	Assay <sup>1</sup>	SQD <sup>2</sup>	Delta	Status
Oxygen	20.8	51.7	-30.9	Both
Silicon	13.9	34.2	-20.3	Both
Aluminum	2.65	5.27	-2.61	Both
Calcium	2.37	3.30	-0.93	Both
Iron	2.01	1.04	0.98	Both
Potassium	0.54	0.94	-0.40	Both
Magnesium	0.46	2.02	-1.56	Both
Sodium	0.29	0.17	0.12	Both
Titanium	0.18	-	0.18	XRF
Manganese	0.11	-	0.11	XRF
Phosphorus	0.03	-	0.03	XRF
Hydrogen	-	0.28	0.28	SQD
Carbon	-	0.90	0.90	SQD
Sulfur	-	0.20	0.20	SQD

### SGS-1 6/28/18 1330 3.3 Sink

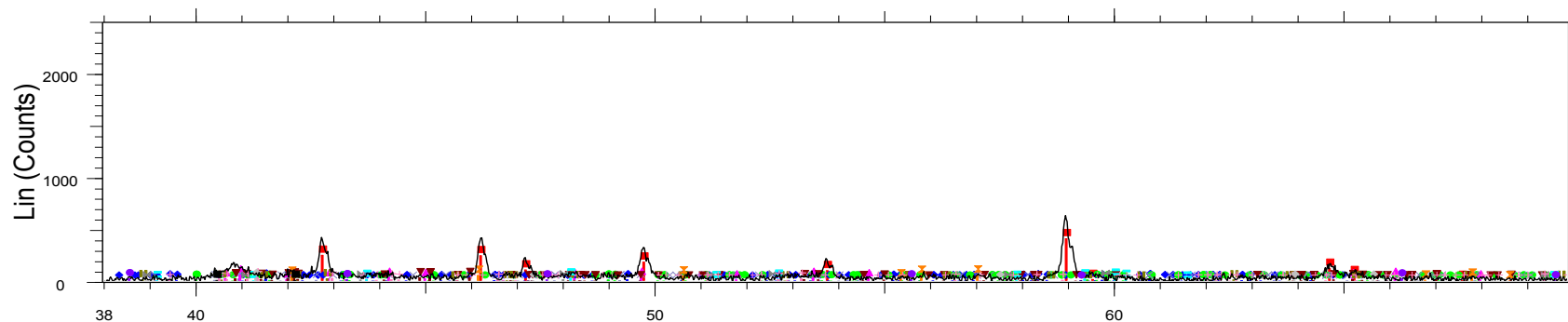
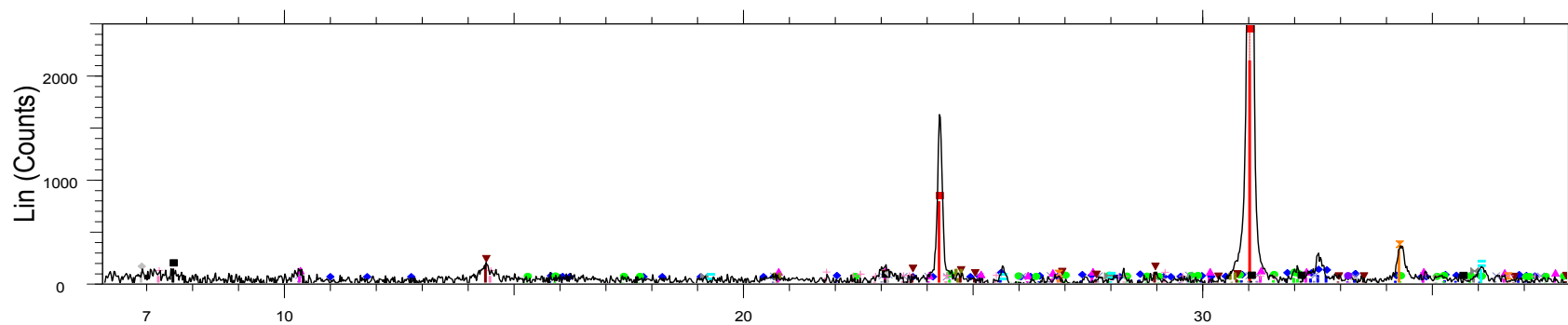
Name	Assay <sup>1</sup>	SQD <sup>2</sup>	Delta	Status
Oxygen	36.3	35.3	0.96	Both
Iron	35.5	36.7	-1.16	Both
Silicon	10.4	12.6	-2.16	Both
Aluminum	4.59	6.16	-1.57	Both
Titanium	3.45	3.76	-0.31	Both
Calcium	2.19	2.37	-0.17	Both
Magnesium	2.16	2.45	-0.29	Both
Manganese	0.53	0.32	0.21	Both
Potassium	0.17	0.19	-0.01	Both
Phosphorus	0.12	-	0.12	XRF
Sodium	0.07	0.03	0.04	Both
Chromium	0.05	-	0.05	XRF
Vanadium	0.03	-	0.03	XRF
Hydrogen	-	0.12	0.12	SQD
Fluorine	-	0.05	0.05	SQD

1. Values measured by chemical assay. Reported in weight percent.

2. Values calculated based on mineral/compound formulas and quantities identified by semi-quantitative XRD.



# SGS-1 6/28/18 1330 2.0 Float

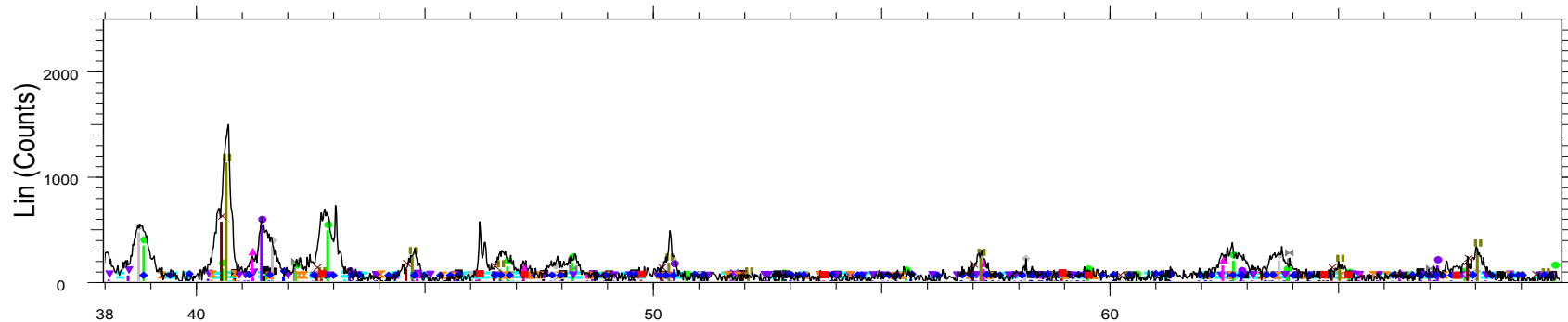
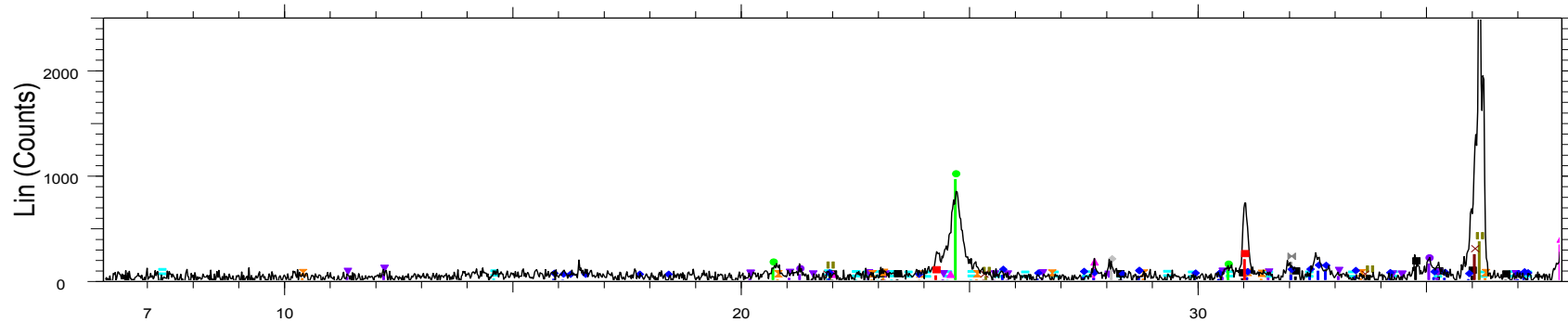


## 2-Theta - Scale

- |  |  |
|--|--|
| SGS-1 6/28/18 1330 2.0 Float - File: OCT5022-2.raw   | 01-086-2334 (C) - Calcite - Ca(CO <sub>3</sub> )   |
| 01-079-1910 (C) - Quartz - SiO <sub>2</sub>  | 00-033-0282 (D) - Ankerite - Ca(Fe+2,Mg)(CO <sub>3</sub> ) <sub>2</sub>  |
| 01-086-1705 (C) - Anorthite - Ca(Al <sub>2</sub> Si <sub>2</sub> O <sub>8</sub> )                    | 01-084-2065 (C) - Dolomite - CaMg <sub>0.77</sub> Fe <sub>0.23</sub> (CO <sub>3</sub> ) <sub>2</sub>   |
| 01-084-1455 (C) - Microcline Pellotsalo - K-rich phase - (K.95Na.05)AlSi <sub>3</sub> O <sub>8</sub> | 01-087-2496 (C) - Clinocllore (Ilb-4) - Mg <sub>4.882</sub> Fe <sub>0.22</sub> Al <sub>1.881</sub> Si <sub>2.96</sub> O <sub>10</sub> (OH) <sub>8</sub>          |
| 01-084-1302 (C) - Muscovite - KAl <sub>3</sub> Si <sub>3</sub> O <sub>10</sub> (OH) <sub>2</sub>     | 00-013-0259 (Q) - Montmorillonite-14A - Na <sub>0.3</sub> (Al,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> ·xH <sub>2</sub> O              |
| 00-002-0056 (D) - Illite - KAl <sub>2</sub> Si <sub>3</sub> AlO <sub>10</sub> (OH) <sub>2</sub>      | 00-003-0015 (D) - Montmorillonite (bentonite) - (Na,Ca) <sub>0.3</sub> (Al,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> ·xH <sub>2</sub> O |
| 01-080-0885 (C) - Kaolinite - Al <sub>2</sub> (Si <sub>2</sub> O <sub>5</sub> )(OH) <sub>4</sub>     | 01-071-0053 (C) - Pyrite - FeS <sub>2</sub>  |
| 01-081-0462 (C) - Goethite, syn - FeO(OH)  |  |



# SGS-1 6/28/18 1330 3.3 Sink



## 2-Theta - Scale

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>▲ SGS-1 6/28/18 1330 3.3 Sink - File: OCT5022-3.raw</li> <li>■ 01-079-1910 (C) - Quartz - SiO<sub>2</sub></li> <li>▤ 01-074-1137 (C) - Clinocllore - Al<sub>2</sub>Mg<sub>5</sub>Si<sub>3</sub>O<sub>10</sub>(OH)<sub>8</sub></li> <li>▨ 00-001-1292 (D) - Rutile - TiO<sub>2</sub></li> <li>● 00-029-0713 (I) - Goethite - Fe+3O(OH)</li> <li>■ 00-011-0654 (D) - Diopside - CaMg(SiO<sub>3</sub>)<sub>2</sub></li> <li>▼ 01-080-0521 (C) - Actinolite - Ca<sub>2</sub>(Mg,Fe)<sub>5</sub>Si<sub>8</sub>O<sub>22</sub>(OH)</li> <li>◆ 01-086-0550 (C) - Hematite, syn - Fe<sub>2</sub>O<sub>3</sub></li> </ul> | <ul style="list-style-type: none"> <li>● 01-087-2334 (C) - Magnetite - synthetic - Fe<sub>3</sub>O<sub>4</sub></li> <li>▲ 01-075-1209 (C) - Ilmenite, syn - FeTiO<sub>3</sub></li> <li>▤ 01-085-1855 (C) - Muscovite - KAl<sub>2</sub>(Si<sub>3</sub>Al)O<sub>10</sub>(OH,F)</li> <li>▨ 01-085-2497 (C) - Almandine, syn - Fe<sub>3</sub>Al<sub>2</sub>(SiO<sub>4</sub>)<sub>3</sub></li> <li>⊠ 01-073-1367 (C) - Pyrope, ferroan - Mg<sub>1.6</sub>Fe<sub>1.2</sub>Ca<sub>2</sub>Al<sub>2</sub>Si<sub>3</sub>O<sub>12</sub></li> <li>◆ 01-087-1832 (C) - Anorthite (Mn-bearing), syn - (Ca<sub>0.715</sub>Mn<sub>0.196</sub>Na<sub>0.045</sub>)(Al<sub>1.911</sub>Si<sub>2.0</sub></li> </ul> |
|--|--|



SGS Canada Inc.

P.O. Box 4300 - 185 Concession St.

Lakefield - Ontario - KOL 2HO

Phone: 705-652-2000 FAX: 705-652-6365

LR Internal Dept 14

Attn : Chris Gunning

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Phone: ---, Fax:---

12-November-2018

Date Rec. : 25 October 2018

LR Report : CA03057-OCT18

Project : CA201-00000-110-16774-01

Client Ref : MI5022-OCT18

# CERTIFICATE OF ANALYSIS

## Final Report

Sample ID	SiO2 %	Al2O3 %	Fe2O3 %	MgO %	CaO %	Na2O %	K2O %	TiO2 %	P2O5 %	MnO %	Cr2O3 %
1: SGS-1 6/28/18 1330 2.0 Float	29.8	5.01	2.88	0.76	3.32	0.39	0.65	0.30	0.08	0.14	< 0.01
2: SGS-1 6/28/18 1330 3.3 Sink	22.3	8.68	50.8	3.59	3.07	0.10	0.21	5.75	0.27	0.68	0.07

Sample ID	V2O5 %	LOI %	Sum %	Ag g/t	As g/t	Ba g/t	Be g/t	Bi g/t	Cd g/t	Co g/t	Cu g/t	Li g/t
1: SGS-1 6/28/18 1330 2.0 Float	< 0.01	56.7	100.1	< 3	< 100	240	2.41	< 20	< 2	19	83.6	< 20
2: SGS-1 6/28/18 1330 3.3 Sink	0.06	3.61	99.2	< 3	< 100	85.5	1.28	< 20	< 2	83	64.3	< 20

Sample ID	Mo g/t	Ni g/t	Pb g/t	Sb g/t	Se g/t	Sn g/t	Sr g/t	Tl g/t	U g/t	Y g/t	Hg g/t	F %
1: SGS-1 6/28/18 1330 2.0 Float	< 5	72	< 40	< 40	< 30	< 30	85.2	< 30	< 40	45.5	< 0.3	0.038
2: SGS-1 6/28/18 1330 3.3 Sink	< 5	57	< 40	< 40	< 30	< 30	52.7	< 30	< 40	175	< 0.3	0.051

Sample ID	S %
1: SGS-1 6/28/18 1330 2.0 Float	0.53
2: SGS-1 6/28/18 1330 3.3 Sink	0.13

Control Quality Assay  
Not Suitable for Commercial Exchange

Tom Watt  
Project Coordinator



## **APPENDIX B**

## APPENDIX B

**To:** Brian G. Palmer, American Electric Power (AEP)

**From:** Andrew E. Ashton, P.G., and Chip Crocetti, PhD, P.G.

**File:** 4345.02

**Date:** November 2021

**Re:** Mountaineer Plant Bottom Ash Ponds - Remedy Selection Report

Documentation of Supporting Hydraulic Testing and Numerical Groundwater Model

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### 1.0 INTRODUCTION

This document summarizes the construction of a three-dimensional, numerical groundwater flow model, and the development and use of an associated fate and transport model, that was initially prepared in support of the Assessment of Corrective Measures (ACM) and has been subsequently updated to support the Remedy Selection Report (RSR) for the AEP Mountaineer Plant (Plant) Bottom Ash Ponds (BAPs). The conceptual site model (CSM) used to develop this numerical groundwater model was presented in Section 2 of the ACM Report. The CSM was supplemented by additional data collection and hydraulic testing performed by Sanborn Head and AEP in March to May 2021 as described in Section 2. Development and calibration of the numerical groundwater model is presented in Section 3 and 4, with a discussion of the model results included in Section 5. The objectives for this modeling effort are as follows:

- Construct a numerical flow model to approximate the hydrogeologic CSM; and
- Use this numerical model of the groundwater flow system for predictive contaminant fate and transport simulations to support a planning level comparison of the three remedial alternatives presented in the ACM, with refinement of the alternatives as further discussed below.

### 2.0 GROUNDWATER FLOW STUDY

The Plant has several production wells (East 1, West 1, Well 4, Well 5, and Well 6) that extract water from the unconsolidated sand and gravel aquifer system. The extraction of water from these wells depresses groundwater elevations near the wells and influences the groundwater flow patterns in the vicinity, and downgradient, of the BAPs. The effect of the operation of the production wells on flow patterns in the vicinity of the BAPs has been the subject of previous assessments including as part of the BAP Groundwater Monitoring Well Network Evaluation (Arcadis, October 2016).

We note that data was previously recorded for well drawdown step-tests at East 1, West 1, and Fire Well #1 (Well 5) that were performed by AEP/Reynolds as part of well installation and testing in December 2008. In addition, groundwater level data was also recorded during shut-down testing of East 1 and West 1 in February/March 2019. To improve the understanding of the effect of the production wells on groundwater levels, the groundwater flow study performed by Sanborn Head and AEP in March to May 2021 was conducted specifically to provide data associated with pumping of Well 5 at the upper range of its capacity (approximately 400 gpm) while limiting the extraction of groundwater at East 1 and West 1 relative to the typical pumping rates of those two wells. The purpose of the groundwater flow study was to provide data that can be used to modify/re-balance extraction of groundwater during implementation of a remedy utilizing the existing Plant wells as a hydraulic control system (HCS).

From March to early May 2021, high resolution potentiometric head data was collected for ten site monitoring wells (JTMN-2, MW-016, MW-1607S, MW-1608, MW-1921, MW-1922S, MW-1922D, MW-1923, MW-1924, and MW-1925) in the vicinity of wells East 1, West 1, and Well 5, through transducer data loggers. Sanborn Head also made manual measurements of groundwater level at up to 29 site monitoring wells during the Well 5 test period from May 3 to May 7, 2021. AEP personnel provided data recorded by the Plant during the assessment period and a summary of pumping rates is provided in Exhibit 1. This including metered flow rate data for East 1, West 1, and Well 4 was recorded at 15-minute intervals from March 1 to May 10, 2021, to match the 15-minute interval groundwater level transducer data collected by Sanborn Head. Data for these wells was also recorded at 1-minute intervals from April 28 to May 10, 2021, to match the 1-minute interval groundwater level transducer data collected by Sanborn Head. Metered flow rate data for Wells 5 and 6 was provided as a daily average rate for the period from March 25 to May 10, 2021. Average river level was also provided by the Plant for the same period of record and measurement intervals as that recorded for wells East 1, West 1, and Well 4. The Well 5 pumping test started on May 3, 2021, and the well was run continuously at a rate of approximately 400 gpm for a period of 72 hours. During the test, to reduce the influence of other wells on groundwater level drawdown in the vicinity of Well 5, pumping of water for Plant operation was shifted from well West 1 to a combination of East 1 and Well 4, and Well 6 was not operated. Prior to the test, Well 5 was off for a period of three days to allow groundwater levels to recover in the vicinity of Well 5.

**Exhibit 1 – Summary of Plant Supply Well Pumping Rates During Study Period** – This table summarizes the average daily pumping rates for the Plant wells for the periods indicated.

Well	Averaged <sup>1</sup> Daily Pumping Rate (gpm)								
	Pre-Test Average <sup>2</sup>	April	May						
		30	1	2	3	4	5	6	7
East 1	410	460	320	270	420	470	500	390	430
West 1	400	360	200	90	150	280	140	170	310
Well 4	30	250	260	280	280	260	290	290	200
Well 5	70	0	0	0	400	400	400	0	70
Well 6	10	100	100	100	0	0	0	20	0

### 3.0 MODEL DEVELOPMENT

The numerical flow model was developed based on assessments and interpretations of data collected at the site over varying periods of time by others as documented in the ACM Report, and by Sanborn Head as described in Section 2. We acknowledge that inferences and assumptions made have not necessarily been confirmed or measured in the field for all locations and depths. The goal for model calibration was generally to match groundwater flow directions indicated by available field data, and generally match the hydraulic gradients and saturated thickness in the model area, while honoring the hydraulic conductivity values determined by others. The model should not be viewed as a unique solution/portrayal of groundwater flow in unconsolidated and consolidated units in the model area, but should be considered an approximate analog, developed based on available knowledge and interpretations of site conditions, and a codification of the CSM.

#### 3.1 Model Code

The software package Groundwater Vistas 6.96 (64-bit, Build 41) was used for model processing, with MODFLOW-NWT<sup>1</sup> (a version of MODFLOW-2005<sup>2</sup> which offers a Newton formulation for solving nonlinear problems) selected as the flow model solver. MT3D<sup>3</sup> is the software package implemented within Groundwater Vistas that was used for development of the solute fate and transport model, and includes processes for simulating advection, dispersion, and chemical reactions of contaminants in groundwater flow systems.

#### 3.2 Model Discretization

The model was discretized into a rectangular grid with model cells of 200 feet (ft) by 200 ft over the model domain, with 100 rows and 30 columns, i.e., 6,000 ft wide by 20,000 feet long covering an area of approximately 0.65 square miles. Three layers were used for vertical discretization to simulate the saturated overburden sand and gravel geologic unit, resulting in a total of 9,000 model grid cells. All model cells in layer one are active; in model layers two and three, model cells in the 6 westernmost columns of layer 2, and 12 westernmost columns of layer 3 were made inactive, to simulate the approximate topography of the underlying bedrock surface that is conceptually assumed to have no significant groundwater flow compared to the overlying granular sand and gravel. Exhibit 2 below summarizes the model layers and unit types.

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<sup>1</sup> Niswonger, Richard G., Sorab Panday and Motomu Ibaraki, MODFLOW-NWT, A Newton Formulation for MODFLOW-2005: U.S. Geological Survey Techniques and Methods 6-A37, variously paginated.

<sup>2</sup> Harbaugh, A.W., 2005, MODFLOW-2005, the U.S. Geological Survey modular groundwater model – the Groundwater Flow Process: U.S. Geological Survey Techniques and Methods 6-A16, variously paginated.

<sup>3</sup> Zheng, C., Wang, P.P., “MT3DMS: A modular three-dimensional multispecies transport model for simulation of advection, dispersion, and chemical reactions of contaminants in groundwater systems; Documentation and User’s Guide,” US Army Corps of Engineers, 1999, 221p.

**Exhibit 2 – Summary of Model Layers and Relationship to Site Geology and Groundwater** – This table summarizes the model layer number, elevations, and associated geology and groundwater condition applied in the model.

Model Layer Number	Layer Elevation Top/Bottom (feet)	Geologic Unit		Aquifer Type
1	Ground Surface 600	Active (Fine Sand)		Partially saturated (water table ~550-540)
	530			
2	530	Inactive (bedrock)	Active (Coarse Sand)	Saturated
	515			
3	515	Inactive (bedrock)	Active (Sand and Gravel)	Saturated
	500			

### 3.3 Hydraulic Conductivity

Hydraulic testing (single-well aquifer tests [“slug tests”] and pumping tests) have been performed at the site as summarized in Appendix C of the Mountaineer CCR Monitoring Well Network Evaluation (Arcadis, 2016)<sup>4</sup>. Based on our understanding of the overburden geology and the hydraulic conductivity data available for the site, the overall conceptual approach used for this groundwater model is a layered system with hydraulic conductivity values generally increasing with depth, with the highest conductivity unit present in layer 3 (sand & gravel) as summarized in the Exhibit 3 below. Vertical hydraulic conductivity values were assigned as 10% of the horizontal values for each layer.

**Exhibit 3 – Hydraulic Conductivities used in Model** – This table summarizes the model layer number and the K values used in the model. The units assigned in the model are feet per day (ft/day).

Layer No.	Kh (ft/day)	Kh (ft/day)	Kv (ft/day)	Updated Layer Notes
1	115	115	11.5	Upper Sand
2	225	225	22.5	Lower Sand
3	350	350	35.0	Sand & Gravel

### 3.4 Model Boundary Conditions

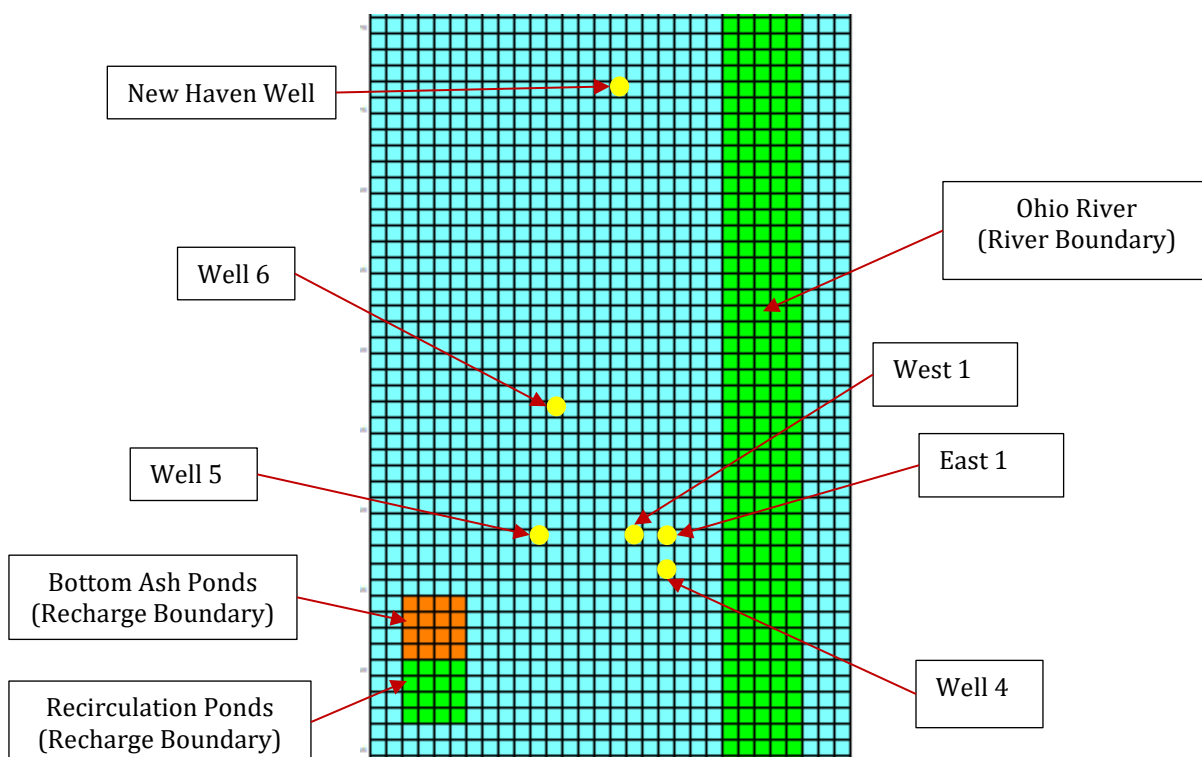
Pumping wells are simulated in the model including five wells located at the Mountaineer Plant and one public supply well located north of the site. The approximate location of the wells within the model are shown on Exhibit 4 below. The model domain also includes the Ohio River to the east of the Site, which is simulated as river boundary condition (BC) cells. The sides and base of the model are treated as no-flow boundaries i.e., it is assumed that

<sup>4</sup> Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation, Mountaineer Plant, prepared by Arcadis, on behalf of AEP, dated October 27, 2016.

there is no inflow of groundwater from bedrock and that there is no lateral flow of groundwater from the overburden soils upgradient of the model domain.

### 3.5 Distributed Recharge

A recharge value of 12 inches per year (in/year) was assigned across the extent of the model (blue cells in Exhibit 5) based on the groundwater model developed by Arcadis (2016). The only modification to this is the application of a higher recharge value associated with the Bottom Ash Ponds and the adjacent recirculation ponds of the BAP complex where a higher recharge value of 66 in/year is applied to represent leakage from the ponds.



**Exhibit 4 - Model Grid and Boundary Conditions** - This exhibit shows the model setup including: river boundary, pumping wells, and different recharge zones assigned to the top layer of the model. The full model grid is not shown.

### 4.0 MODEL CALIBRATION

Model calibration was initially performed for the groundwater model during preparation of the ACM using a semi-quantitative approach where simulated groundwater contours were visually matched to groundwater contours that were developed based on measured groundwater elevation data i.e., individual calibration points were not used in the model.

The simulated pumping rates<sup>5,6</sup> applied in the steady-state model during preparation of the ACM are summarized in Exhibit 5 and were based on information provided in Appendix C of

<sup>5</sup> Simulated pumping rates for site wells are based on information provided in Appendix C of the Ash Pond System-CCR Groundwater Monitoring Well Network Evaluation.

<sup>6</sup> The simulated pumping rate for the New Haven well is based on information provided in the New Haven Water Department Source Water Assessment Report prepared by West Virginia Department of Health and

the BAP Groundwater Monitoring Well Network Evaluation (Arcadis, October 2016). The Ohio River boundary condition was modeled with a surface water elevation approximately equivalent to the non-flood river stage of 541.5 ft, and recharge rates were applied as stated in Section 3.5.

**Exhibit 5 – Pumping Wells Present in the Model** – This table summarizes the name and model assigned pumping rate of each well present in the model. The units assigned in the model are cubic feet per day (ft<sup>3</sup>/d).

Pumping Well	Simulated Flow Rates		
	gpm	gpd	ft <sup>3</sup> /d
Well 5	0	0	0
West 1	750	1,080,000	144,375
East 1	150	216,000	28,875
Well 6	0	0	0
Well 4	0	0	0
New Haven 3	93	133,920	17,903

The modeled steady-state groundwater contours were compared to those presented in Figure C-3 and Figure C-4 from Appendix C of the Groundwater Monitoring Well Network Evaluation Report (Arcadis, 2016). The following Section 4.1 and 4.2 described the additional quantitative calibration that was performed following collection of the data described in Section 2.

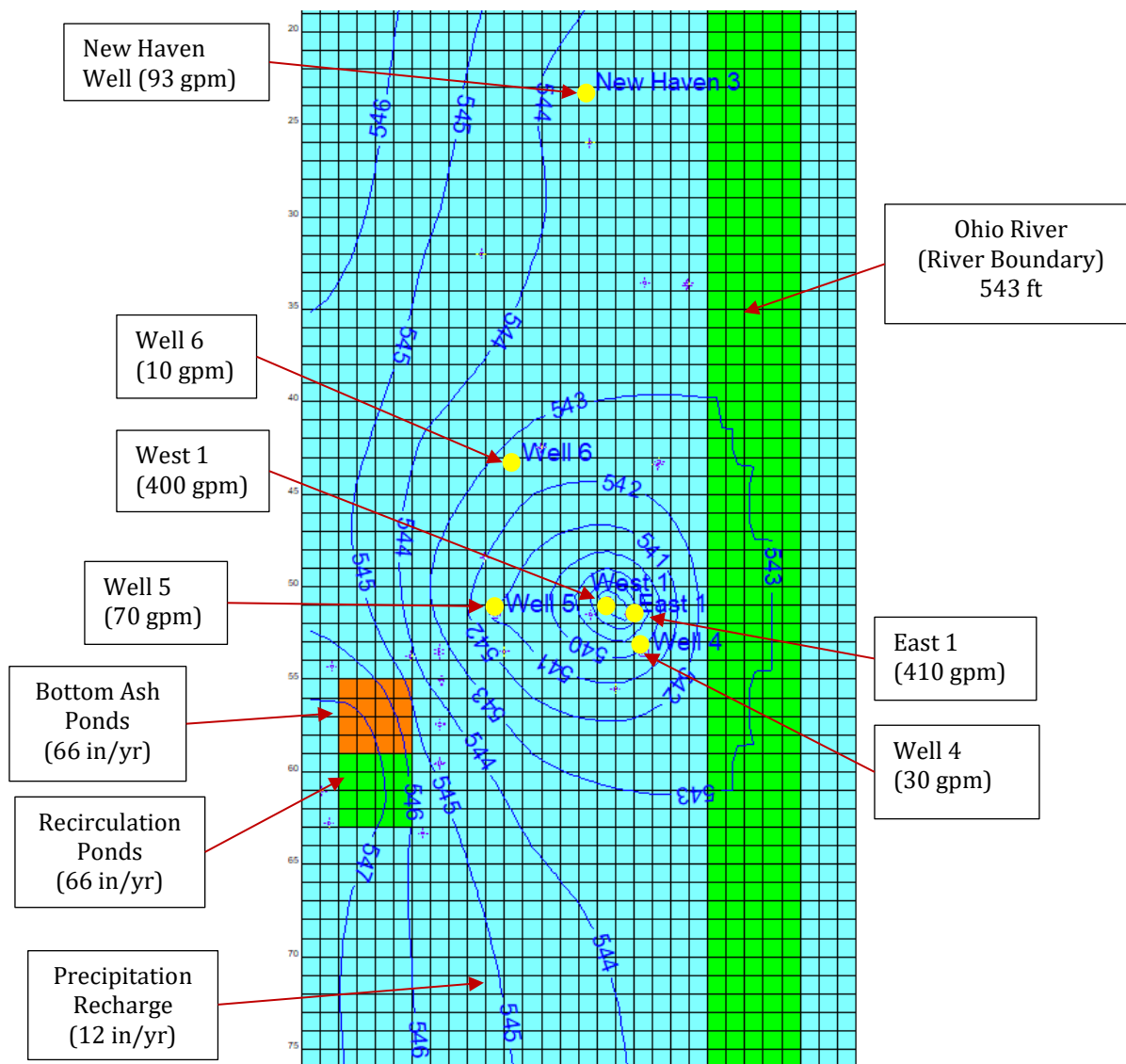
#### 4.1 Steady-State Calibration

For the current selection of remedy, an additional quantitative calibration was performed with the model setup to simulate the operation of Plant production wells associated with the period of data collection described in Section 2 of this appendix. The model results were then compared to the data recorded for the Plant supply wells and the monitoring wells. Exhibit 6 shows the simulated steady-state groundwater flow for the conditions observed at the site on May 3, 2021.

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Human Services. March 2003. The supply is from a single well. The report states that the well is pumped to provide an average daily production of about 133,671 gallons per day.



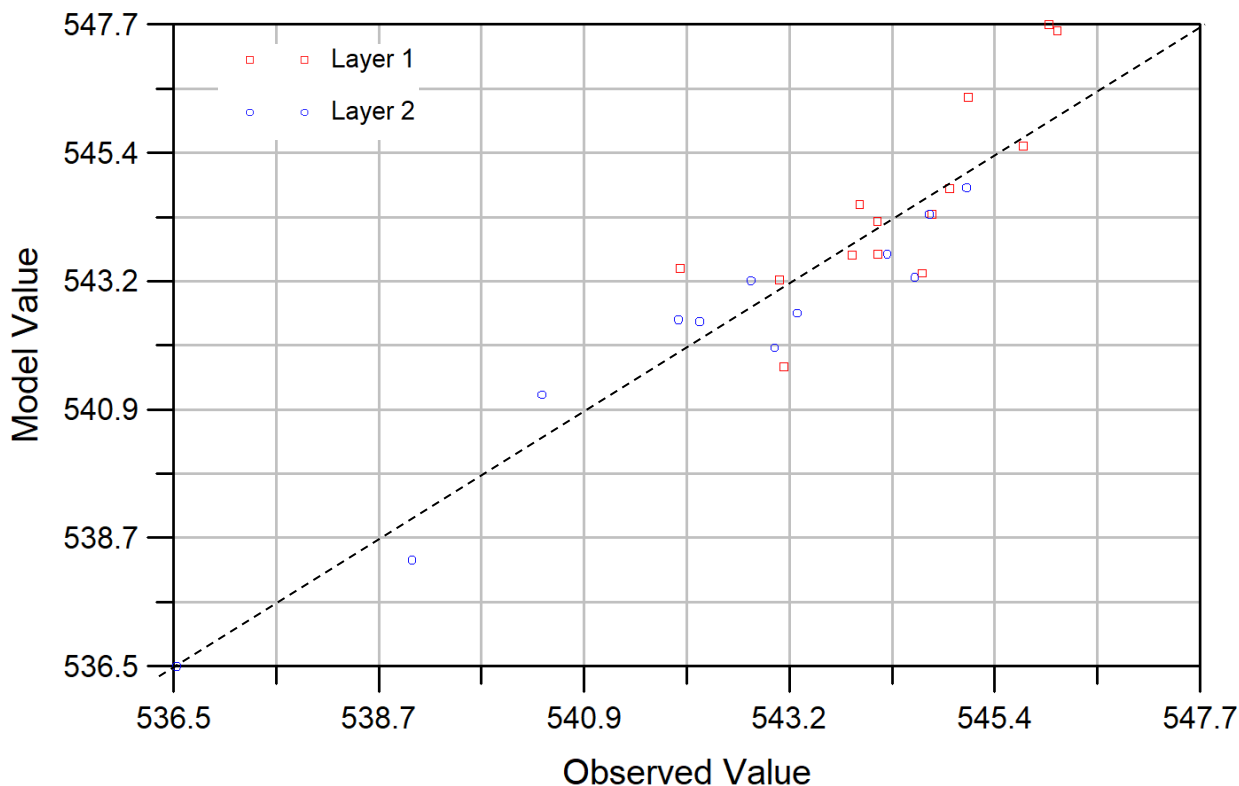


**Exhibit 6 – Steady-State Groundwater Contours** – This exhibit shows the steady-state groundwater contours simulated by the groundwater flow model for average site conditions observed in the two months prior to May 3, 2021.

A value less than 10% for the residual standard deviation divided by the range in targets heads is generally accepted as a measure of a well-calibrated model. Overall, the residual standard deviation divided by the range in targets heads over the 26 target wells for the model was 8.7%, (0.84 ft/9.6 ft). Complete listings of the calibration statistics for the steady-state model are summarized in Exhibit 7.

**Exhibit 7 – Steady-State Model Calibration Statistics**

Residual Mean	0.0235
Absolute Residual Mean	0.681
Residual Std. Deviation	0.841
Sum of Squares	18.4
RMS Error	0.841
Min. Residual	-1.65
Max. Residual	1.44
Number of Observations	26
Range in Observations	9.62
Scaled Residual Std. Deviation	0.0874
Scaled Absolute Residual Mean	0.0708
Scaled RMS Error	0.0875
Scaled Residual Mean	0.00245

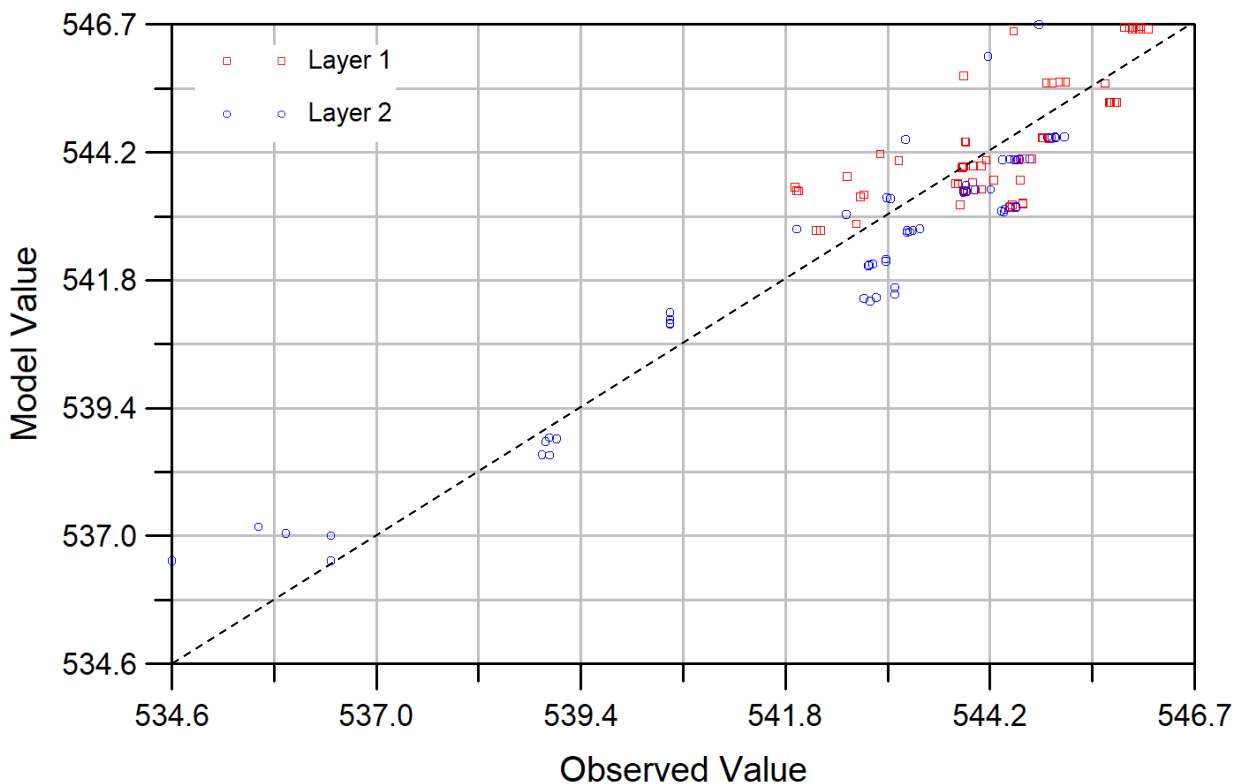


**Exhibit 8 – Steady-State Model Results**– This exhibit shows the scatter plot of observed groundwater levels (May 3) versus calculated model results for the steady-state conditions shown in Exhibit 6

## 4.2 Transient Calibration

To assess the transient calibration of the groundwater flow model i.e., to see how well the model responds to changes in pumping rates and river levels, the flow model was setup to simulate the site conditions and Plant well operations observed during the period associated with the Well 5 pumping test i.e., May 3 to May 7, 2021, as previously summarized above in Exhibit 1. A period of rain also occurred during the Well 5 test period which resulted in an increase in the level of the Ohio River from approximately 543 ft AMSL before the test to 551 ft AMSL at the end of the test period. The change in reiver level during the test period was incorporated into the transient model, but the precipitation rate included in the model was maintained at an average rate equivalent to 12 in/year (prorated as a daily rate of 0.00274 feet/day)

As shown in Exhibit 9 (scatter plot of observed versus calculated) and summarized in Exhibit 10, calibration statistics for the transient model are comparable to those reported for the steady-state model, which indicates that the model can replicate the flow conditions that results due to changes in well pumping rates and to changes in the Ohio River level. In particular, the monitoring wells in the vicinity of Well 5 (including MW-016, MW-1922D, and MW-1925) showed a similar change in the observed groundwater levels in response to the Well 5 pumping test to those calculated by the numerical groundwater flow model for the same conditions.



**Exhibit 9 – Transient Model Results**– This exhibit shows the scatter plot of observed groundwater levels (May 3 to May 7) versus calculated model results for the transient groundwater flow model conditions described in Section 4.2.

**Exhibit 10 – Transient Model Calibration Statistics**

Overall, the residual standard deviation divided by the range in targets heads over the 130 target wells (i.e., 26 wells with measurements collected on 5 separate days) for the model was 7.1%, (0.82 ft/11.5 ft). Complete listings of the overall calibration statistics for the transient flow model are summarized in Exhibit 10.

Residual Mean	0.0491
Absolute Residual Mean	0.690
Residual Std. Deviation	0.818
Sum of Squares	87.4
RMS Error	0.820
Min. Residual	-2.00
Max. Residual	1.55
Number of Observations	130
Range in Observations	11.5
Scaled Residual Std. Deviation	0.0712
Scaled Absolute Residual Mean	0.0600
Scaled RMS Error	0.0713
Scaled Residual Mean	0.00427

## 5.0 FATE AND TRANSPORT

Following calibration of the numerical flow model, a fate and transport model was developed to simulate transport of lithium from the BAP source area, and to obtain an approximate match to currently observed lithium concentrations in groundwater downgradient of the

BAPs. MT3D<sup>7</sup> is the software package used for development of the solute fate and transport model, and includes processes for simulating advection, dispersion, and chemical reactions of contaminants in groundwater flow systems. For the purposes of this assessment, no reactions were simulated, and model runs were performed with and without sorption as described in Section 4.1.4. The advection term was solved using the finite difference package, with the generalized conjugate gradient (GCG) solver used as the transport equation solver. Inputs for the fate and transport simulation and results from the simulation are provided below.

## **5.1 Fate and Transport Model Parameters**

### **5.1.1 Concentration Source**

Information about subsurface contamination is summarized in Section 2.3.5 of the ACM Report<sup>8</sup> with data obtained from the BAP Statistical Analysis Summary Report (January 2019)<sup>9</sup>. A constant recharge concentration of 200 µg/l lithium was applied to the water entering the model as recharge from the BAPs to obtain an approximate match to the observed lithium concentrations in groundwater in the CCR Monitoring Well Network downgradient of the BAPs.

### **5.1.2 Porosity**

The porosity value applied was based on typical literature values for the overburden geology being model. The effective porosity value used in the transport model simulations was 30%. The porosity value was not varied based on geology/layer and was assigned uniformly across the entire model.

### **5.1.3 Hydrodynamic Dispersion**

The program considers MT3D hydrodynamic dispersion tensor, as proposed by Frind & Burnett (1987) in order to evaluate the parameters of horizontal, transverse, and vertical dispersivity. Calculated values for dispersivity of contaminants in the aquifer are based on the assumed transport path flow length. For this simulation, an approximate transport path flow length distance of 200 ft was used in the calculation, i.e., equal to the dimensions for one grid cell of the model grid. The longitudinal dispersivity used in the model was 20 ft, transverse dispersivity was 2.0 ft, and vertical dispersivity assigned a value of 0.2 ft, i.e., factors of 0.1, 0.01, and 0.001 of the transport path flow length.

### **5.1.4 Chemical Reactions**

The MT3D code is capable of handling equilibrium-controlled linear or non-linear sorption, nonequilibrium (rate-limited) sorption, and first-order reaction that can represent

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<sup>7</sup> Zheng, C., Wang, P.P., "MT3DMS: A modular three-dimensional multispecies transport model for simulation of advection, dispersion, and chemical reactions of contaminants in groundwater systems; Documentation and User's Guide," US Army Corps of Engineers, 1999, 221p.

<sup>8</sup> Assessment of Corrective Measures, Bottom Ash Pond, Mountaineer Plant, New Haven, West Virginia prepared by Sanborn, Head & Associates, on behalf of AEP, dated June 24, 2019.

<sup>9</sup> Statistical Analysis Summary, Bottom Ash Pond, Mountaineer Plant, New Haven, West Virginia prepared by Geosyntec Consultants, on behalf of AEP, dated January 8, 2019.

radioactive decay or provide an approximate representation of biodegradation. The geochemistry and environmental fate and transport of lithium is summarized in *Chemical Constituents in Coal Combustion Products: Lithium*. (EPRI, Palo Alto, CA: 2018. 3002012311), and pertinent information from this guidance document was considered in the development of this screening level lithium fate and transport simulation. For the simulation of lithium transport described in this memorandum, only equilibrium-controlled linear sorption is applied to model simulations based on a soil/water partition coefficient ( $K_d$ ). The  $K_d$  is a factor that is applied to the groundwater seepage velocity rate, to account for the retardation (i.e., slowing down) of a dissolved contaminant due to partitioning (i.e., by adsorption to solid particles) of the contaminant between solid and dissolved phases.  $K_d$  is defined as the ratio of: the contaminant concentration sorbed per unit mass of solid, to the dissolved concentration of the contaminant remaining in solution at equilibrium, or

$$K_d = \text{Contaminant Concentration in Soil} / \text{Contaminant Concentration Dissolved in Groundwater.}$$

A literature review was performed to collect published soil/water partition coefficient ( $K_d$ ) values for lithium which are provided in Exhibit 11.  $K_d$  values vary based on factors such as: method of analysis; soil composition (e.g. grain size, mineralogy, organic matter content, initial COC concentration); water composition (e.g. initial COC concentration, pH); and solid/liquid ratio. Therefore, the literature search was limited to references that provide overview of multiple studies to gain an understanding of the degree of variability, as well as studies based on conditions generally similar to those encountered at the site (e.g. granular soils and near neutral groundwater pH).

**Exhibit 11 – Summary of Literature Review - Lithium Partition Coefficient Values**

Analyte	Soil/Water Partition Coefficient (mL/g)	Reference	Notes
Lithium	0.0	(a) USDOE 1989	pH 5 to 9, sandy soils
	0.2		pH 5 to 9, loamy soils
	0.8		pH 5 to 9, clayey soils

Notes:

1. References:

(a) Chemical Data Bases for the Multimedia Environmental Pollutant Assessment System (MEPAS): Version 1, prepared by Strenge, D.L. and Peterson, S.R. (Pacific Northwest National Laboratory operated by Battelle) on behalf of the U.S. Department of Energy, dated December 1989.

2. Soil/water partition coefficients ( $K_d$ ) are presented in units of milliliters per gram (mL/g).

Equilibrium-controlled linear sorption is incorporated in the model as part of the retardation factor ( $R$ ), which is represented by the equation:

$$R = 1 + \frac{\rho_b}{\theta} K_d$$

Aquifer bulk density ( $\rho_b$ ) has a value in the model of 1.85 g/cm<sup>3</sup>, and porosity ( $\theta$ ) has a value in the model of 0.3 (30%), both of which are representative of sand and gravel soils. Based on the literature review and the types of overburden soils present at the site, lithium may be expected to be weakly attenuated in the shallow silty clay soils beneath the BAPs, but would be expected to be relatively mobile (non-retarded) in the groundwater present in the deeper sand and gravel under existing Site conditions. Therefore, the sorption coefficient ( $K_d$ ) was assigned a value of zero for half of the simulations and a value of 0.8 cm<sup>3</sup>/g (mL/g) for the other half to provide two potential end-points for lithium transport. As summarized in Exhibit 11, the  $K_d$  value of zero represents non-retarded lithium transport that may occur in overburden soils with a higher sand and gravel content, while the  $K_d$  value of 0.8 cm<sup>3</sup>/g is representative of retarded lithium transport that may occur in overburden soils with a higher clay content.

## 5.2 Fate and Transport Model Calibration

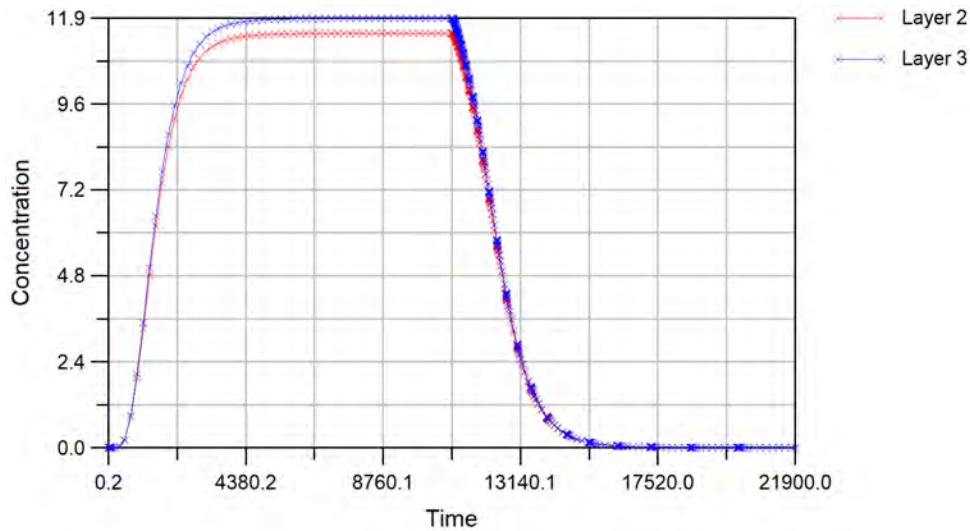
To obtain an approximate match to the observed lithium concentrations in groundwater in the CCR Monitoring Well Network downgradient of the BAPs, a constant recharge concentration was applied to the water entering the model as recharge from the BAPs. As indicated in Section 4.1.1 above, information about subsurface contamination is summarized in Section 2.3.5 of the ACM Report<sup>10</sup> with data obtained from the BAP Statistical Analysis Summary Report (January 2019)<sup>11</sup>, and this information was used to assess the adequacy of the fate and transport model calibration.

At the beginning of the fate and transport calibration, the lithium concentration throughout the model was equal to zero. To obtain an approximate calibration for the lithium fate and transport model, the simulation was run for 30 years with the flow model component run as steady-state i.e., no change in pumping rates, recharge rates, or river level. The simulation was run for this duration to provide sufficient time to represent the approximate length of BAP operation at the site, and to allow the fate and transport model to reach a steady-state solution. Exhibit 12 shows the concentration with time chart for simulated lithium concentrations at the West 1 well. The chart shows that the concentration reaches a steady-state condition before the end of the 30-year loading period.

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<sup>10</sup> Assessment of Corrective Measures, Bottom Ash Pond, Mountaineer Plant, New Haven, West Virginia prepared by Sanborn, Head & Associates, on behalf of AEP, dated June 24, 2019.

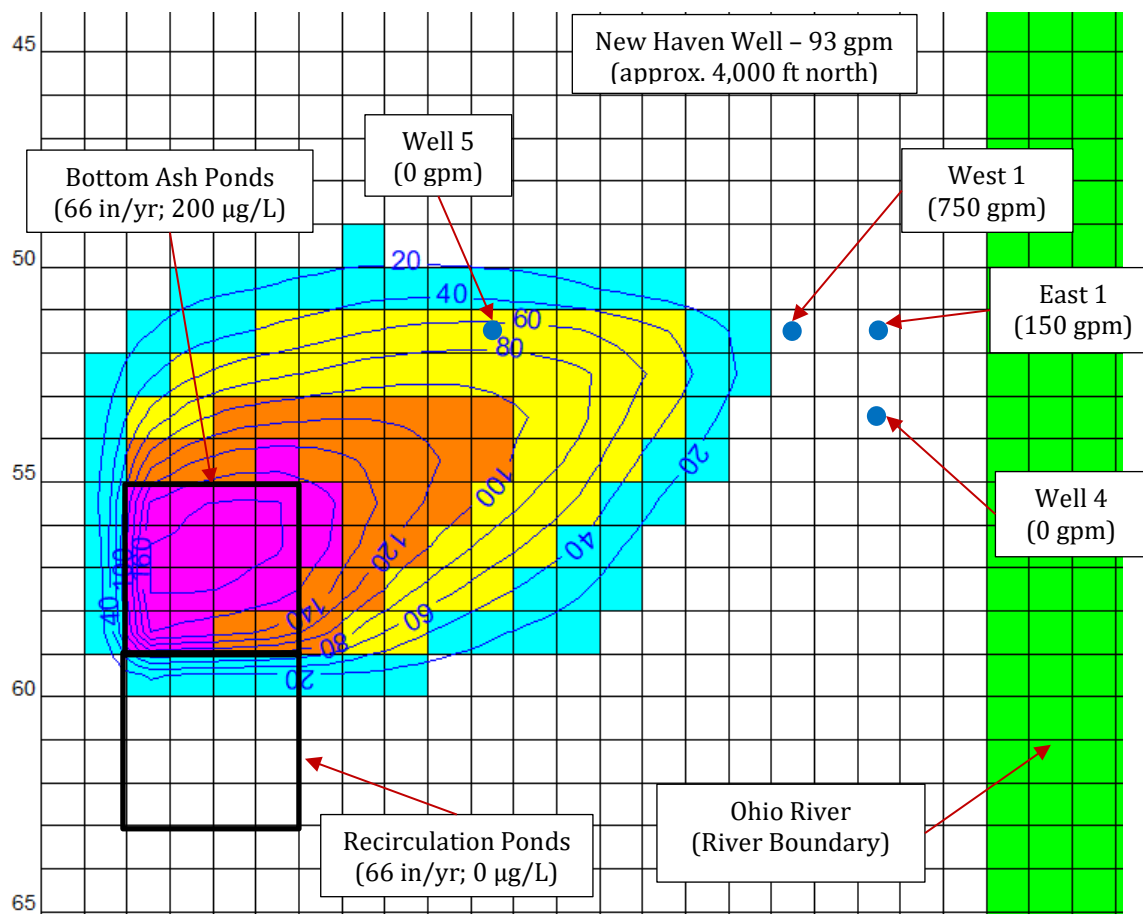
<sup>11</sup> Statistical Analysis Summary, Bottom Ash Pond, Mountaineer Plant, New Haven, West Virginia prepared by Geosyntec Consultants, on behalf of AEP, dated January 8, 2019.



**Exhibit 12 – Simulated Lithium Concentrations at Well West 1 During a 30-Year BAP Operation Period and a 30-Year Closure Period** – Well West 1 is screened in layer 2 and 3 of the model and concentrations are shown for groundwater withdrawn from each layer of the model at the well location. Concentrations are in µg/L and time is in days.

Following a limited iteration of the source concentration, a BAP recharge lithium concentration of 200 µg/L was found to provide a reasonable approximation of the concentrations observed in site groundwater downgradient of the BAP. Exhibit 13 shows the fate and transport calibration steady-state lithium concentrations simulated in layer 1 of the model under steady-state groundwater flow conditions with a constant lithium source from the BAP recharge of 200 µg/L for a period of 30 years. The simulated magnitude and distribution of lithium concentrations downgradient of the BAP are considered sufficiently representative of recently observed site conditions as to allow use of the model for screening level simulation of the remedial alternatives. The model simulation shows that the position of the plume is influenced by pumping of the site wells and by recharge from the adjacent recirculation ponds. Lithium concentrations decrease away from the BAP because of dilution and dispersion. Simulated lithium concentrations at the West 1 well in layer 1 of the model are below 10 µg/L resulting from dilution by precipitation and from dilution caused by the pumping well drawing in clean water from outside of the plume footprint. The depth of the well screen also results in a diving plume resulting from the downward gradient induced around the pumping well.





**Exhibit 13 - Fate and Transport Calibration Steady-State Lithium Concentrations** - This exhibit shows the steady-state lithium concentrations simulated in layer 1 of the model under steady-state groundwater flow conditions with a constant lithium source from the BAP recharge of 200 µg/L for a period of 30 years. Simulated lithium concentrations in groundwater are represented by the blue contour lines and the shaded blue (10 to 40 µg/L), yellow (40 to 100 µg/L), orange (100 to 150 µg/L), and magenta (150 to 200 µg/L) grid cells.

We note that other potential sources of lithium in groundwater other than the BAP have not been simulated. In addition, as previously stated we have assumed that the base and side of the model is a no-flow boundary (i.e., no inflow of groundwater from bedrock to overburden soils). This is a conservative approach in terms of the hydraulics of the simulation because additional inflow of groundwater from bedrock would act to dilute the lithium concentration in overburden groundwater (assuming that the concentration of lithium in bedrock groundwater is less than the concentration in overburden groundwater).

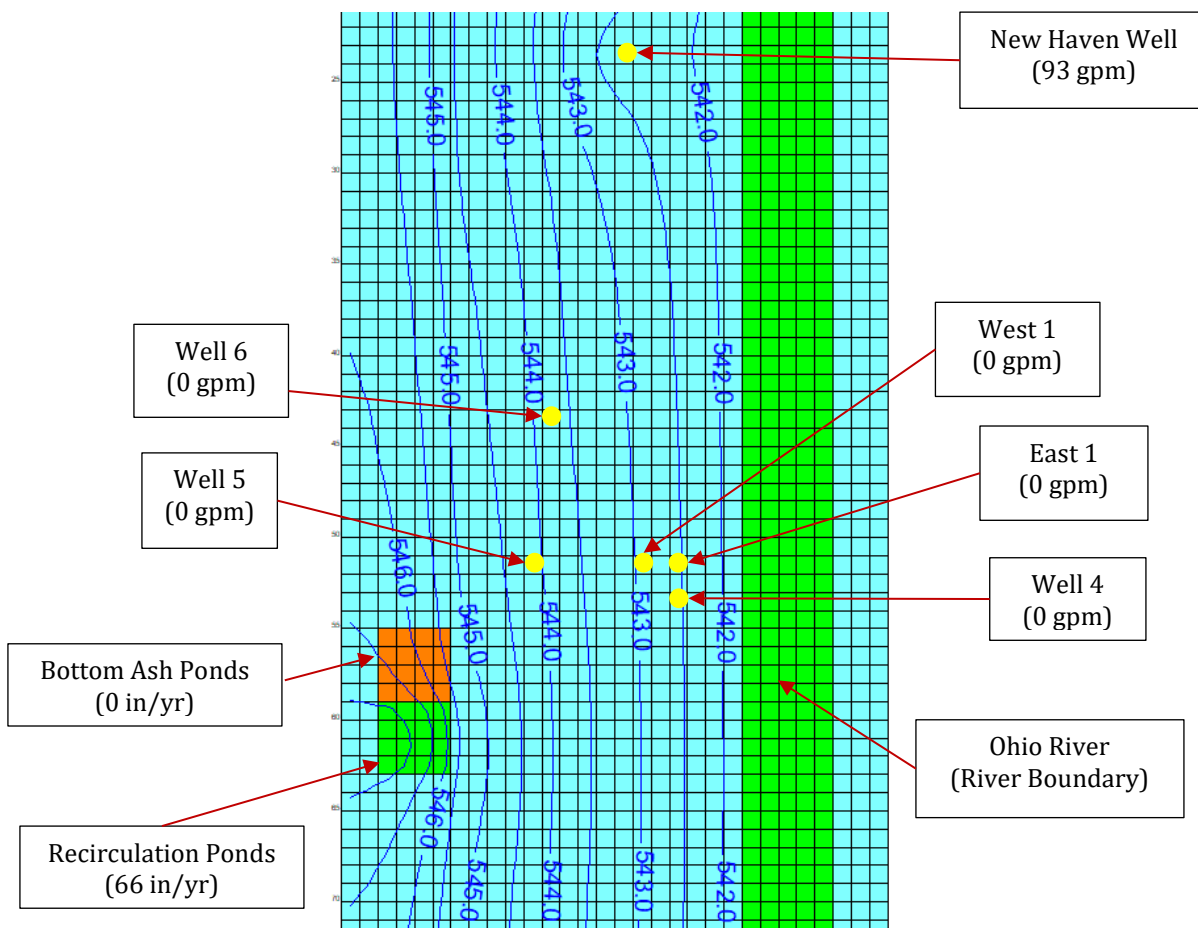
### 5.3 Setup of Remedial Alternatives Model Simulations

Following the fate and transport calibration, the model was used to simulate three remedial alternatives associated with closure and remediation of the BAP as documented in the ACM report. The three remedial alternatives all include closure of the ponds followed by either: monitored natural attenuation (MNA); pumping and ex-situ treatment of groundwater; or in-situ permeable reactive barrier. Pond closure may consist of capping of the ponds, or excavation of the bottom ash followed by lining and repurposing of the ponds. Both approaches will result in a cessation of recharge from the BAP into groundwater. Therefore,

for each simulation of the remedial measures, the recharge rate associated with the BAP was reduced to zero, but the recharge rate associated with the recirculation ponds was maintained at a rate of 66 in/year for the duration of the simulations. As noted in Section 4.2, each simulation was run with a  $K_d$  of zero and a  $K_d$  of 0.8 cm<sup>3</sup>/g (mL/g) resulting in six separate simulations. Model conditions that were individually varied for each of the three remedial alternatives are further described below.

### 5.3.1 Monitored Natural Attenuation

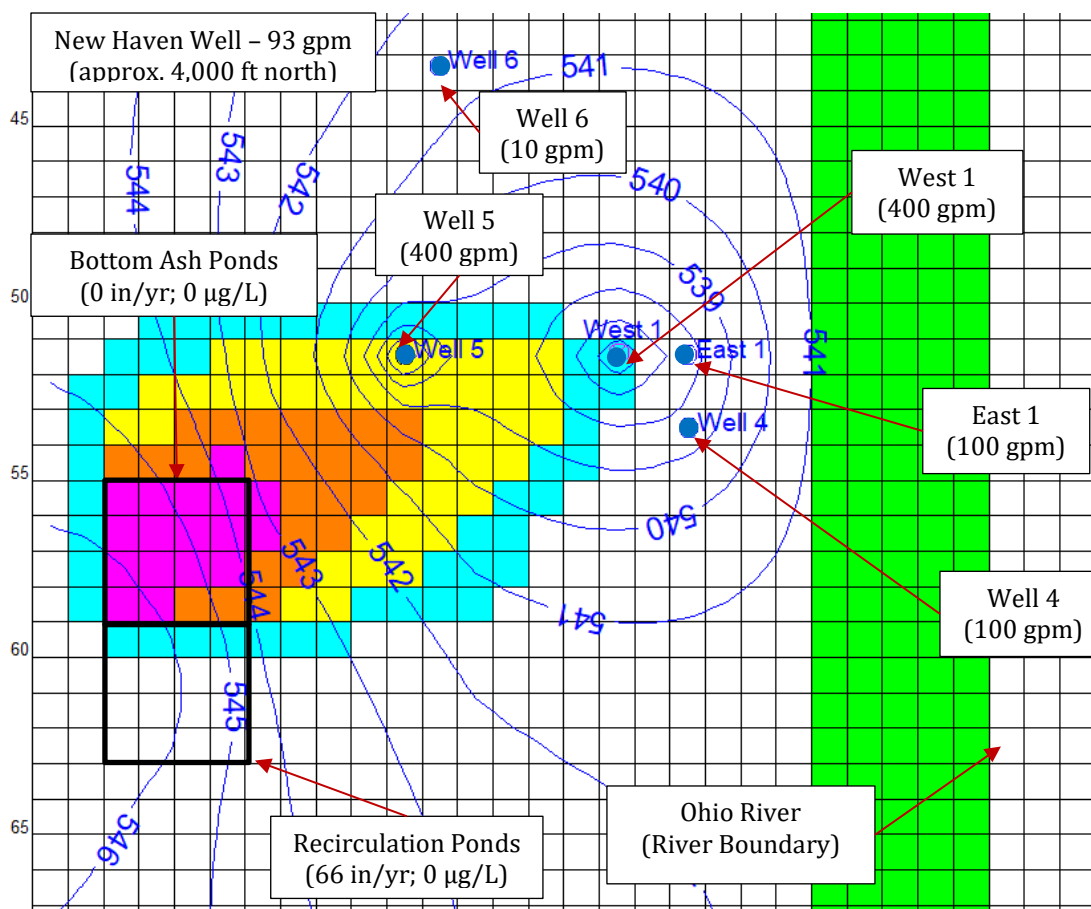
For the MNA scenario, all site extraction wells had pumping rates set to zero for the duration following simulated pond closure. The New Haven Well continued to pump at a steady-state rate equal to 93 gpm. The steady-state groundwater contours resulting from this model configuration are shown in Exhibit 14. Although the Plant wells will be operational for a period after the BAP have been lined and repurposed (i.e., while the Plant is still operational), the MNA remedy option was simulated without any Plant pumping wells active to allow for comparison of the time frame associated with MNA and that of the HCS and PRB remedy options. The other change in condition relative to the calibration condition is the removal of recharge and lithium source from the BAP area, which simulates the proposed closure, lining and repurposing of the BAP.



**Exhibit 14 – Simulated Groundwater Flow for MNA** – This exhibit shows the steady-state groundwater flow conditions for BAP post-closure conditions and with no site wells operational (New Haven well pumping at 93 gpm).

### 5.3.2 Hydraulic Containment System (HCS)

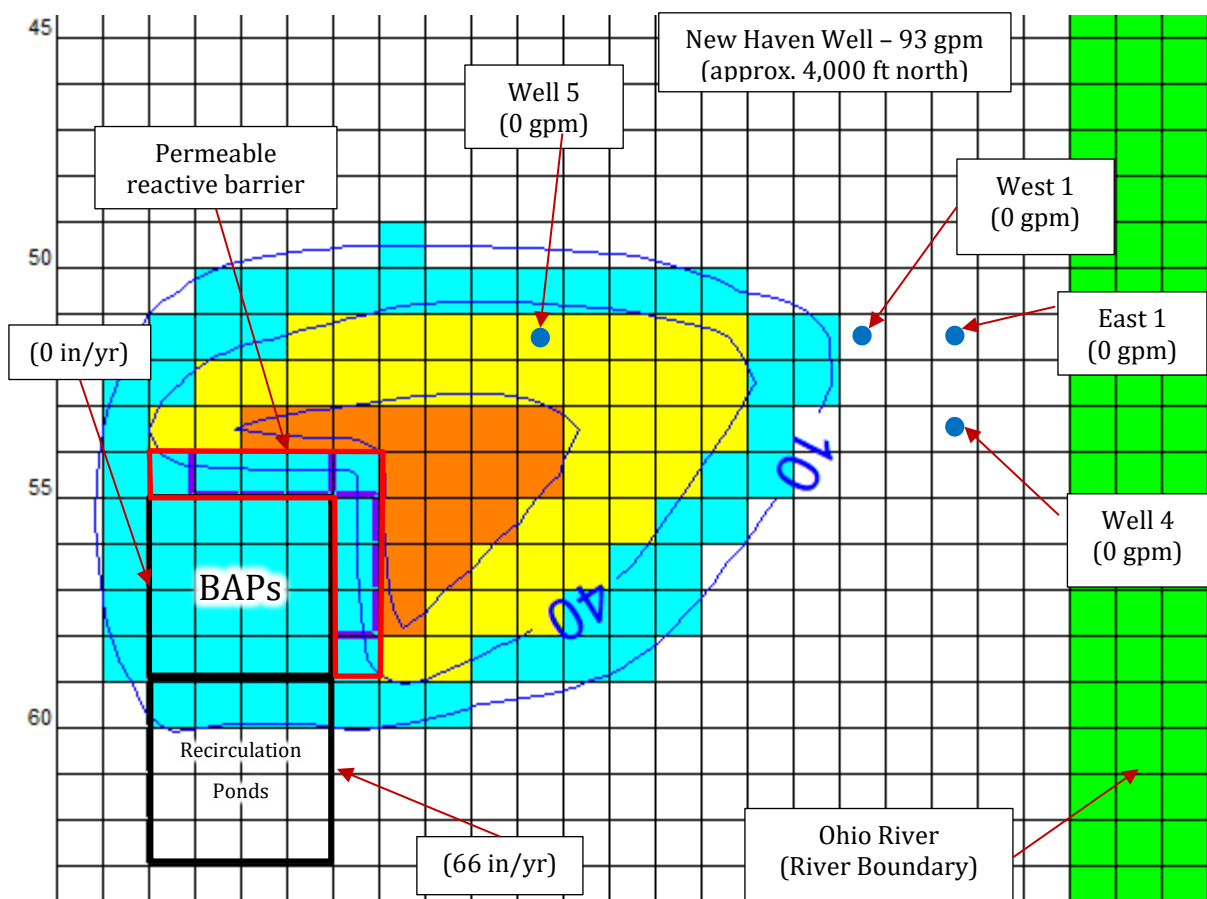
For the simulation of the HCS remedial alternative, pumping rates assigned in the model during the initial calibration phase were adjusted to represent a condition that maintains the approximate total volume of water extracted (roughly 1,000 gpm), but shifts groundwater extraction closer to the BAP area. We note that this is a new simulation relative to the HCS scenario modeled during the preparation of the ACM. The new setup simulated for the remedy selection process is considered favorable to that considered as part of the ACM because it will likely reduce the time required to remove lithium from groundwater and will also limited the spreading of the plume by positioning groundwater extraction closer to the BAP source area. As with the MNA scenario, the New Haven Well continued to pump at a steady-state rate equal to 93 gpm, and the BAP contributes no recharge or lithium source. Exhibit 15 shows the simulated groundwater contours and lithium concentrations in groundwater at the initiation of the HCS remedy.



**Exhibit 15 - HCS Conditions at Initiation of Remedy** - This exhibit shows the groundwater contours, proposed pumping rates, and lithium concentrations simulated in layer 1 of the model at the initiation of the HCS remedy. To represent lining and repurposing of the BAP, the BAP area has no recharge and does not contribute lithium mass to groundwater once the remedy is initiated. Simulated lithium concentrations in groundwater are represented by the blue contour lines and the shaded blue (10 to 40 µg/L), yellow (40 to 100 µg/L), orange (100 to 150 µg/L), and magenta (150 to 200 µg/L) grid cells.

### 5.3.3 Permeable Reactive Barrier

The simulation for the permeable reactive barrier alternative is setup in a similar manner as the MNA option but with the following differences. The hydraulic component of a permeable reactive barrier was simulated using the Horizontal Flow Barrier (HFB) Package available in MODFLOW (also referred to as the Wall boundary condition). This boundary condition was assigned to the grid cells indicated by the red outline in Exhibit 16 and was assigned to each active and saturated layer at that horizontal location. The hydraulic properties assigned to the boundary condition include wall thickness which was set to 1 foot in the simulation, and hydraulic conductivity of the wall which was set to be 10% of the hydraulic conductivity for the model layer in which the boundary was assigned. As shown in Exhibit 16, at the start of the simulation, the lithium concentration was equal to the pre-remediation calibration condition with the exception that the lithium concentration in all model grid cells upgradient of the wall and in the model cells where the wall is present was modified to be 30  $\mu\text{g/l}$ . This modification was made to simulate the potential reduction in lithium concentration due to the influence of the permeable reactive barrier. Downgradient of the wall the initial concentrations are represented by the plume concentrations simulated in the pre-remediation steady-state model.



**Exhibit 16 - Simulation of Permeable Reactive Barrier** - This exhibit shows the setup of the permeable reactive barrier simulation showing conditions immediately after closure of the BAPs. Simulated lithium concentrations in groundwater are shown for model layer 1 and are represented by the blue contour lines and the shaded blue (10 to 40  $\mu\text{g/L}$ ), yellow (40 to 100  $\mu\text{g/L}$ ) and orange (greater than 100  $\mu\text{g/L}$ ) grid cells.

## 5.4 Remedial Alternatives Simulation Results

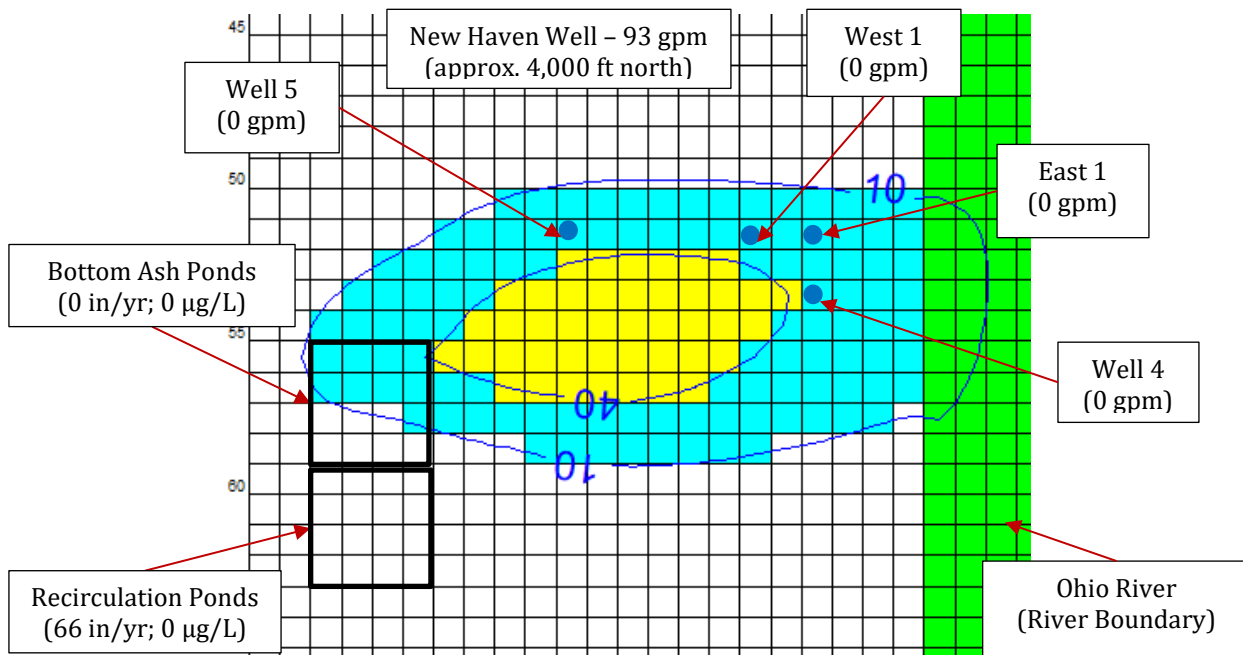
Following setup of each of the models representing the three remedial alternatives, the fate and transport model was run for a duration long enough to observe concentrations less than the lithium groundwater protection standard in each of the model layers. As described previously, each of the three models was run with the partition coefficient set to zero and a value of 0.8 cm<sup>3</sup>/g to simulate non-retarded and retarded lithium transport. Exhibit 17 summarizes the time taken for the simulated lithium concentrations to fall below the lithium GWPS of 40 µg/l throughout the simulated extent of the plume deriving from the BAP. The model results were previously used in the ACM to provide a comparison of potential remedial time-frames for each of the three remedial alternatives that were included in the ACM. For the selection of remedy process, the time estimate for the HCS option has been revised to account for the modification to the operation of the Plant pumps (i.e., shifting pumping of water from East 1 to Well 5) as previously described. The timeframe to achieve the GWPS for the HCS option is between 2 and 7 years, compared to 5 to 25 years stated in the ACM, with the difference in timeframe related to the revised pumping conditions simulated for the remedy selection process (increased pumping from Well 5 and West 1).

**Exhibit 17 - Summary of Literature Review - Partition Coefficient Values**

Model	No Sorption Time (years)	Sorption Time (years)
Monitored Natural Attenuation	10	56
HCS	2	7
Permeable Reactive Barrier	8	43

## 5.4 Public Water Supply Protectiveness

In addition, the model simulations were also used to assess if each of the considered remedial alternatives is likely to be protective of the New Haven well. For all simulations summarized above, the results of the groundwater model showed that there was no indication that lithium emanating from the BAP would reach the New Haven well at a concentration greater than the GWPS before or after closure and remediation of the BAP and groundwater. As an example, Exhibit 18 shows the simulated lithium concentrations in groundwater after 30 years (i.e., typical period required for post-closure care) of monitored natural attenuation is shown. The simulated lithium plume is observed to be migrating toward the river downgradient of the BAP and the maximum concentration in the center of the plume has reduced during the 30-year BAP post-closure simulation period from approximately 160 µg/l to about 40 µg/l.



**Exhibit 18 - Lithium Concentrations After 30 Years of MNA-** This exhibit shows the location and concentration of the simulated lithium plume (model layer 1) 30 years after BAP closure for the monitored natural attenuation alternative and with simulation of retarded lithium transport. The New Haven well is operational during the simulation, but no site wells are pumping. Simulated lithium concentrations in groundwater are represented by the blue contour lines and the shaded blue (10 to 40 µg/L), and yellow (greater than 40 µg/L) grid cells.

AEA/CAC: aea

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## APPENDIX C



# Memorandum

December 3, 2021

To: Gary Zych, American Electric Power

From: Alec Macbeth, Anchor QEA, LLC

cc: Justin Jent, American Electric Power; Dimitri Vlassopoulos, Masa Kanematsu, Jim Redwine, Anchor QEA, LLC

**Re: Groundwater Reactive Media Treatability Study—AEP Mountaineer Plant**

## Introduction

This report summarizes laboratory testing performed to evaluate the effectiveness of reactive media in removing inorganic constituents from groundwater impacted by coal combustion residuals at the American Electric Power (AEP) Mountaineer Plant in Letart, West Virginia. Treatability was evaluated for seven reactive amendments, including amendments from the Carus Corporation, zerovalent iron (ZVI), Cleanit, and two slag materials. The groundwater included in the treatability study was sampled near the bottom ash pond at the Mountaineer Plant. Anchor QEA, LLC, performed batch testing for treatability effectiveness, appropriate dosing, and kinetics, in accordance with the *Evaluation of Reactive Media for Treatment of Appendix III and IV Constituents: Proposed Scope of Work* (SOW; Anchor QEA and Carus 2018).

In addition to the batch testing, two of the high performing reactive amendments were subjected to column testing to evaluate their effectiveness to remove the metals from site groundwater under flow conditions. The column tests also evaluated potential for effluent from the reactive media columns to inadvertently mobilize constituents from native soils in the surficial aquifer. The results of the column testing are included in this report. Results of the column studies were used to calculate the estimated media lifetime in a field application.

## Sample Collection

The groundwater sample used for this study was collected from monitoring well MW-1606D, located downgradient of the bottom ash pond at the Mountaineer Plant. This monitoring well was selected based on discussions with AEP regarding constituents of interest and a review of groundwater monitoring reports to identify the well with the greatest concentration of those constituents.

The monitoring well was sampled on July 23, 2018, by filling collapsible, plastic cubic containers with zero headspace. The containers were immediately sealed inside Mylar barrier bags with oxygen-absorbent packets and shipped on ice to the Anchor QEA Environmental Geochemistry Laboratory (EGL) in Portland, Oregon. All sample processing, batch test preparation, and column testing were performed under a nitrogen atmosphere. The groundwater sample was chemically characterized to

support the design and interpretation of the treatability tests. On receipt of the site groundwater sample at the EGL, pH, oxidation-reduction potential (ORP), and total dissolved solids (TDS) were measured under nitrogen atmosphere. An aliquot of the groundwater sample was also submitted in duplicate to PDC Laboratories, Inc. (Peoria, Illinois), for chemical analysis. Initial groundwater characterization results are summarized in Table 1 and presented in Attachment A<sup>1</sup>.

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<sup>1</sup> Laboratory work order 8075269, samples OMT\_002\_t0 and OMT\_052\_t0.

**Table 1**  
**Initial Groundwater Characterization Results**

Parameter	Results1	
	MW-1606D	Unit
Total Alkalinity	260 (0)	mg/L as CaCO <sub>3</sub>
Antimony, dissolved	<0.8	µg/L
Arsenic, dissolved	0.5 (0.05)	µg/L
Barium, dissolved	53.0 (8.5)	µg/L
Beryllium, dissolved	0.17 (0.13)	µg/L
Boron, dissolved	8.8 (0.9)	mg/L
Cadmium, dissolved	0.34 (0.04)	µg/L
Calcium, dissolved	310 (28)	mg/L
Chloride	225 (7)	mg/L
Chromium, dissolved	5.0 (5.7)	µg/L
Cobalt, dissolved	1.8 (0)	µg/L
Fluoride	0.30 (0.01)	mg/L
Iron, dissolved	0.01 (0.01)	mg/L
Lead, dissolved	0.6 (0.4)	µg/L
Lithium, dissolved	110 (0)	µg/L
Magnesium, dissolved	73.5 (2.1)	mg/L
Manganese, dissolved	1.15 (0.07)	mg/L
Mercury, dissolved	0.05 (0.01)	µg/L
Molybdenum, dissolved	77 (7)	µg/L
Nitrate-N	0.83 (0.01)	mg/L
Phosphorus	<0.035	mg/L
Potassium, dissolved	11.0 (0)	mg/L
Selenium, dissolved	11.5 (0.7)	µg/L
Silicon, dissolved	8.8 (0.5)	mg/L
Sodium, dissolved	99.0 (1.4)	mg/L
Sulfate	755 (7)	mg/L
Thallium, dissolved	0.23 (0.02)	µg/L
pH	6.99	--
ORP	232	mV
TDS	1,600 (1,040)	mg/L

Notes:

1: The results are averages of two replicate samples, with standard deviations in parentheses. Samples were field-filtered (0.45 micron) at the time of collection and filtered again prior to analysis for dissolved constituents. The laboratory report is presented in Attachment A. Pertinent samples are samples OMT\_002\_t0 and OMT\_052\_t0 within laboratory work order 8075269.

--: not applicable

µg/L: microgram per liter

mV: millivolt

CaCO<sub>3</sub>: calcium carbonate

ORP: oxidation reduction potential

mg/L: milligram per liter

The native soil used for the batch tests consisted of sands, which were collected at the Mountaineer Plant near MW-1606D at depths of approximately 65 to 75 feet below ground surface (bgs).

## Amendments

As described in the SOW (Anchor QEA and Carus 2018), seven reactive amendments and a quartz sand control were tested for treatability effectiveness for groundwater from the Mountaineer Plant (Table 2). Cleanit media (a form of zero-valent iron) were added to the list of reactive amendments with client input. The available vendor data sheets for the reactive media are included as Attachment B.

**Table 2**  
**Amendments Tested**

Amendment	Physical Form	Composition	Vendor
Carus B <sup>1</sup>	Granular/Powder	Magnesium-iron-aluminum oxide	Carus Corporation (IL)
Carus MMO II <sup>2</sup>	Granular/Powder	Iron, manganese, and aluminum oxides, calcium carbonate	
Carus MMO <sup>1</sup>	Granular/Powder	Iron, manganese, aluminum oxides	
Cleanit	Powder	Iron (98%)	Höganäs AB
Middleton BOF Slag	Granular	Calcium-iron-magnesium silicate	Stein Inc.
Copperhill Slag	Granular	Iron-calcium oxide	Copperhill Industries (TN)
ZVI	Granular	Iron	Connelly GPM (IL)
Accusand 20/30 Control	Granular	Quartz	Unimin

Notes:

1. Carus B and the original Carus MMO are no longer available from Carus Corporation.
2. MMO II formerly known as K<sup>+</sup> Cake.

--: Not relevant; this reactive amendment is no longer available from Carus Corporation.

BOF: basic oxygen furnace

lb: pound

MMO: mixed metal oxides

NA: Cost not applicable for the sand control.

TBD: To be determined; amendment costs would be dependent on total amendment mass and site proximity.

## Methodology

### Batch Tests

Batch treatability testing was performed including a 24-hour screening test, a kinetics test over multiple time steps, and isotherm testing at multiple amendment rates (Table 3). All batch tests were prepared under a nitrogen atmosphere, and reaction vessels were kept inside Mylar barrier bags with oxygen-absorbent packets during the reaction period. Samples were placed on a laboratory shaker table and agitated continuously during the reaction period for each batch test. Following the reaction period, the batch tests were returned to the anaerobic chamber for measurement of water

quality parameters (oxidation reduction potential, pH, and total dissolved solids) as well as the collection of a 0.45-micron filtered sample for constituent analysis.

**Table 3**  
**Summary of the Analytical Parameters for Batch Tests**

<b>Constituent Type</b>	<b>Screening (24-Hour) Tests</b>	<b>Kinetic Tests</b>	<b>Isotherm Tests</b>
Supporting	Iron, manganese	Iron, manganese, sulfate <sup>1</sup>	Iron, manganese
Appendix III/IV Metals	Arsenic, barium, boron, calcium, chromium, cobalt, lead, lithium, mercury, molybdenum, selenium, and thallium	Boron, cobalt, lithium, molybdenum, chromium, lead, selenium, mercury, barium, and thallium <sup>1</sup>	Boron, cobalt, lithium, molybdenum

Notes:

1. Chromium, lead, selenium, mercury, barium, and thallium were analyzed for the 24- and 192-hour reaction period samples only.

The solution pH, ORP, dissolved oxygen, and TDS in each batch test were measured following the specified reaction period. In addition, selected Appendix III/IV constituents and supporting constituents were analyzed for the batch tests. The selection of the Appendix III/IV constituents was based on client discussion and analytical results from each subsequent set of batch tests.

Preliminary client discussions indicated the following Appendix III/IV constituents were of potential interest at the Mountaineer Plant:

- Boron
- Lithium
- Molybdenum

Batch screening tests were performed for each of the reactive amendments and the sand control with the site groundwater. Batch screening tests were sampled for water quality parameters and dissolved Appendix III/IV constituents following a 24-hour reaction period.

These initial 24-hour screening tests were analyzed for all Appendix III/IV constituents, as well as for iron, manganese, and sulfate. Iron and manganese were included to support evaluation of the batch test geochemistry. Based on the initial groundwater chemistry and the results of the screening tests, a subset of the Appendix III/IV metals were analyzed in the kinetic and isotherm tests.

Kinetic tests were performed for all amendments and the sand control for the groundwater sample. The kinetic tests were prepared at two liquid-to-solid (L/S) ratios (L/S = 5 and L/S = 10). The L/S = 10 batch kinetic tests were sampled following reaction periods of 24, 48, 96, and 192 hours. The L/S = 5 batch kinetic tests were sampled following reaction periods of 24 and 192 hours. The batch kinetic tests were sampled in duplicate at the final sampling point (192 hours). At each sampling point prior

to 192 hours, the minimum sample volume (50 milliliters [mL]) required for constituent analysis was removed from the 1,000-mL reaction vessels.

The isotherm tests were performed for a 192-hour reaction period to utilize the  $L/S = 5$  and  $L/S = 10$  data collected in the kinetic tests. Additional batch tests were performed at  $L/S = 25, 50,$  and  $100$  for a total of five ratios of amendment mass to groundwater volume.

## Column Tests

Column tests were performed using the groundwater collected from Mountaineer Plant's monitoring well MW-1606D to determine amendment capacity to remove the Appendix III/IV constituents from site groundwater under flow conditions and to estimate useful lifetime of amendments in the field.

The column tests were carried out in 4.2-centimeter (cm)-diameter by 25-cm-long polycarbonate columns. Based on the batch test results and discussions with AEP, a combination of two high-performing reactive amendments, Carus MMO<sup>2</sup> II and Cleanit, were subject to column testing and packed into the treatment columns (Carus MMO II 25 weight%; Cleanit 25 weight%; and quartz sand 50 weight%). The effluents from the treatment columns were sequentially flowed into columns packed with the site aquifer soil to assess leaching of Appendix III/IV constituents from the aquifer soil contacted with the treatment column effluents. The column test setup is illustrated in Figure 1.

The column test operating parameters are summarized in Table 4. The influent solution chemistry is summarized in Table 5. The groundwater was stored in a carboy and maintained under a nitrogen atmosphere throughout the duration of the column testing (Figure 1). The columns were operated at a constant flow rate of approximately 17.9 mL per hour with a hydraulic residence time of 3.0 hours for a total of approximately 4 weeks, using a peristaltic pump with a multichannel pump head. The influent solution and treatment column effluents were periodically sampled to analyze the Appendix III/IV constituents of interest and to monitor pH and specific conductivity. The soil column effluents were sampled at the beginning and end of the column testing. Aliquot samples were filtered by 0.45 micrometer nylon filters. A subset of the Appendix III/IV constituents, boron, lithium, and molybdenum were specifically targeted.

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<sup>2</sup> Mixed metal oxides

**Table 4**  
**Column Test Operating Parameters**

Parameter	Unit	Value
Column diameter	cm	5.0
Column depth	cm	22.0
Flow rate	mL/hr	17.9
Test duration	days	30
Hydraulic residence time	hours	6.0
Total pore volumes treated during the test	-	121
Total groundwater volume treated	L	13.0

Notes:  
cm: centimeters  
mL/hr: milliliters per hour

**Table 5**  
**Column Influent Solution Chemistry**

Parameter	Unit	Result <sup>1</sup>
Boron, dissolved	µg/L	7,800
Lithium, dissolved	µg/L	100
Molybdenum, dissolved	µg/L	67.0
pH	-	7.89
Specific Conductivity	µS/cm	3,470

Notes: Influent solution chemistry was maintained and not altered throughout the column testing.  
µg/L: micrograms per liter

1: The laboratory report is presented in Attachment C, laboratory work order 9091026. Pertinent sample is AEP-COL-CV-INF-20190819.

## Results

### Batch Tests

#### *Kinetic Batch Tests*

The reactive media tested in batch studies included amendments effective at removing the Appendix III/IV constituents of potential interest, though a mixture of amendments may be required to maximize effectiveness. The results of the 24-hour screening and kinetic batch tests are summarized in Attachment D, and the PDC Laboratories, Inc. analytical reports are included as Attachment A.

The Mountaineer Plant kinetic batch test results for the three constituents of potential interest (boron, lithium, and molybdenum) are illustrated in Figures 2a through 2g. Most of the treatment media removed two of the constituents, boron and molybdenum, within 24 hours with decreasing



rates of removal thereafter. Carus MMO and MMO II rapidly removed lithium and boron, but concentrations using BOF slag, Cleanit, Copperhill slag, and ZVI remained about the same for both of these constituents. The concentration of lithium actually increased in the Carus B batch test, as did the concentration of molybdenum in the MMO II test.

Overall, Carus MMO and Carus MMO II performed well among all the media tested for the Mountaineer groundwater and constituents of interest. However, combinations of media may be required to achieve groundwater remediation objectives for multiple constituents of interest.

### *Isotherm Batch Tests*

The results of the isotherm batch tests are summarized in Attachment E, and the PDC Laboratories analytical reports for the isotherm tests are included as Attachment F. Quality control information for the batch test analytical data is included in Attachment G.

The Mountaineer isotherm batch test results are illustrated in Figure 3. The removal of both lithium and boron by MMO and MMO II demonstrated an increased removal rate at lower L/S ratios.

### *Media Effectiveness Summary from the Batch Tests*

Each of the reactive amendments tested was effective at removing a subset of the Appendix III/IV constituents from the groundwater samples. A qualitative assessment of the effectiveness of the media in each groundwater sample is summarized in Table 6.

**Table 6**  
**Summary of Reactive Media Effective for Removal of Appendix III/IV Constituents**

Reactive Media	Summary
Carus B Media <sup>1</sup>	<ul style="list-style-type: none"> <li>• Effective for boron and molybdenum</li> <li>• Lithium concentrations increased during treatment</li> </ul>
Carus MMO <sup>2</sup>	<ul style="list-style-type: none"> <li>• Effective for boron, lithium, and molybdenum</li> </ul>
Carus MMO II	<ul style="list-style-type: none"> <li>• Effective for boron and lithium</li> <li>• Molybdenum concentrations increased during treatment</li> </ul>
BOF Slag	<ul style="list-style-type: none"> <li>• Effective for boron</li> </ul>
Copperhill Slag	<ul style="list-style-type: none"> <li>• Effective for molybdenum</li> </ul>
ZVI	<ul style="list-style-type: none"> <li>• Effective for boron</li> </ul>
Cleanit	<ul style="list-style-type: none"> <li>• Effective for molybdenum</li> </ul>

Notes:

1. Carus B Media is no longer produced by Carus Corporation, but a potential alternate supplier has been identified.
2. Carus MMO is no longer produced (and possibly neither is MMO II, as it is no longer shown on the Carus website) by Carus Corporation, but a similar mixed oxide could be formulated.

Site-specific media combinations recommended for the identified constituents of interest are summarized in Table 7.

**Table 7**  
**Site-Specific Media Combinations Recommended for Further Evaluation**

Site	Constituents of Interest	Media Mixture
Mountaineer	Boron, lithium, molybdenum	Carus MMO II/Cleanit

## Column Test Results

Column tests were performed for the groundwater collected from the Mountaineer Plant using a mixture of Carus MMO II and Cleanit media to evaluate their effectiveness to remove the metals from site groundwater under flow conditions. The media mixture (Carus MMO II/Cleanit; see Table 7) was mixed with clean quartz sand (Accusand) in a 50:50 mass ratio. The treatment columns contain 25 weight% of Carus MMO II, 25 weight% of Cleanit, and 50 weight% of clean quartz sand. The media/sand mixture was packed into the treatment columns to achieve a total depth of 22 cm. The detailed column test conditions were described in the previous section, and a column test schematic and the laboratory column setup are shown in Figure 1.

The dissolved concentrations of the identified Appendix III and IV constituents of interest (i.e., boron, lithium, and molybdenum) in the treatment column influents and effluents are plotted as a function of pore volumes treated in Figure 4. Data are included in Attachment C. The treatment columns packed with Carus MMO II and Cleanit achieved excellent removal of molybdenum and lithium throughout the column testing, up to approximately 100 pore volumes (Table 8). Iron oxides and

manganese oxides in the reactive amendments probably removed the molybdenum by adsorption. Lithium was probably removed by manganese oxides in Carus MMO II by forming lithium manganese oxides. Boron concentrations in the treatment column effluents, however, were reduced up to approximately 16 pore volumes, then increased thereafter and reached similar levels as the influents. Boron is a neutrally charged ion in the influent solutions, and it is difficult to remove effectively by adsorption on iron/manganese oxides. Throughout the column tests, pH in the treatment column effluents remained at similar levels as the influents (Figure 5). Specific conductivity was higher in the treatment effluents than in the influent solutions (Figure 5).

**Table 8**  
**Summary of Reactive Media Effectiveness from Column Test Results**

Reactive Media	Mountaineer	Comments
Boron	<ul style="list-style-type: none"> <li>&gt;50% concentration breakthrough after 20 to 25 pore volumes</li> <li>About 10% removal after 100 pore volumes</li> </ul>	<ul style="list-style-type: none"> <li>Breakthrough curves suggest two sorption mechanisms, strong and weak</li> </ul>
Lithium	<ul style="list-style-type: none"> <li>&gt;95% removal for at least 100 pore volumes</li> <li>Effluent concentrations were about 5 µg/L through 100 pore volumes</li> </ul>	<ul style="list-style-type: none"> <li>Based on batch tests, lithium removal is due to uptake by MMO II</li> </ul>
Molybdenum	<ul style="list-style-type: none"> <li>Effluent concentration decreased over time to about 10 µg/L</li> <li>About 80% removal for at least 100 pore volumes</li> </ul>	<ul style="list-style-type: none"> <li>Reactivity increased likely to gradual transformation of Cleanit (a form of zero-valent iron) to iron oxyhydroxide</li> </ul>

Note:  
µg/L: micrograms per liter

The concentrations of all Appendix III/IV constituents were monitored in the influents, treatment column effluents, and soil column effluents at the beginning of the column test (approximately 10 pore volumes) and before terminating the column tests (approximately 90 pore volumes). Effluent concentrations were evaluated to determine if the treatment media had any unintended consequences, i.e., release of any Appendix III or IV constituents. Except for a few constituents, no significant elevation of the Appendix III/IV constituents were observed in the soil column effluents. Potassium and manganese were elevated in the first flush of the soil column effluents. Elevated sulfate concentrations (1,700 to 1,800 mg/L) were also detected in the soil column effluents. The elevated sulfate concentrations were probably due to leaching from Carus MMO II. Potassium permanganate and ferrous sulfate are used to manufacture Carus MMO II and residual sulfate may be present in the as received material.

## Effective Treatment Lifetime Calculations

The effective treatment lifetime for field application of the media mixtures tested in the column studies was estimated by upscaling the column breakthrough curves to hypothetical field conditions. The capacity of the media is related to the number of pore volumes (PV) treated before breakthrough, as defined by 50% of influent concentration, in the column effluent (PV<sub>50</sub>).

For a media mix and groundwater chemistry similar to those used in the column tests, the time to breakthrough in the field can be estimated by multiplying the time required for one PV to flow through the treatment zone (e.g., a permeable reactive barrier [PRB]) by the PV<sub>50</sub>:

$$\text{Effective Treatment lifetime} = \text{PV}_{50} \times W / V$$

where:

W = width of the treatment zone along the groundwater flow direction

$V$  = the linear groundwater velocity

For constituents that did not breakthrough for the duration of the column test (lithium and molybdenum), the minimum treatment lifetime can be estimated by substituting the total number of PVs treated by the column for  $PV_{50}$ . For potential field applications, two treatment zone widths were considered: 3 feet (ft) to represent a PRB installed by single-pass trenching, and 10 feet to represent a treatment zone installed by soil mixing to provide a longer flow path for groundwater within the treatment media. A range of groundwater velocities (0.1 and 1 ft/day) were used, based on review of site-specific data. The estimated treatment lifetime for these field applications is summarized in Table 9.

**Table 9**  
**Estimated Effective Treatment Lifetime**

Treatment Zone Width (ft)		3		10	
Groundwater Velocity (ft/day)		0.1	1	0.1	1
Constituent	$PV_{50}$	Time to Breakthrough <sup>2</sup> (years)			
Boron	25	2.1	0.2	6.8	0.7
Lithium	>100	>8	>1	>27	>3
Molybdenum					

Notes:

1. 25% MMO + 25% Cleanit media by weight emplaced in treatment zone
2. Defined as  $C/C_0 = 50\%$

As shown in Table 9, minimum treatment lifetime estimates for constituents other than boron ranged from greater than 1 to greater than 27 years, depending on installation method (PRB vs. soil mixing) and are sensitive to groundwater velocity. Note that these are minimum estimates due to the fact that lithium and molybdenum did not break through in the column tests, which suggests that reasonable media life expectancies, on the order of several years, are achievable for lithium and molybdenum treatment with the media mix tested. Estimated media lifetime for boron ranged from less than 1 year at the upper range of groundwater velocity to several years at the lower end of the range. Soil mixing would be preferable to a PRB installation for boron treatment.

## References

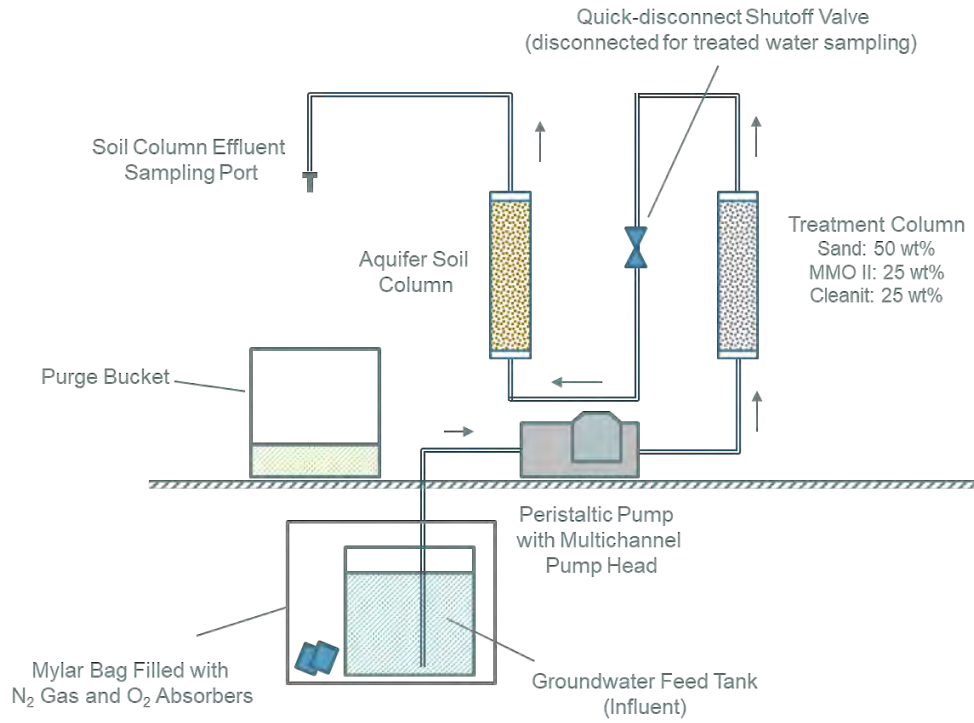
Anchor QEA and Carus (Anchor QEA, LLC, and Carus Corporation), 2018. *Evaluation of Reactive Media for Treatment of Appendix III and IV Constituents: Proposed Scope of Work*. April 2018.

Anchor QEA, 2021. Memorandum Regarding Groundwater Reactive Media Treatability Study, March 31, 2021.

# Figures

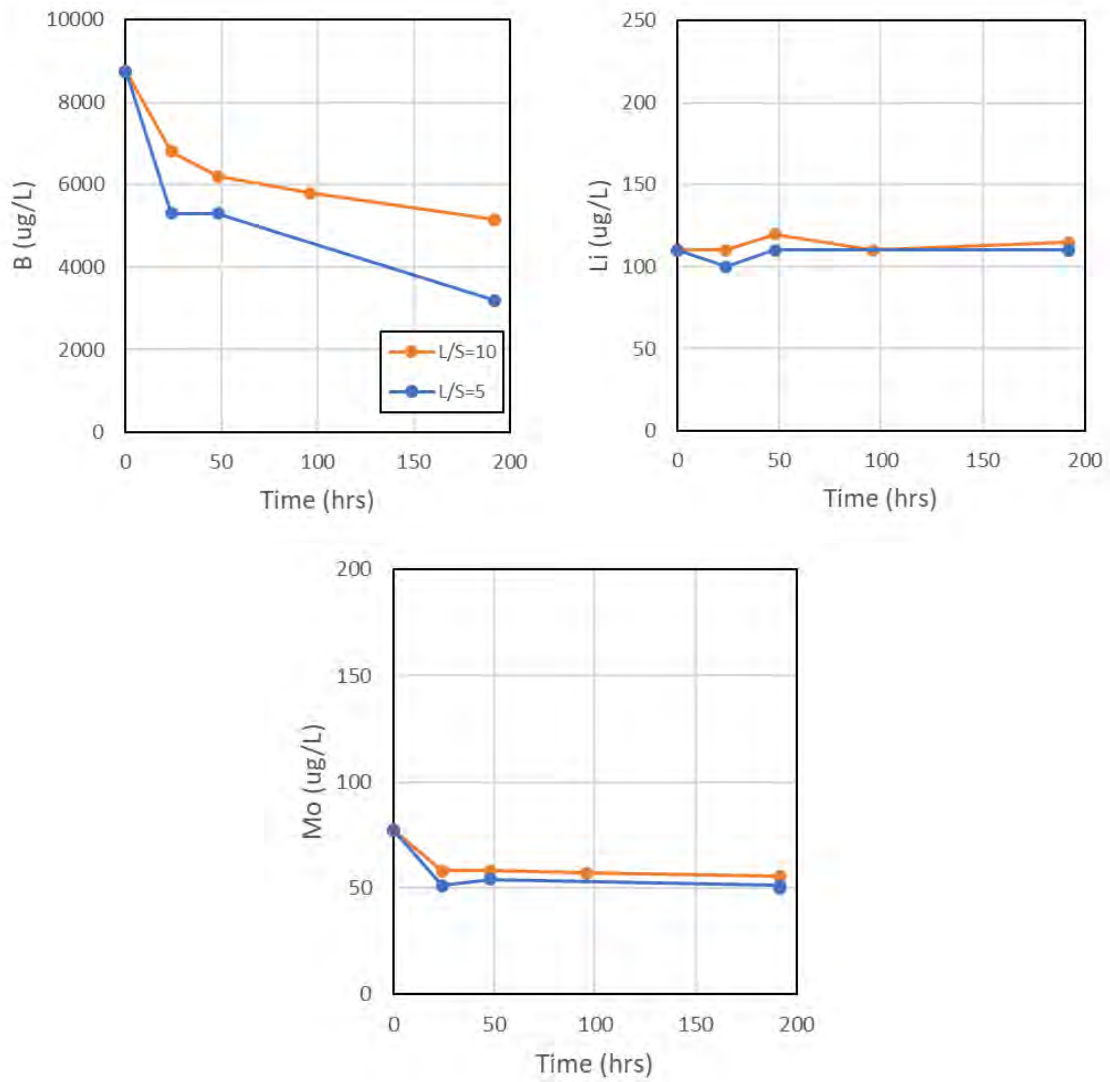
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**Figure 1**  
**Column Test Setup**

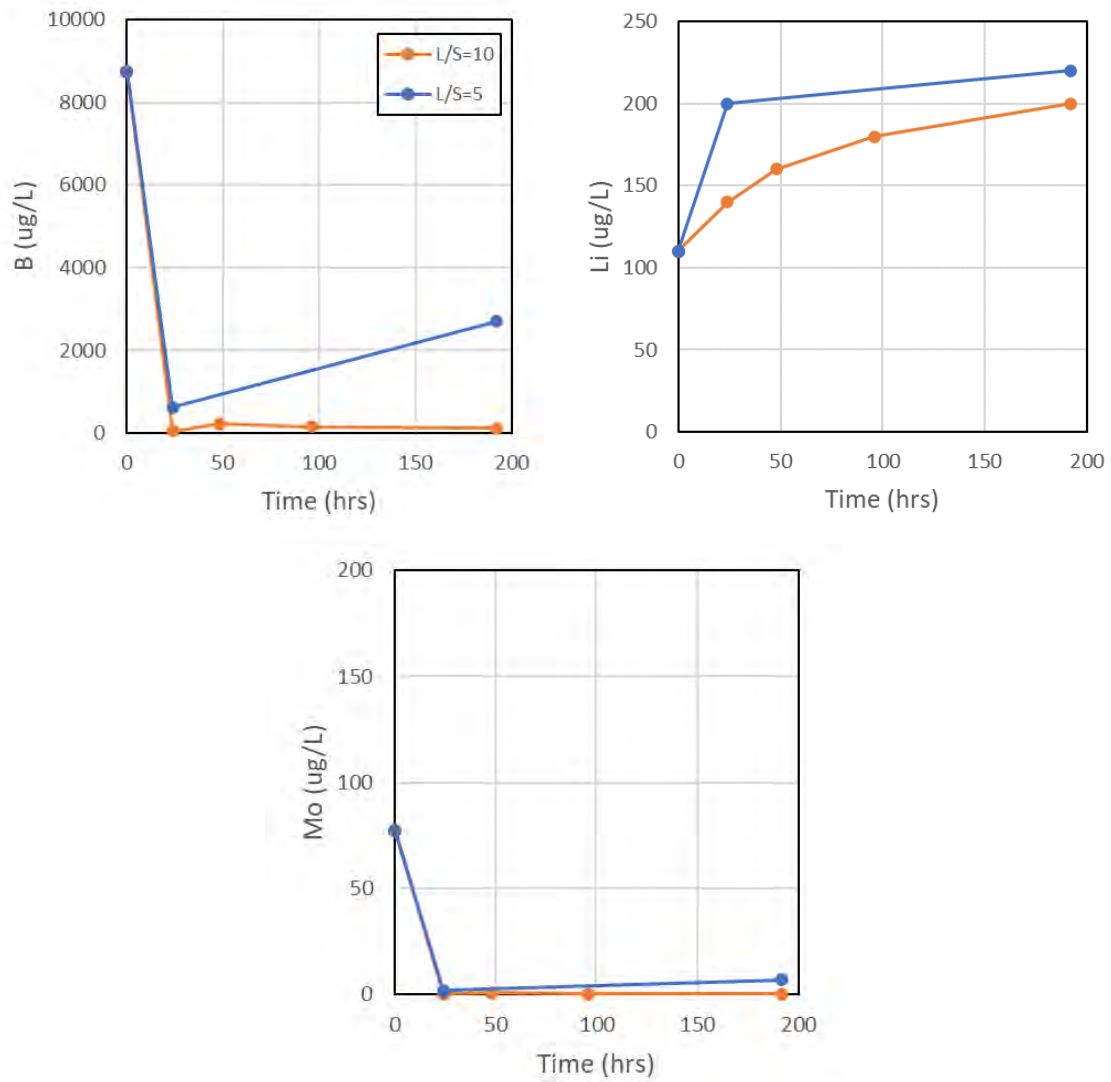




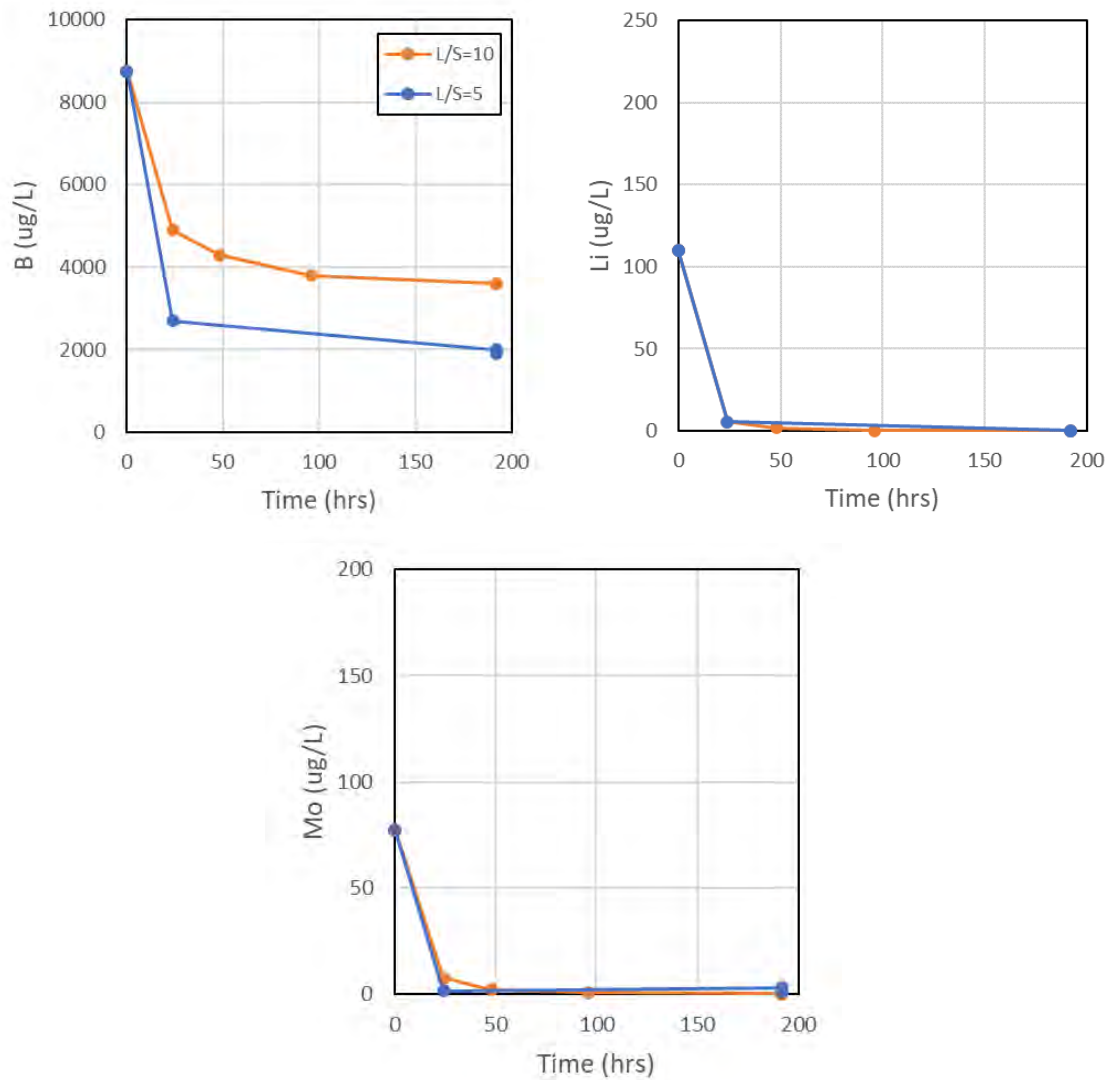
**Figure 2a**  
**Mountaineer Kinetic Test Results: Middletown BOF Slag**



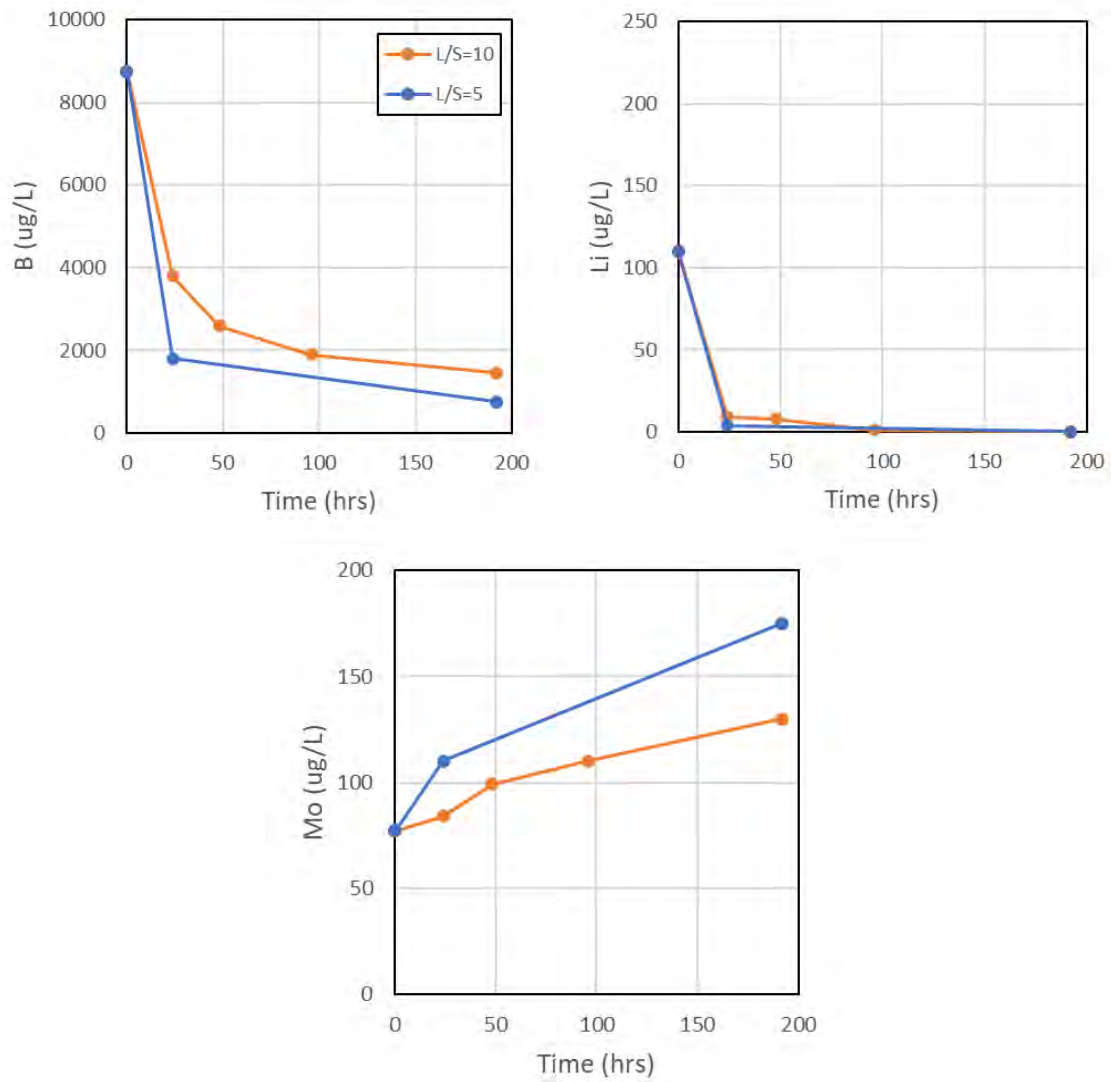
**Figure 2b**  
**Mountaineer Kinetic Test Results: Carus B Media**



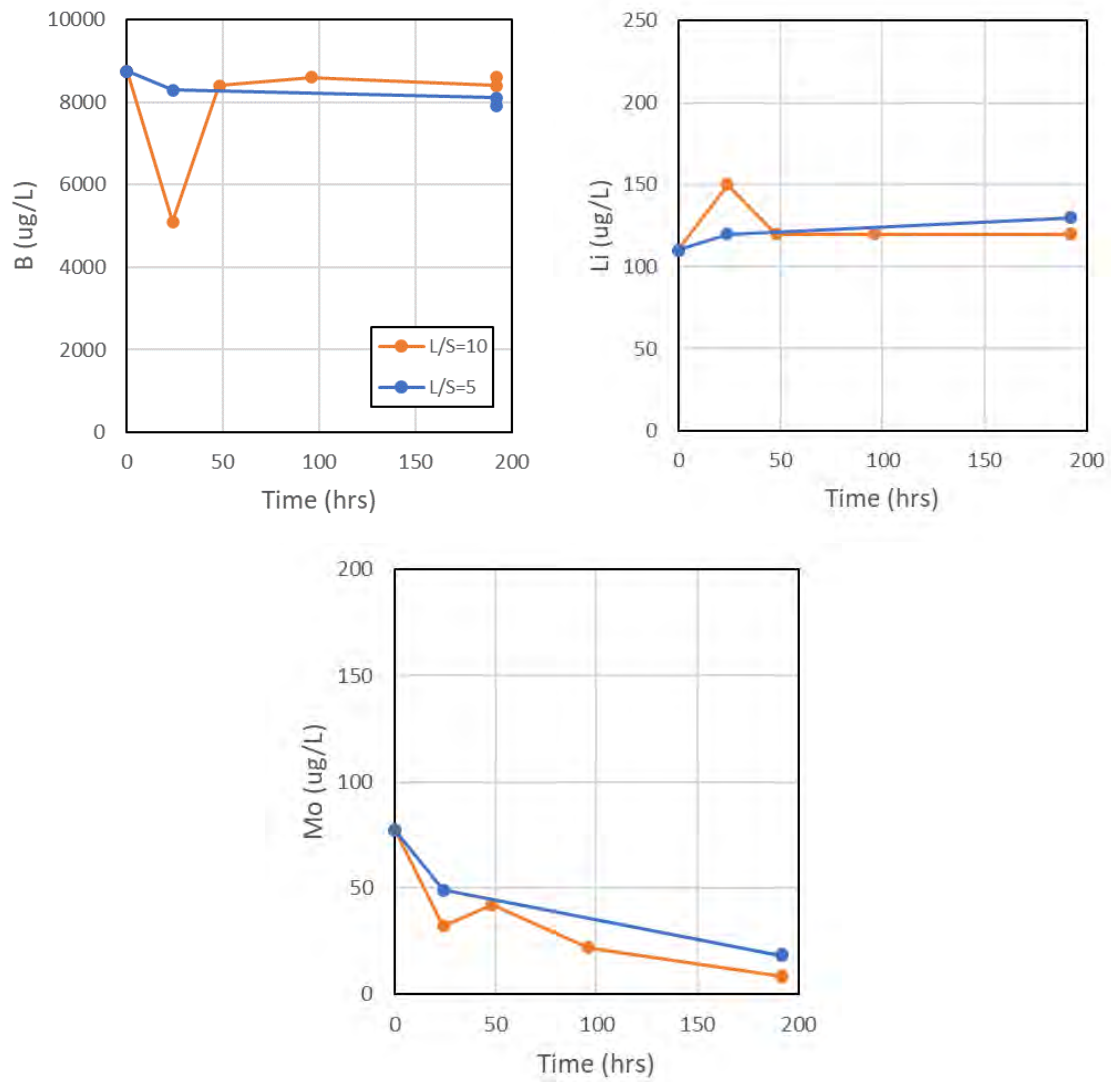
**Figure 2c**  
**Mountaineer Kinetic Test Results: Carus MMO**



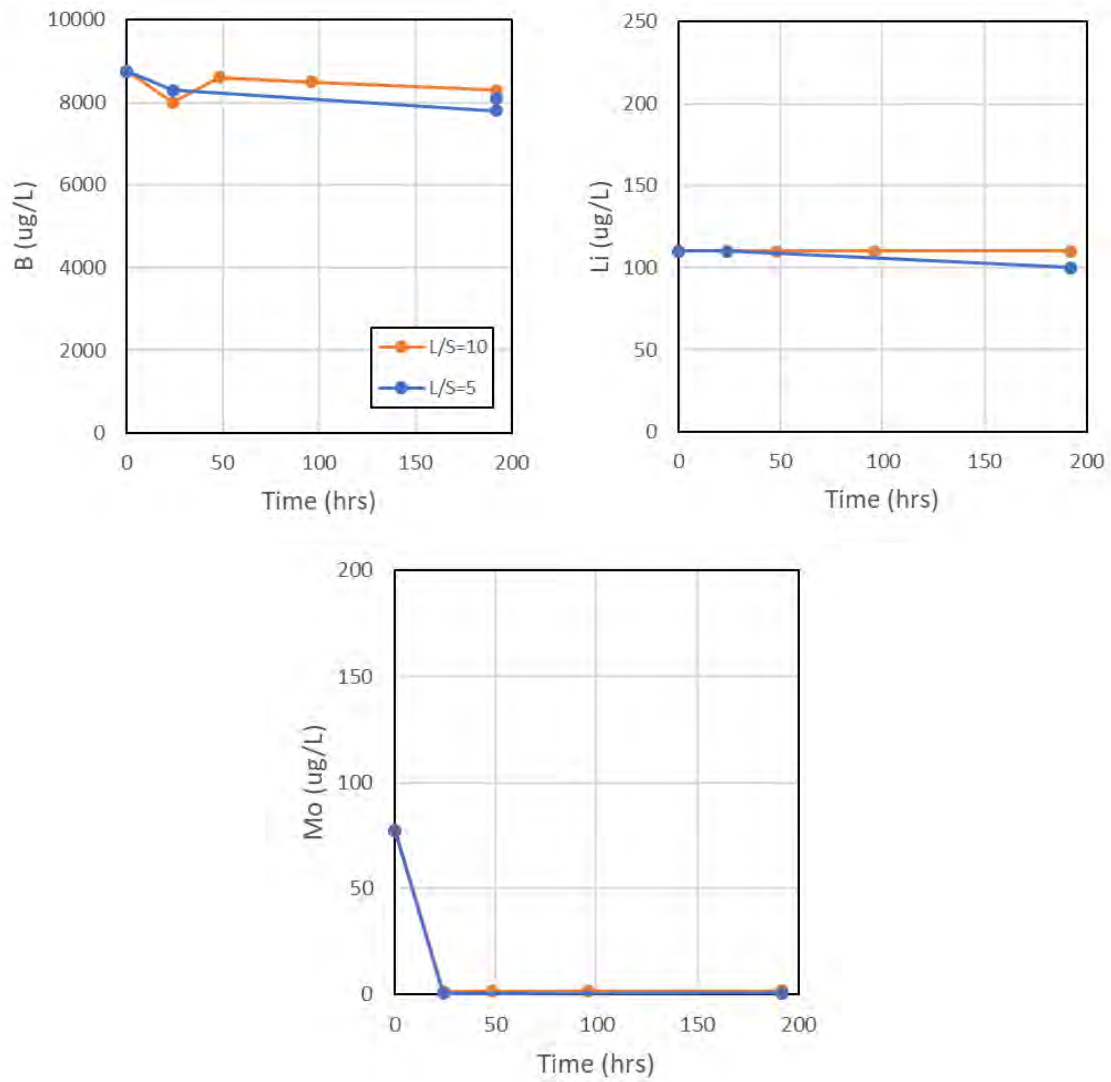
**Figure 2d**  
**Mountaineer Kinetic Test Results: Carus MMO II**



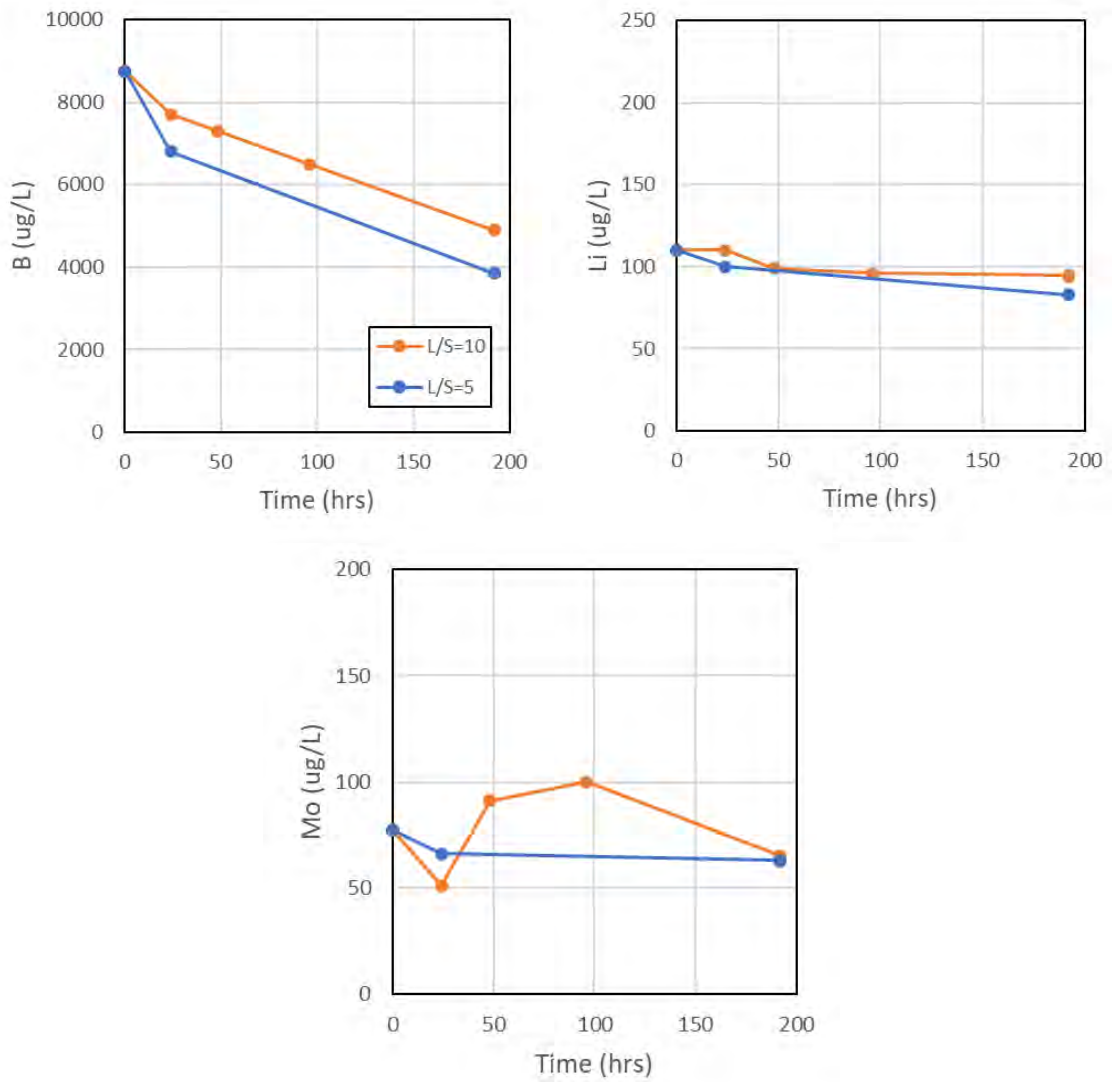
**Figure 2e**  
**Mountaineer Kinetic Test Results: Höganäs AB Cleanit**



**Figure 2f**  
**Mountaineer Kinetic Test Results: Copperhill Iron Oxide Slag**

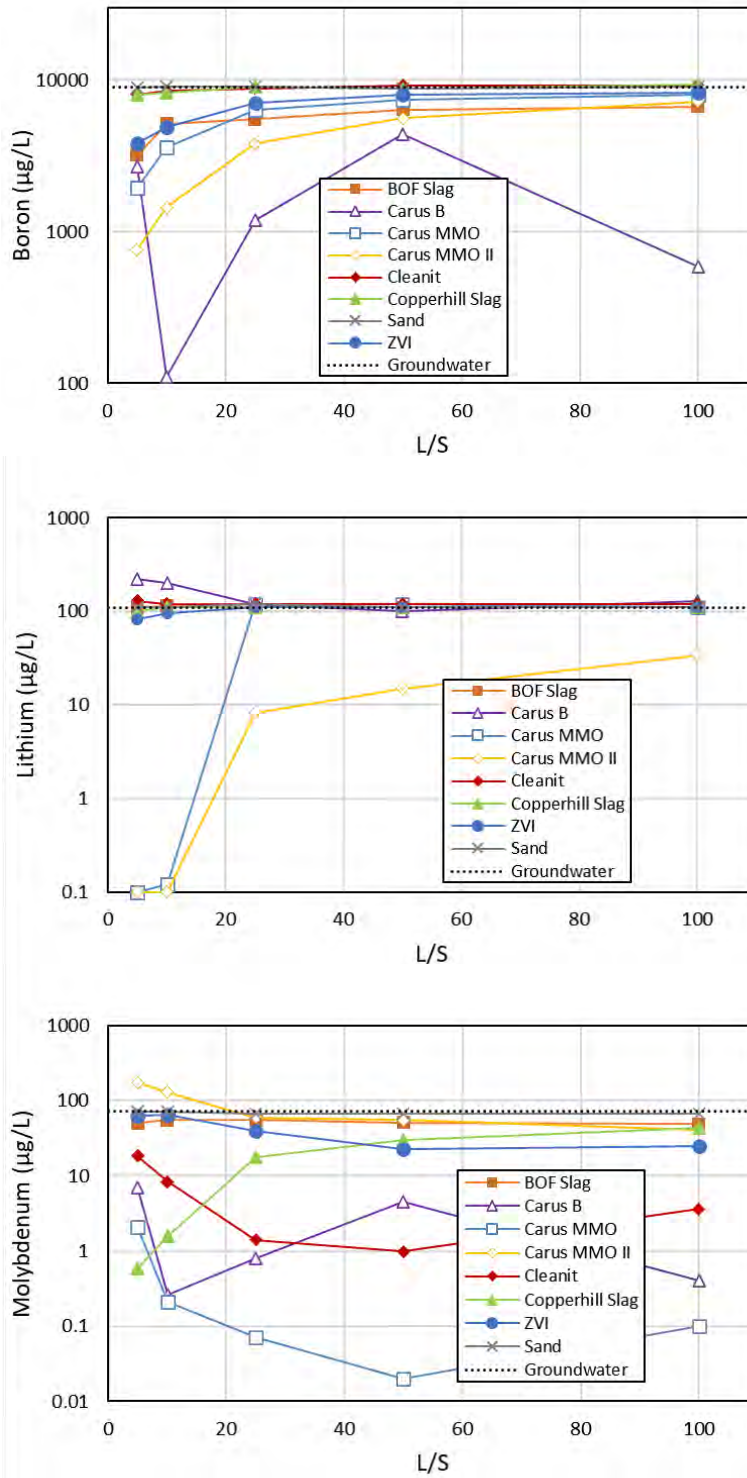


**Figure 2g**  
**Mountaineer Kinetic Test Results: Connelly GPM Zerovalent Iron**

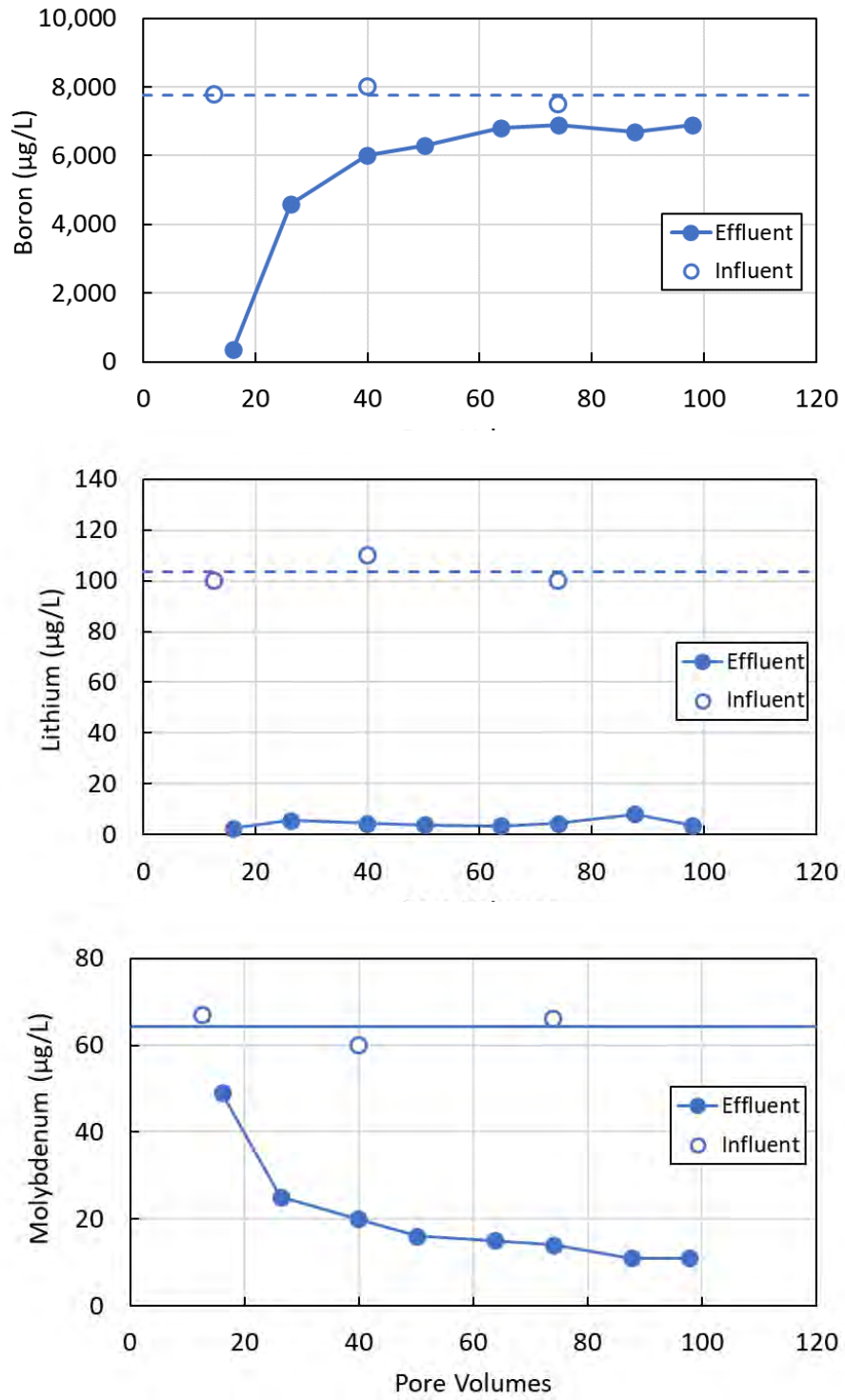




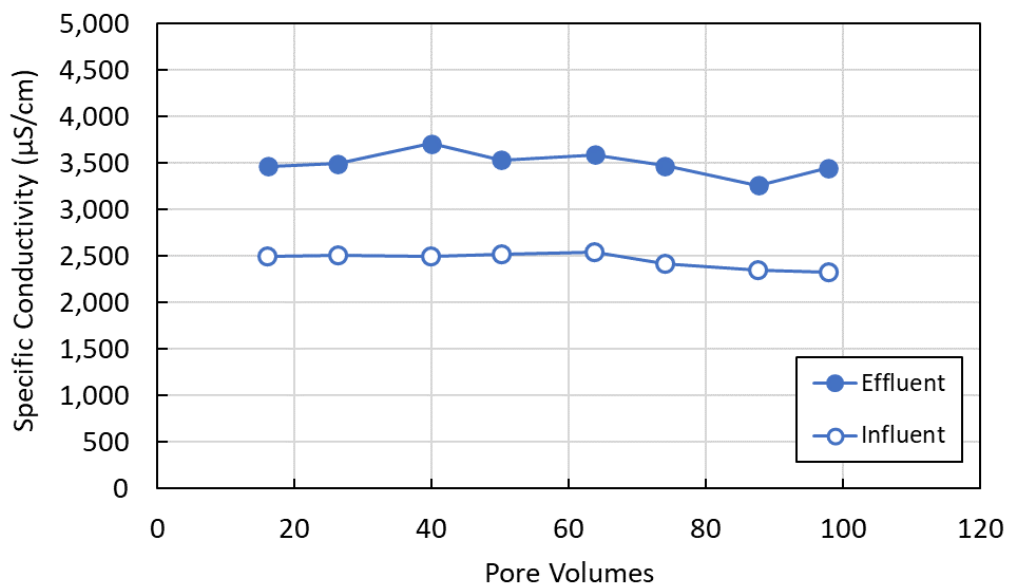
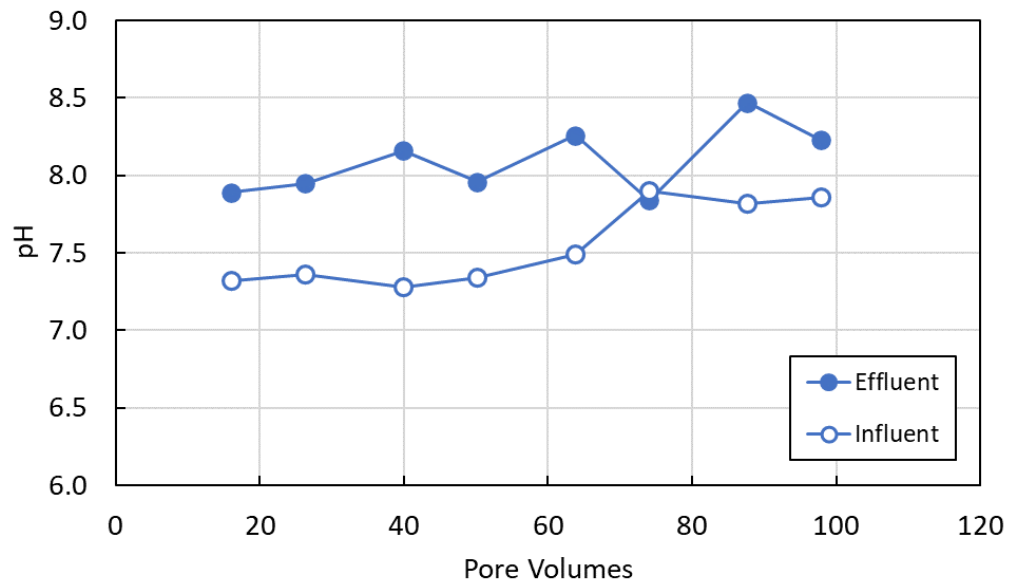
**Figure 3**  
**Mountaineer Isotherm Results: Boron, Lithium, and Molybdenum**



**Figure 4**  
**Mountaineer Column Test: Breakthrough Curves for Boron, Lithium and Molybdenum**



**Figure 5**  
**Mountaineer Column Test: pH and Specific Conductivity in the Influent and Effluent**



Attachment A

PDC Laboratory Analytical Reports

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# PDC Laboratories, Inc.

PROFESSIONAL • DEPENDABLE • COMMITTED

September 06, 2018

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

Dear Jessica Goin:

Please find enclosed the **revised** analytical results for the sample(s) the laboratory received on **7/27/18 10:00 am** and logged in under work order **8075269**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President, John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com





**REVISED ANALYTICAL RESULTS**

**Sample:** 8075269-01  
**Name:** OMT\_002\_t0  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/23/18 15:25  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Chloride	220	mg/L		07/30/18 09:51	07/30/18 09:51	LAM	EPA 300.0
Nitrate-N	0.82	mg/L	H	07/30/18 09:33	07/30/18 09:33	LAM	EPA 300.0
Sulfate	750	mg/L		07/30/18 11:21	07/30/18 11:21	LAM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>							
Alkalinity - total as CaCO3	260	mg/L		07/31/18 10:21	07/31/18 10:21	kns	SM 2320B
Fluoride	0.309	mg/L		08/02/18 12:20	08/02/18 12:20	TTH	SM 4500-F C
Solids - total dissolved solids (TDS)	1500	mg/L		07/30/18 10:55	07/30/18 11:42	ARL	SM 2540C
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.83	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Arsenic	0.54	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Barium	47	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Beryllium	0.26	ug/L		08/07/18 07:27	08/08/18 06:08	JMW	SW 6020
Boron	8100	ug/L		08/07/18 07:27	08/08/18 06:08	JMW	SW 6020
Cadmium	0.36	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Calcium	290	mg/L		08/07/18 07:27	08/08/18 06:08	JMW	SW 6020
Chromium	< 0.94	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Cobalt	1.8	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Iron	15	ug/L		08/03/18 14:03	08/06/18 11:24	TJJ	SW 6010
Lead	0.37	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Lithium	110	ug/L		08/03/18 14:03	08/06/18 14:57	TJJ	SW 6010*
Magnesium	72	mg/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Manganese	1100	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Mercury	0.060	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Molybdenum	72	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Phosphorus	< 35	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020*
Potassium	11	mg/L		08/07/18 07:27	08/08/18 06:08	JMW	SW 6020
Selenium	11	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Sodium	98	mg/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
Thallium	0.21	ug/L		08/07/18 07:27	08/07/18 14:55	JMW	SW 6020
<b><u>Total Metals - PIA</u></b>							
Silicon	8400	ug/L		08/09/18 06:30	08/09/18 09:13	TJJ	SW 6010



## REVISED ANALYTICAL RESULTS

Sample: 8075269-02  
Name: OMT\_052\_t0  
Matrix: Ground Water - Regular Sample

Sampled: 07/23/18 15:30  
Received: 07/27/18 10:00  
PO #: 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Anions - PIA</b>							
Chloride	230	mg/L		07/30/18 10:27	07/30/18 10:27	LAM	EPA 300.0
Nitrate-N	0.83	mg/L	H	07/30/18 10:09	07/30/18 10:09	LAM	EPA 300.0
Sulfate	760	mg/L		07/30/18 11:40	07/30/18 11:40	LAM	EPA 300.0
<b>General Chemistry - PIA</b>							
Alkalinity - total as CaCO3	260	mg/L		07/31/18 10:21	07/31/18 10:21	kns	SM 2320B
Fluoride	0.297	mg/L		08/02/18 12:25	08/02/18 12:25	TTH	SM 4500-F C
Solids - total dissolved solids (TDS)	1700	mg/L		07/30/18 10:55	07/30/18 11:42	ARL	SM 2540C
<b>Soluble Metals - PIA</b>							
Antimony	< 0.83	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Arsenic	0.47	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Barium	59	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Beryllium	< 0.072	ug/L		08/07/18 07:27	08/08/18 06:09	JMW	SW 6020
Boron	9400	ug/L		08/07/18 07:27	08/08/18 06:09	JMW	SW 6020
Cadmium	< 0.31	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Calcium	330	mg/L		08/07/18 07:27	08/08/18 06:09	JMW	SW 6020
Chromium	9.0	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Cobalt	1.8	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Iron	< 2.4	ug/L		08/03/18 14:03	08/06/18 11:27	TJJ	SW 6010
Lead	0.88	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Lithium	110	ug/L		08/03/18 14:03	08/06/18 15:00	TJJ	SW 6010*
Magnesium	75	mg/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Manganese	1200	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Mercury	< 0.044	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Molybdenum	82	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Phosphorus	< 35	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020*
Potassium	11	mg/L		08/07/18 07:27	08/08/18 06:09	JMW	SW 6020
Selenium	12	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Sodium	100	mg/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
Thallium	0.24	ug/L		08/07/18 07:27	08/07/18 14:58	JMW	SW 6020
<b>Total Metals - PIA</b>							
Silicon	9100	ug/L		08/09/18 06:30	08/09/18 09:18	TJJ	SW 6010





**REVISED ANALYTICAL RESULTS**

**Sample:** 8075269-03  
**Name:** OMT\_MB\_000\_t0  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/23/18 15:00  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Chloride	0.34	mg/L		07/30/18 10:45	07/30/18 10:45	LAM	EPA 300.0
Fluoride	< 0.185	mg/L		07/30/18 10:45	07/30/18 10:45	LAM	EPA 300.0
Nitrate-N	< 0.02	mg/L	H	07/30/18 10:45	07/30/18 10:45	LAM	EPA 300.0
Sulfate	< 0.062	mg/L		07/30/18 10:45	07/30/18 10:45	LAM	EPA 300.0
<b><u>General Chemistry - PIA</u></b>							
Alkalinity - total as CaCO3	6.0	mg/L		07/31/18 10:21	07/31/18 10:21	kns	SM 2320B
Solids - total dissolved solids (TDS)	<	mg/L		07/30/18 10:55	07/30/18 11:42	ARL	SM 2540C
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.83	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Arsenic	0.36	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Barium	6.2	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Beryllium	0.11	ug/L		08/07/18 07:27	08/08/18 06:10	JMW	SW 6020
Boron	1100	ug/L		08/07/18 07:27	08/08/18 06:10	JMW	SW 6020
Cadmium	< 0.31	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Calcium	54	mg/L		08/07/18 07:27	08/08/18 06:10	JMW	SW 6020
Chromium	17	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Cobalt	0.46	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Iron	< 2.4	ug/L		08/03/18 14:03	08/06/18 11:30	TJJ	SW 6010
Lead	1.6	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Lithium	1.8	ug/L		08/03/18 14:03	08/06/18 15:03	TJJ	SW 6010*
Magnesium	1.8	mg/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Manganese	32	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Mercury	< 0.044	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Molybdenum	2.4	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Phosphorus	< 35	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020*
Potassium	0.23	mg/L		08/07/18 07:27	08/08/18 06:10	JMW	SW 6020
Selenium	< 0.62	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Sodium	1.4	mg/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
Thallium	0.19	ug/L		08/07/18 07:27	08/07/18 15:01	JMW	SW 6020
<b><u>Total Metals - PIA</u></b>							
Silicon	13	ug/L		08/09/18 06:30	08/09/18 09:32	TJJ	SW 6010



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B815125 - No Prep - SM 2540C</u></b>									
<b>Blank (B815125-BLK1)</b> Prepared & Analyzed: 07/30/18									
Solids - total dissolved solids (TDS)	<	mg/L							
<b><u>Batch B815232 - IC No Prep - EPA 300.0</u></b>									
<b>Calibration Blank (B815232-CCB1)</b> Prepared & Analyzed: 07/30/18									
Nitrate-N	0.00	mg/L							
Chloride	0.323	mg/L							
Fluoride	0.00	mg/L							
Sulfate	0.00	mg/L							
<b>Calibration Check (B815232-CCV1)</b> Prepared & Analyzed: 07/30/18									
Chloride	4.59	mg/L		5.000		92	90-110		
Nitrate-N	0.947	mg/L		1.000		95	90-110		
Sulfate	4.73	mg/L		5.000		95	90-110		
Fluoride	4.83	mg/L		5.000		97	90-110		
<b><u>Batch B815260 - No Prep - SM 2320B</u></b>									
<b>Blank (B815260-BLK1)</b> Prepared & Analyzed: 07/31/18									
Alkalinity - total as CaCO3	0.500	mg/L							
<b>Blank (B815260-BLK2)</b> Prepared & Analyzed: 07/31/18									
Alkalinity - total as CaCO3	0.500	mg/L							
<b>LCS (B815260-BS1)</b> Prepared & Analyzed: 07/31/18									
Alkalinity - total as CaCO3	105	mg/L		98.90		106	85-115		
<b>LCS (B815260-BS2)</b> Prepared & Analyzed: 07/31/18									
Alkalinity - total as CaCO3	105	mg/L		98.90		106	85-115		
<b><u>Batch B815449 - No Prep - SM 4500-F C</u></b>									
<b>Calibration Check (B815449-CCV1)</b> Prepared & Analyzed: 08/02/18									
Fluoride	0.640	mg/L		0.7000		91	90-110		
<b>Calibration Check (B815449-CCV2)</b> Prepared & Analyzed: 08/02/18									
Fluoride	0.727	mg/L		0.7000		104	90-110		
<b><u>Batch B815593 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B815593-BLK1)</b> Prepared: 08/03/18 Analyzed: 08/06/18									
Lithium	1.89	ug/L							
Iron	< 2.4	ug/L							
<b>LCS (B815593-BS1)</b> Prepared: 08/03/18 Analyzed: 08/06/18									
Lithium	517	ug/L		500.0		103	80-120		
Iron	544	ug/L		500.0		109	80-120		
<b><u>Batch B815758 - 6020 Sol no prep - SW 6020</u></b>									
<b>Blank (B815758-BLK1)</b> Prepared & Analyzed: 08/07/18									
Antimony	< 0.83	ug/L							
Arsenic	< 0.15	ug/L							
Barium	< 0.084	ug/L							
Beryllium	< 0.072	ug/L							



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B815758 - 6020 Sol no prep - SW 6020</u></b>									
<b>Blank (B815758-BLK1)</b>					Prepared: 08/07/18 Analyzed: 08/08/18				
Boron	< 6.9	ug/L							
Cadmium	< 0.31	ug/L							
Calcium	< 0.018	mg/L							
Chromium	< 0.94	ug/L							
Cobalt	< 0.23	ug/L							
Lead	< 0.10	ug/L							
Magnesium	< 0.011	mg/L							
Manganese	< 0.44	ug/L							
Mercury	< 0.044	ug/L							
Molybdenum	< 0.29	ug/L							
Phosphorus	< 35	ug/L							
Potassium	< 0.022	mg/L							
Selenium	< 0.62	ug/L							
Sodium	< 0.0096	mg/L							
Thallium	< 0.18	ug/L							
<b>LCS (B815758-BS1)</b>					Prepared & Analyzed: 08/07/18				
Antimony	256	ug/L		250.0		103	80-120		
Arsenic	240	ug/L		250.0		96	80-120		
Barium	255	ug/L		250.0		102	80-120		
Beryllium	241	ug/L		250.0		96	80-120		
Boron	2320	ug/L		2500		93	80-120		
Cadmium	245	ug/L		250.0		98	80-120		
Calcium	25.1	mg/L		25.00		100	80-120		
Chromium	227	ug/L		250.0		91	80-120		
Cobalt	230	ug/L		250.0		92	80-120		
Lead	263	ug/L		250.0		105	80-120		
Magnesium	23.1	mg/L		25.00		92	80-120		
Manganese	221	ug/L		250.0		89	80-120		
Mercury	27.1	ug/L		25.00		108	80-120		
Molybdenum	250	ug/L		250.0		100	80-120		
Phosphorus	2580	ug/L		2500		103	80-120		
Potassium	24.0	mg/L		25.00		96	80-120		
Selenium	248	ug/L		250.0		99	80-120		
Sodium	23.3	mg/L		25.00		93	80-120		
Thallium	256	ug/L		250.0		102	80-120		
<b><u>Batch B816087 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B816087-BLK1)</b>					Prepared & Analyzed: 08/09/18				
Silicon	< 1.0	ug/L							
<b>LCS (B816087-BS1)</b>					Prepared & Analyzed: 08/09/18				
Silicon	505	ug/L		500.0		101	85-115		



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## NOTES

Specific method revisions used for analysis are available upon request.

### Memos

Samples were field filtered with 0.45 micron filter so samples were relogged in for soluble metals  
Revised Report - report down to MDL

### Certifications

CHI - McHenry, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO

USEPA DMR-QA Program

STL - St. Louis, MO

TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050  
Drinking Water Certifications: Missouri (1050)  
Missouri Department of Natural Resources

\* Not a TNI accredited analyte

### Qualifiers

H Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.

Certified by: Gail Schindler, Project Manager





**PDC Laboratories, Inc.**  
 P.O. Box 9071 • Peoria, IL 61612-9071  
 (309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



## CASE NARRATIVE

**Client:** Anchor QEA, LLC, Project AEP\_MT

**PDC Work Orders:** 8075269

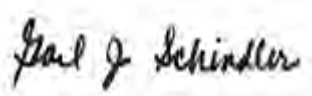
PDC Laboratories, Inc. received 3 water samples on July 27, 2018. The samples were received in good condition at our Peoria, IL facility. Samples were initially logged in for total metals analysis but were switched to soluble metals because the chain of custody indicated the metals were field filtered using a 0.45 micron filter. Additional parameters not listed in the initial quote were received. Ms. Jessica Goin was contacted for approval to proceed with analysis on the additional parameters and informed the nitrate was received outside the method recommended hold time. Approval was given by Ms. Goin.

Sample ID's		Date	
Field	Lab ID	Collected	Received
OMT_002_t0	8075269-01	07/23/18	07/27/18
OMT_052_t0	8075269-02	07/23/18	07/27/18
OMT_MB_000_t0	8075269-03	07/23/18	07/27/18

## QC SUMMARY

All QC items in this QC summary report meet acceptance criteria with the following exceptions:

Nitrate: Samples received outside method recommended hold time and are flagged with an H.

CERTIFICATION	
<b>Name:</b> Gail Schindler	<b>Title:</b> Project Manager
<b>Signature:</b> 	<b>Date:</b> August 13, 2018

# CHAIN OF CUSTODY RECORD

PDC LABORATORIES, INC.  
 2231 WEST ALTORFER DRIVE  
 PEORIA, IL 61615

PHONE # 800-752-6651  
 FAX # 309-692-9689

State where samples collected

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

<b>1</b> CLIENT Anchor QRE ADDRESS 6720 SW Maccocks Ave CITY STATE ZIP Portland, OR 97219 CONTACT PERSON Jessica Gorn		PROJECT NUMBER AEP-MT PHONE NUMBER 503 972 5019 P.O. NUMBER FAX NUMBER		MEANS SHIPPED DATE SHIPPED		ANALYSIS REQUESTED (FOR LAB USE ONLY) LOGIN # 8075269-3 LOGGED BY: [Signature] LAB PROJ. # TEMPLATE: PROJ. MGR.:	
<b>2</b> SAMPLE DESCRIPTION AS YOU WANT ON REPORT OMT-002-to OMT-052-to OMT-MB-000-to		DATE COLLECTED 7/23/18 TIME COLLECTED 3:25 PM 3:30 PM 3:00 PM		SAMPLE TYPE GRAB COMP GW L L		BOTTLE COUNT 3 3 3	
REMARKS All metals samples 0.45 L filtered		MATRIX TYPES: WW-WASTEWATER DW-DRINKING WATER GW-GROUND WATER WW-SLUDGE NAS-SOLID LOHT-LEACHATE OTHER: MATRIX TYPE		TDS CaCO <sub>3</sub> Alkalinity F, Cl, SO <sub>4</sub> , NO <sub>2</sub> , PO <sub>4</sub> NO <sub>3</sub> , Fe, Pb, K, Li, Na, Hg Sb, Ar, Ba, Be, B, Cd, Cr, Cu		REMARKS All metals samples 0.45 L filtered	
<b>5</b> TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) RUSH RESULTS VIA (PLEASE CIRCLE) FAX		NORMAL RUSH PHONE E-MAIL		<b>6</b> The sample temperature will be measured upon receipt at the lab. By initiating this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0-16.0°C. By not initiating this area you allow the lab to proceed with analytical testing regardless of the sample temperature.		COMMENTS: (FOR LAB USE ONLY)	
<b>7</b> RELINQUISHED BY (SIGNATURE) [Signature] RELINQUISHED BY (SIGNATURE) [Signature] RELINQUISHED BY (SIGNATURE) [Signature]		RECEIVED BY (SIGNATURE) [Signature] RECEIVED BY (SIGNATURE) [Signature] RECEIVED AT LAB BY (SIGNATURE) [Signature]		DATE TIME 7/23/18 3:25 PM 3:30 PM 3:00 PM		SAMPLE TEMPERATURE UPON RECEIPT CHILL PROCESS STARTED PRIOR TO RECEIPT OR N SAMPLE(S) RECEIVED ON ICE OR N BOTTLES FILLED WITH ADEQUATE VOLUME OR N SAMPLES RECEIVED WITHIN HOLD TIME(S) OR N (EXCLUDES TYPICAL FIELD PARAMETERS) OR N DATE AND TIME TAKEN FROM SAMPLE BOTTLE	



# PDC Laboratories, Inc.

PROFESSIONAL • DEPENDABLE • COMMITTED

September 06, 2018

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

Dear Jessica Goin:

Please find enclosed the **revised** analytical results for the sample(s) the laboratory received on **7/27/18 10:00 am** and logged in under work order **8075268**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President, John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com







**PDC Laboratories, Inc.**  
2231 West Altorfer Drive  
Peoria, IL 61615  
(800) 752-6651

### REVISED ANALYTICAL RESULTS

**Sample:** 8075268-01  
**Name:** 1MT1\_201Cl\_10\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:25  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
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**Soluble Metals - PIA**

Antimony	0.34	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Arsenic	< 0.088	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Barium	22	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Beryllium	0.055	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Boron	5100	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Cadmium	0.050	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Calcium	150	mg/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Chromium	0.42	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Cobalt	0.98	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Iron	1000	ug/L		07/30/18 15:09	07/31/18 09:12	TJJ	SW 6010
Lead	0.12	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Lithium	150	ug/L		07/30/18 15:09	08/01/18 06:57	TJJ	SW 6010*
Manganese	540	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Mercury	0.18	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Molybdenum	32	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Selenium	4.5	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 07:47	JMW	SW 6020



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**REVISED ANALYTICAL RESULTS**

**Sample:** 8075268-02  
**Name:** 1MT1\_202Cl\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 13:55  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Arsenic	< 0.088	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Barium	41	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Boron	8300	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Cadmium	< 0.049	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Calcium	240	mg/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Chromium	0.64	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Cobalt	0.69	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Iron	1300	ug/L		08/03/18 14:03	08/06/18 10:29	TJJ	SW 6010
Lead	< 0.070	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Lithium	120	ug/L		08/03/18 14:03	08/06/18 14:02	TJJ	SW 6010*
Manganese	650	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Mercury	0.065	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Molybdenum	49	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Selenium	6.5	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 07:51	JMW	SW 6020



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### REVISED ANALYTICAL RESULTS

**Sample:** 8075268-03  
**Name:** 1MT1\_301B\_10\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:30  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Arsenic	< 0.088	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Barium	160	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Boron	42	ug/L		08/06/18 06:26	08/08/18 08:20	JMW	SW 6020
Cadmium	< 0.049	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Calcium	280	mg/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Chromium	0.66	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Cobalt	< 0.064	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Iron	52	ug/L		08/03/18 14:03	08/06/18 10:32	TJJ	SW 6010
Lead	1.3	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Lithium	140	ug/L		08/03/18 14:03	08/06/18 14:05	TJJ	SW 6010*
Manganese	9.2	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Mercury	0.050	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Molybdenum	0.20	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Selenium	< 0.22	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 07:54	JMW	SW 6020



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### REVISED ANALYTICAL RESULTS

**Sample:** 8075268-04  
**Name:** 1MT1\_302B\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 13:50  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	0.38	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Arsenic	2.0	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Barium	410	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Boron	630	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Cadmium	0.83	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Calcium	350	mg/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Chromium	3.1	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Cobalt	0.32	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Iron	330	ug/L		07/30/18 15:09	07/31/18 09:27	TJJ	SW 6010
Lead	2.1	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Lithium	200	ug/L		07/30/18 15:09	08/01/18 07:06	TJJ	SW 6010*
Manganese	95	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Mercury	0.055	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Molybdenum	1.8	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Selenium	0.47	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 07:58	JMW	SW 6020



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## REVISED ANALYTICAL RESULTS

**Sample:** 8075268-05  
**Name:** 1MT1\_401SL\_10\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:35  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Arsenic	0.23	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Barium	17	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Boron	8000	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Cadmium	0.60	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Calcium	550	mg/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Chromium	0.30	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Cobalt	3.9	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Iron	240	ug/L		08/03/18 14:03	08/06/18 10:41	TJJ	SW 6010
Lead	4.2	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Lithium	110	ug/L		08/03/18 14:03	08/06/18 14:08	TJJ	SW 6010*
Manganese	870	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Mercury	< 0.034	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Molybdenum	1.3	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Selenium	22	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020
Thallium	1.1	ug/L		08/06/18 06:26	08/06/18 08:02	JMW	SW 6020



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### REVISED ANALYTICAL RESULTS

**Sample:** 8075268-06  
**Name:** 1MT1\_402SL\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:05  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Arsenic	0.42	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Barium	13	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Boron	8300	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Cadmium	0.68	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Calcium	580	mg/L	Q4	08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Chromium	0.38	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Cobalt	4.9	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Iron	540	ug/L		08/03/18 14:03	08/06/18 10:44	TJJ	SW 6010
Lead	11	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Lithium	110	ug/L		08/03/18 14:03	08/06/18 14:17	TJJ	SW 6010*
Manganese	820	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Mercury	< 0.034	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Molybdenum	0.42	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Selenium	29	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020
Thallium	1.5	ug/L		08/06/18 06:26	08/06/18 08:06	JMW	SW 6020



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### REVISED ANALYTICAL RESULTS

**Sample:** 8075268-07  
**Name:** 1MT1\_501Kc\_10\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:40  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Arsenic	0.53	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Barium	110	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Boron	3800	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Cadmium	< 0.049	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Calcium	550	mg/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Chromium	39	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Cobalt	4.1	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Iron	380	ug/L		08/03/18 14:03	08/06/18 10:46	TJJ	SW 6010
Lead	0.31	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Lithium	9.4	ug/L		08/03/18 14:03	08/06/18 14:19	TJJ	SW 6010*
Manganese	90	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Mercury	2.5	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Molybdenum	84	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Selenium	13	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 09:05	JMW	SW 6020





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**REVISED ANALYTICAL RESULTS**

**Sample:** 8075268-08  
**Name:** 1MT1\_502Kc\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:00  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Arsenic	0.30	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Barium	100	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Boron	1800	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Cadmium	< 0.049	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Calcium	520	mg/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Chromium	64	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Cobalt	1.8	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Iron	120	ug/L		08/03/18 14:03	08/06/18 10:49	TJJ	SW 6010
Lead	0.12	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Lithium	4.0	ug/L		08/03/18 14:03	08/06/18 14:22	TJJ	SW 6010*
Manganese	30	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Mercury	4.4	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Molybdenum	110	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Selenium	15	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 09:08	JMW	SW 6020



**REVISED ANALYTICAL RESULTS**

**Sample:** 8075268-09  
**Name:** 1MT1\_601MM\_10\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:45  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Arsenic	0.31	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Barium	0.22	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Boron	4900	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Cadmium	< 0.049	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Calcium	< 0.088	mg/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Chromium	150	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Cobalt	0.55	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Iron	3.1	ug/L		08/03/18 14:03	08/06/18 10:53	TJJ	SW 6010
Lead	< 0.070	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Lithium	5.4	ug/L		08/03/18 14:03	08/06/18 14:25	TJJ	SW 6010*
Manganese	660	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Mercury	0.060	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Molybdenum	7.7	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Selenium	9.7	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 09:12	JMW	SW 6020

**Sample:** 8075268-10  
**Name:** 1MT1\_602MM\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:10  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Arsenic	0.42	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Barium	0.73	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Boron	2700	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Cadmium	< 0.049	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Chromium	270	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Cobalt	0.76	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Iron	2.9	ug/L		08/03/18 14:03	08/06/18 10:56	TJJ	SW 6010
Lead	< 0.070	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Lithium	5.6	ug/L		08/03/18 14:03	08/06/18 14:28	TJJ	SW 6010*
Manganese	1600	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Mercury	0.040	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Molybdenum	1.6	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Selenium	10	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 09:16	JMW	SW 6020



**REVISED ANALYTICAL RESULTS**

**Sample:** 8075268-10RE1  
**Name:** 1MT1\_602MM\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:10  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Calcium	< 0.088	mg/L		08/06/18 06:26	08/14/18 12:12	JMW	SW 6020

**Sample:** 8075268-11  
**Name:** 1MT1\_101Sa\_10\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:50  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Arsenic	0.31	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Barium	50	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Boron	9300	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Cadmium	0.075	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Calcium	290	mg/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Chromium	0.30	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Cobalt	1.4	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Iron	16	ug/L		08/03/18 14:03	08/06/18 10:59	TJJ	SW 6010
Lead	0.080	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Lithium	110	ug/L		08/03/18 14:03	08/06/18 14:31	TJJ	SW 6010*
Manganese	1200	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Mercury	< 0.034	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Molybdenum	68	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Selenium	11	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 09:20	JMW	SW 6020



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### REVISED ANALYTICAL RESULTS

**Sample:** 8075268-12  
**Name:** 1MT1\_102a\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:20  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Arsenic	0.38	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Barium	50	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Boron	8800	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Cadmium	0.075	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Calcium	290	mg/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Chromium	0.32	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Cobalt	1.4	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Iron	23	ug/L		08/03/18 14:03	08/06/18 11:02	TJJ	SW 6010
Lead	0.13	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Lithium	110	ug/L		08/03/18 14:03	08/06/18 14:34	TJJ	SW 6010*
Manganese	1100	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Mercury	< 0.034	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Molybdenum	67	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Selenium	10	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 09:23	JMW	SW 6020



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## REVISED ANALYTICAL RESULTS

**Sample:** 8075268-13  
**Name:** 1MT1\_701ZV\_10\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:55  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Arsenic	0.12	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Barium	79	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Boron	7700	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Cadmium	< 0.049	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Calcium	280	mg/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Chromium	1.1	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Cobalt	3.8	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Iron	11000	ug/L		08/03/18 14:03	08/06/18 11:18	TJJ	SW 6010
Lead	0.36	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Lithium	110	ug/L		08/03/18 14:03	08/06/18 14:51	TJJ	SW 6010*
Manganese	5900	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Mercury	< 0.034	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Molybdenum	51	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Selenium	7.3	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 09:27	JMW	SW 6020



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### REVISED ANALYTICAL RESULTS

**Sample:** 8075268-14  
**Name:** 1MT1\_702ZV\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/24/18 14:15  
**Received:** 07/27/18 10:00  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Antimony	< 0.25	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Arsenic	< 0.088	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Barium	92	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Beryllium	< 0.054	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Boron	6800	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Cadmium	< 0.049	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Calcium	270	mg/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Chromium	0.64	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Cobalt	3.1	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Iron	11000	ug/L		08/03/18 14:03	08/06/18 11:20	TJJ	SW 6010
Lead	0.36	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Lithium	100	ug/L		08/03/18 14:03	08/06/18 14:54	TJJ	SW 6010*
Manganese	7100	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Mercury	< 0.034	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Molybdenum	66	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Selenium	6.6	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020
Thallium	< 0.068	ug/L		08/06/18 06:26	08/06/18 09:31	JMW	SW 6020



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B815172 - SW 3015 - SW 6010</u></b>									
<b>Blank (B815172-BLK1)</b>				Prepared: 07/30/18 Analyzed: 08/01/18					
Lithium	< 0.11	ug/L							
Iron	6.73	ug/L							
<b>LCS (B815172-BS1)</b>				Prepared: 07/30/18 Analyzed: 08/01/18					
Lithium	593	ug/L		555.6		107	80-120		
Iron	578	ug/L		555.6		104	80-120		
<b><u>Batch B815593 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B815593-BLK1)</b>				Prepared: 08/03/18 Analyzed: 08/06/18					
Lithium	1.89	ug/L							
Iron	< 2.4	ug/L							
<b>LCS (B815593-BS1)</b>				Prepared: 08/03/18 Analyzed: 08/06/18					
Lithium	517	ug/L		500.0		103	80-120		
Iron	544	ug/L		500.0		109	80-120		
<b><u>Batch B815634 - 6020 Sol no prep - SW 6020</u></b>									
<b>Blank (B815634-BLK1)</b>				Prepared & Analyzed: 08/06/18					
Antimony	< 0.25	ug/L							
Arsenic	< 0.088	ug/L							
Barium	< 0.048	ug/L							
Beryllium	< 0.054	ug/L							
Boron	5.42	ug/L							
Cadmium	< 0.049	ug/L							
Calcium	0.119	mg/L			B				
Chromium	< 0.25	ug/L							
Cobalt	< 0.064	ug/L							
Lead	0.0950	ug/L							
Manganese	0.215	ug/L							
Mercury	< 0.034	ug/L							
Molybdenum	< 0.069	ug/L							
Selenium	< 0.22	ug/L							
Thallium	< 0.068	ug/L							
<b>LCS (B815634-BS1)</b>				Prepared & Analyzed: 08/06/18					
Antimony	237	ug/L		250.0		95	80-120		
Arsenic	241	ug/L		250.0		96	80-120		
Barium	238	ug/L		250.0		95	80-120		
Beryllium	248	ug/L		250.0		99	80-120		
Boron	2540	ug/L		2500		102	80-120		
Cadmium	244	ug/L		250.0		98	80-120		
Calcium	23.9	mg/L		25.00		96	80-120		
Chromium	237	ug/L		250.0		95	80-120		
Cobalt	234	ug/L		250.0		94	80-120		
Lead	236	ug/L		250.0		94	80-120		
Manganese	237	ug/L		250.0		95	80-120		
Mercury	23.8	ug/L		25.00		95	80-120		
Molybdenum	234	ug/L		250.0		94	80-120		





**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B815634 - 6020 Sol no prep - SW 6020</u></b>									
<b>LCS (B815634-BS1)</b>					Prepared & Analyzed: 08/06/18				
Selenium	246	ug/L		250.0		98	80-120		
Thallium	246	ug/L		250.0		98	80-120		
<b>Matrix Spike (B815634-MS1)</b>					Sample: 8075268-06 Prepared & Analyzed: 08/06/18				
Antimony	234	ug/L		250.0	ND	94	75-125		
Arsenic	243	ug/L		250.0	0.420	97	75-125		
Barium	249	ug/L		250.0	13.4	94	75-125		
Beryllium	236	ug/L		250.0	ND	94	75-125		
Boron	10500	ug/L		2500	8310	88	75-125		
Cadmium	237	ug/L		250.0	0.680	95	75-125		
Calcium	600	mg/L	Q4	25.00	584	63	75-125		
Chromium	235	ug/L		250.0	0.385	94	75-125		
Cobalt	232	ug/L		250.0	4.87	91	75-125		
Lead	238	ug/L		250.0	11.3	91	75-125		
Manganese	1090	ug/L		250.0	820	110	75-125		
Mercury	24.4	ug/L		25.00	ND	98	75-125		
Molybdenum	236	ug/L		250.0	0.425	94	75-125		
Selenium	276	ug/L		250.0	29.3	99	75-125		
Thallium	240	ug/L		250.0	1.51	95	75-125		
<b>Matrix Spike Dup (B815634-MSD1)</b>					Sample: 8075268-06 Prepared & Analyzed: 08/06/18				
Antimony	237	ug/L		250.0	ND	95	75-125	1	20
Arsenic	242	ug/L		250.0	0.420	96	75-125	0.4	20
Barium	248	ug/L		250.0	13.4	94	75-125	0.4	20
Beryllium	239	ug/L		250.0	ND	96	75-125	1	20
Boron	10600	ug/L		2500	8310	91	75-125	0.6	20
Cadmium	237	ug/L		250.0	0.680	95	75-125	0.04	20
Calcium	592	mg/L	Q4	25.00	584	32	75-125	1	20
Chromium	233	ug/L		250.0	0.385	93	75-125	0.8	20
Cobalt	232	ug/L		250.0	4.87	91	75-125	0.02	20
Lead	240	ug/L		250.0	11.3	91	75-125	0.7	20
Manganese	1060	ug/L		250.0	820	94	75-125	4	20
Mercury	24.5	ug/L		25.00	ND	98	75-125	0.5	20
Molybdenum	237	ug/L		250.0	0.425	94	75-125	0.3	20
Selenium	274	ug/L		250.0	29.3	98	75-125	0.9	20
Thallium	242	ug/L		250.0	1.51	96	75-125	0.6	20
<b><u>Batch B816306 - 6020 Sol no prep - SW 6020</u></b>									
<b>Blank (B816306-BLK1)</b>					Prepared & Analyzed: 08/14/18				
Calcium	< 0.088	mg/L							
<b>LCS (B816306-BS1)</b>					Prepared & Analyzed: 08/14/18				
Calcium	23.5	mg/L		25.00		94	80-120		



**PDC Laboratories, Inc.**  
2231 West Altorfer Drive  
Peoria, IL 61615  
(800) 752-6651

## NOTES

Specific method revisions used for analysis are available upon request.

### Memos

Samples were field filtered with 0.45 micron filter so samples were relogged in for soluble metals.  
Revised Report - report down to MDL

### Certifications

CHI - McHenry, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO

USEPA DMR-QA Program

STL - St. Louis, MO

TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050  
Drinking Water Certifications: Missouri (1050)  
Missouri Department of Natural Resources

\* Not a TNI accredited analyte

### Qualifiers

- B Present in the method blank at 119 ug/L.
- Q4 The matrix spike recovery result is unusable since the analyte concentration in the sample is greater than four times the spike level.  
The associated blank spike was acceptable.

Certified by: Gail Schindler, Project Manager





**PDC Laboratories, Inc.**  
P.O. Box 9071 • Peoria, IL 61612-9071  
(309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



## CASE NARRATIVE

**Client:** Anchor QEA, LLC, Project AEP\_MT

**PDC Work Order:** 8075268

PDC Laboratories, Inc. received 14 water samples on July 27, 2018. The samples were received in good condition at our Peoria, Illinois facility. Samples were initially logged in for total metals analysis but were switched to soluble metals because the chain of custody indicated the metals were field filtered using a 0.45 micron filter.

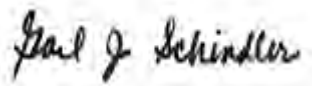
Sample ID's		Date	
Field	Lab ID	Collected	Received
1MT1_201CI_10_t24	8075268-01	07/24/18	07/27/18
1MT1_202CI_5_t24	8075268-02	07/24/18	07/27/18
1MT1_301B_10_t24	8075268-03	07/24/18	07/27/18
1MT1_302B_5_t24	8075268-04	07/24/18	07/27/18
1MT1_401SL_10_t24	8075268-05	07/24/18	07/27/18
1MT1_402SL_5_t24	8075268-06	07/24/18	07/27/18
1MT1_501KC_10_t24	8075268-07	07/24/18	07/27/18
1MT1_502KC_5_t24	8075268-08	07/24/18	07/27/18
1MT1_601MM_10_t24	8075268-09	07/24/18	07/27/18
1MT1_602MM_5_t24	8075268-10	07/24/18	07/27/18
1MT1_101Sa_10_t24	8075268-11	07/24/18	07/27/18
1MT1_102Sa_5_t24	8075268-12	07/24/18	07/27/18
1MT1_701ZV_10_t24	8075268-13	07/24/18	07/27/18
1MT1_702ZV_5_t24	8075268-14	07/24/18	07/27/18

### QC SUMMARY

All QC items in this QC summary report meet acceptance criteria with the following exceptions:

Calcium: Spiked sample 8075268-06, MS & MSD flagged with Q4, the level in the sample spiked is greater than 4 times the spiked amount.

On the initial metals analysis on August 6, 2018, all results met the method blank project criteria of less than five times the sample concentration with the exception of 1MT1\_602MM\_5\_t24. The sample was reanalyzed on August 14, 2018 and both the sample and method blank were non-detect.

<b>CERTIFICATION</b>	
<b>Name:</b> Gail Schindler	<b>Title:</b> Project Manager
<b>Signature:</b> 	<b>Date:</b> August 15, 2018

# CHAIN OF CUSTODY RECORD

PDC LABORATORIES, INC.  
 2231 WEST ALTORFER DRIVE  
 PEORIA, IL 61615  
 PHONE # 800-752-6651  
 FAX # 309-692-9689

State where samples collected

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

CLIENT		PROJECT NUMBER	P.O. NUMBER	MEANS SHIPPED	ANALYSIS REQUESTED		(FOR LAB USE ONLY)	
1 Anchor OEA		APP-MT			3		4	
ADDRESS 6720 SW Macadam		PHONE NUMBER 503 972 5019	FAX NUMBER	DATE SHIPPED	5		LOGIN # 8075268-KH	LOGGED BY: [Signature]
CITY PORTLAND, OR		SAMPLER (PLEASE PRINT)		MATRIX TYPES: WW-WASTEWATER DW-DRINKING WATER GW-GROUND WATER WWSL-SLUDGE NAS-SOLID LOCH-LEACHATE OTHER:	6		LAB PROJ. #	TEMPLATE:
ZIP 97219		SAMPLER'S SIGNATURE		MATRIX TYPE	7		PROJ. MGR.:	
CONTACT PERSON Jessica Goin		DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE	8		REMARKS	
2 SAMPLE DESCRIPTION AS YOU WANT ON REPORT		DATE COLLECTED	TIME COLLECTED	GRAB	COMP	9		
IMTI-201C1-10-+24		7/24	14:25			SW-As-BaBoBcda		
IMTI-202C1-5-+24			13:55			G.Cofc Ph.L.Mn		ALL METALS
IMTI-301B-10-+24			14:30			Hg,Mo,Se,Th		SAMPLES
IMTI-302B-5-+24			13:50					O-45 Mn
IMTI-401SL-10-+24			14:35					Altered
IMTI-402SL-5-+24			14:05					
IMTI-501KC-10-+24			14:40					
IMTI-502KC-5-+24			14:00					
IMTI-601MM-10-+24			14:45					
IMTI-602MM-5-+24			14:10					
IMTI-101SA-10-+24			14:50					
IMTI-102SA-5-+24			14:20					
5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE)		RUSH		DATE RESULTS NEEDED		6 The sample temperature will be measured upon receipt at the lab. By initiating this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0 C. By not initiating this area you allow the lab to proceed with analytical testing regardless of the sample temperature.		
FAX #	PHONE #	PHONE	E-MAIL	7 RELINQUISHED BY: (SIGNATURE)				
				DATE	TIME	DATE	TIME	8 COMMENTS: (FOR LAB USE ONLY)
				7/26	5:00			SAMPLE TEMPERATURE UPON RECEIPT
								CHILL PROCESS STARTED PRIOR TO RECEIPT
								SAMPLE(S) RECEIVED ON ICE
								PROPER BOTTLES RECEIVED IN GOOD CONDITION
								BOTTLES FILLED WITH ADEQUATE VOLUME
								SAMPLES RECEIVED WITHIN HOLD TIME(S)
								(EXCLUDES TYPICAL FIELD PARAMETERS)
								DATE AND TIME TAKEN FROM SAMPLE BOTTLE
								°C
								FOR N
								FOR N
								FOR N
								FOR N

# CHAIN OF CUSTODY RECORD

PDC LABORATORIES, INC.  
 2231 WEST ALTORFER DRIVE  
 PEORIA, IL 61615

PHONE # 800-752-6651  
 FAX # 309-692-9689

State where samples collected

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

<b>1</b> CLIENT ANCHOR OEA ADDRESS 6720 SW MACADAM CITY PORTLAND, OR 97219 STATE CONTACT PERSON Jessica Goin		PROJECT NUMBER AN-MY PHONE NUMBER 503 973 5026 FAX NUMBER SAMPLER (PLEASE PRINT) SAMPLER'S SIGNATURE		P.O. NUMBER MEANS SHIPPED DATE SHIPPED MATRIX TYPES: WW-WASTEWATER DW-DRINKING WATER GW-GROUND WATER WW-SLUDGE NAS-SOLID LCHT-LEACHATE OTHER:		ANALYSIS REQUESTED 3 B.A.S.B., B.B., B.C.D.A. C.C., C.F., P.L., M.N. Hg, Mo, Se, Tn		(FOR LAB USE ONLY) 4 LOGIN # LOGGED BY: LAB PROJ. # TEMPLATE: PROJ. MGR.:	
<b>2</b> SAMPLE DESCRIPTION AS YOU WANT ON REPORT I.M.T.L. 701ZV-10-+24 I.M.T.L. 702ZV-5-+24		DATE COLLECTED 7/24 TIME COLLECTED 14:55 14:15		SAMPLE TYPE GRAB COMP BOTTLE COUNT 1 1		MATRIX TYPE GW GW		REMARKS all metal samples 0.45 Mn filtered	
<b>5</b> TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) RUSH RESULTS VIA (PLEASE CIRCLE) FAX (NORMAL)		RUSH DATE RESULTS NEEDED E-MAIL		PHONE EMAIL ADDRESS		6 The sample temperature will be measured upon receipt at the lab. By initialising this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0°C. By not initialising this area you allow the lab to proceed with analytical testing regardless of the sample temperature.			
<b>7</b> RELINQUISHED BY (SIGNATURE) RELINQUISHED BY (SIGNATURE) RELINQUISHED BY (SIGNATURE)		RECEIVED BY (SIGNATURE) RECEIVED BY (SIGNATURE) RECEIVED AT LAB BY (SIGNATURE)		DATE TIME DATE TIME DATE TIME		8 COMMENTS: (FOR LAB USE ONLY) SAMPLE TEMPERATURE UPON RECEIPT FOR N °C CHILL PROCESS STARTED PRIOR TO RECEIPT FOR N °C SAMPLE(S) RECEIVED ON ICE FOR N °C BOTTLES FILLED WITH ADEQUATE VOLUME FOR N °C SAMPLES RECEIVED WITHIN HOLD TIME(S) FOR N °C (EXCLUDES TYPICAL FIELD PARAMETERS) DATE AND TIME TAKEN FROM SAMPLE BOTTLE			



# PDC Laboratories, Inc.

PROFESSIONAL • DEPENDABLE • COMMITTED

October 02, 2018

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

Dear Jessica Goin:

Please find enclosed the analytical results for the sample(s) the laboratory received on **9/20/18 10:00 am** and logged in under work order **8093724**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President, John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com







**ANALYTICAL RESULTS**

**Sample:** 8093724-01  
**Name:** 2MT2\_801BF\_10\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/12/18 13:00  
**Received:** 09/20/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	6200	ug/L		09/24/18 07:11	09/24/18 11:01	JMW	SW 6020
Cobalt	0.20	ug/L		09/24/18 07:11	09/24/18 11:01	JMW	SW 6020
Lithium	120	ug/L		09/28/18 07:28	09/28/18 08:02	TJJ	SW 6010*
Molybdenum	58	ug/L		09/24/18 07:11	09/24/18 11:01	JMW	SW 6020

**Sample:** 8093724-02  
**Name:** 2MT2\_802BF\_5\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/12/18 13:15  
**Received:** 09/20/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	5300	ug/L		09/24/18 07:11	09/24/18 11:05	JMW	SW 6020
Cobalt	0.16	ug/L		09/24/18 07:11	09/24/18 11:05	JMW	SW 6020
Lithium	110	ug/L		09/28/18 07:28	09/28/18 07:50	TJJ	SW 6010*
Molybdenum	54	ug/L		09/24/18 07:11	09/24/18 11:05	JMW	SW 6020

**Sample:** 8093724-03  
**Name:** 4MT2\_801BF\_10\_t96  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/14/18 11:25  
**Received:** 09/20/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	5800	ug/L		09/24/18 07:11	09/24/18 11:08	JMW	SW 6020
Cobalt	0.14	ug/L		09/24/18 07:11	09/24/18 11:08	JMW	SW 6020
Lithium	110	ug/L		09/28/18 07:28	09/28/18 07:51	TJJ	SW 6010*
Molybdenum	57	ug/L		09/24/18 07:11	09/24/18 11:08	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8093724-04  
**Name:** 8MT2\_801BF\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/18/18 10:35  
**Received:** 09/20/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	570	mg/L		09/22/18 03:35	09/22/18 03:35	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	230	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Boron	5000	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Calcium	690	mg/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Chromium	140	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Cobalt	0.080	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Iron	39	ug/L		10/02/18 06:34	10/02/18 07:47	TJJ	SW 6010
Lead	3.3	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Lithium	110	ug/L		09/28/18 07:28	09/28/18 07:53	TJJ	SW 6010*
Manganese	18	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Mercury	0.045	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Molybdenum	54	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Selenium	11	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020
Thallium	< 0.068	ug/L		09/24/18 07:11	09/24/18 11:12	JMW	SW 6020

**Sample:** 8093724-05  
**Name:** 8MT2\_851BF\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/18/18 11:05  
**Received:** 09/20/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	580	mg/L		09/22/18 03:53	09/22/18 03:53	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	240	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Boron	5300	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Calcium	730	mg/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Chromium	150	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Cobalt	0.11	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Iron	58	ug/L		10/02/18 06:34	10/02/18 07:09	TJJ	SW 6010
Lead	3.6	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Lithium	120	ug/L		09/28/18 07:28	09/28/18 07:55	TJJ	SW 6010*
Manganese	29	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Mercury	0.035	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Molybdenum	57	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Selenium	11	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020
Thallium	< 0.068	ug/L		09/24/18 07:11	09/24/18 11:16	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8093724-06  
**Name:** 8MT2\_802BF\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/18/18 10:50  
**Received:** 09/20/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	450	mg/L		09/22/18 04:12	09/22/18 04:12	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	480	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Boron	3200	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Calcium	1000	mg/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Chromium	260	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Cobalt	0.10	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Iron	1900	ug/L		10/02/18 06:34	10/02/18 07:12	TJJ	SW 6010
Lead	2.6	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Lithium	110	ug/L		09/28/18 07:28	09/28/18 08:00	TJJ	SW 6010*
Manganese	450	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Mercury	< 0.034	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Molybdenum	51	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Selenium	12	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020
Thallium	< 0.068	ug/L		09/24/18 07:11	09/24/18 12:02	JMW	SW 6020

**Sample:** 8093724-07  
**Name:** 8MT2\_852BF\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/18/18 11:20  
**Received:** 09/20/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	480	mg/L		09/22/18 04:30	09/22/18 04:30	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	480	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Boron	3200	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Calcium	970	mg/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Chromium	240	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Cobalt	< 0.064	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Iron	330	ug/L		10/02/18 06:34	10/02/18 07:15	TJJ	SW 6010
Lead	2.1	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Lithium	110	ug/L		09/28/18 07:28	09/28/18 07:44	TJJ	SW 6010*
Manganese	93	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Mercury	0.085	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Molybdenum	50	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Selenium	12	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020
Thallium	< 0.068	ug/L		09/24/18 07:11	09/24/18 12:14	JMW	SW 6020



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B819368 - 6020 Sol no prep - SW 6020</u></b>									
<b>Blank (B819368-BLK1)</b>					Prepared & Analyzed: 09/24/18				
Barium	< 0.048	ug/L							
Boron	5.34	ug/L							
Calcium	< 0.088	mg/L							
Chromium	< 0.25	ug/L							
Cobalt	< 0.064	ug/L							
Lead	< 0.070	ug/L							
Manganese	< 0.064	ug/L							
Mercury	< 0.034	ug/L							
Molybdenum	< 0.069	ug/L							
Selenium	< 0.22	ug/L							
Thallium	< 0.068	ug/L							
<b>LCS (B819368-BS1)</b>					Prepared & Analyzed: 09/24/18				
Barium	235	ug/L		250.0		94	80-120		
Boron	2500	ug/L		2500		100	80-120		
Calcium	24.7	mg/L		25.00		99	80-120		
Chromium	240	ug/L		250.0		96	80-120		
Cobalt	234	ug/L		250.0		94	80-120		
Lead	234	ug/L		250.0		94	80-120		
Manganese	240	ug/L		250.0		96	80-120		
Mercury	24.5	ug/L		25.00		98	80-120		
Molybdenum	243	ug/L		250.0		97	80-120		
Selenium	244	ug/L		250.0		98	80-120		
Thallium	237	ug/L		250.0		95	80-120		
<b><u>Batch B819375 - No Prep - EPA 300.0</u></b>									
<b>Calibration Blank (B819375-CCB1)</b>					Prepared & Analyzed: 09/21/18				
Sulfate	0.00	mg/L							
<b>Calibration Check (B819375-CCV1)</b>					Prepared & Analyzed: 09/21/18				
Sulfate	5.11	mg/L		5.000		102	90-110		
<b><u>Batch B819781 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B819781-BLK1)</b>					Prepared & Analyzed: 09/28/18				
Lithium	< 0.10	ug/L							
<b>LCS (B819781-BS1)</b>					Prepared & Analyzed: 09/28/18				
Lithium	547	ug/L		500.0		109	80-120		
<b>Matrix Spike (B819781-MS1)</b>					Prepared & Analyzed: 09/28/18				
Lithium	655	ug/L		500.0	109	109	75-125		
<b>Matrix Spike Dup (B819781-MSD1)</b>					Prepared & Analyzed: 09/28/18				
Lithium	665	ug/L		500.0	109	111	75-125	2	200
<b><u>Batch B819986 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B819986-BLK1)</b>					Prepared & Analyzed: 10/02/18				
Iron	< 2.4	ug/L							
<b>LCS (B819986-BS1)</b>					Prepared & Analyzed: 10/02/18				
Iron	515	ug/L		500.0		103	80-120		



## NOTES

Specific method revisions used for analysis are available upon request.

### Certifications

#### CHI - McHenry, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

#### PIA - Peoria, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Missouri Department of Natural Resources Certificate of Approval for Microbiological Laboratory Service No. 870  
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

#### SPIL - Springfield, IL

NELAP/NELAC accreditation through the Illinois EPA, Lab No. 100323

#### SPMO - Springfield, MO

USEPA DMR-QA Program

#### STL - St. Louis, MO

TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050  
Drinking Water Certifications: Missouri (1050)  
Missouri Department of Natural Resources

\* Not a TNI accredited analyte

Certified by: Gail Schindler, Project Manager





**PDC Laboratories, Inc.**  
 P.O. Box 9071 • Peoria, IL 61612-9071  
 (309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



## CASE NARRATIVE

**Client:** Anchor QEA, LLC., Project AEP Mountaineer

**PDC Work Order:** 8093724

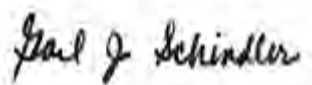
PDC Laboratories, Inc. received 7 water samples on September 20, 2018. Sample analysis was performed at our Peoria, Illinois laboratory.

Sample ID's		Date	
Field	Lab ID	Collected	Received
2MT2_801BF_10_t48	8093724-01	9/12/18	9/20/18
2MT2_802BF_5_t48	8093724-02	9/12/18	9/20/18
4MT2_801BF_10_t96	8093724-03	9/14/18	9/20/18
8MT2_801BF_10_t192	8093724-04	9/18/18	9/20/18
8MT2_851BF_10_t192	8093724-05	9/18/18	9/20/18
8MT2_802BF_5_t192	8093724-06	9/18/18	9/20/18
8MT2_852BF_5_t192	8093724-07	9/18/18	9/20/18

### QC SUMMARY

All QC items in this QC summary report meet acceptance criteria with the following exception:

Boron: Boron was detected in the method blank at 5.34 ug/l which is below the routine reporting level of 10 ug/l. All sample results are greater than 5 times the level found in the blank.

CERTIFICATION	
<b>Name:</b> Gail Schindler	<b>Title:</b> Project Manager
<b>Signature:</b> 	<b>Date:</b> October 2, 2018



ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

<b>1</b> CLIENT Anchor QEA ADDRESS 6720 SW Macadam Ave, Suite 125 CITY Portland, OR, 97219 STATE ZIP CONTRACT PERSON J. Goin		PROJECT NUMBER AEP Mountaineer PHONE NUMBER 503-972-5019		P.O. NUMBER MEANS SHIPPED Fedex DATE SHIPPED 9/19		ANALYSIS REQUESTED B, C, Mo, Co Fe, Mn, Cr, Pb Se, Hg, Ba, Pt Cu Zn SO4		(FOR LAB USE ONLY) LOGIN # 8093724-7 LOGGED BY: [Signature] LAB PROJ # TEMPLATE: PROJ. MGR.:			
<b>2</b> SAMPLE DESCRIPTION AS YOU WANT ON REPORT		DATE COLLECTED 9/12/18 9/12/18 9/14/18 9/18/18 9/18/18 9/18/18 9/18/18		TIME COLLECTED 1:00PM 1:15PM 1125 1035 1105 1050 1120		SAMPLE TYPE GW           		BOTTLE COUNT 1 1 2 2 2 2		REMARKS 0.45 uM filtered	
<b>5</b> TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) RUSH RESULTS VIA (PLEASE CIRCLE) FAX (NORMAL)		RUSH DATE RECEIVED BY (SIGNATURE) 9/19 TIME 11:20		DATE RESULTS NEEDED E-MAIL		<b>6</b> The sample temperature will be measured upon receipt at the lab. By initiating this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0, 1-6.0°C. By not initiating this area you allow the lab to proceed with analytical testing regardless of the sample temperature.		COMMENTS: (FOR LAB USE ONLY)			
<b>7</b> RELINQUISHED BY (SIGNATURE) [Signature]		RECEIVED BY (SIGNATURE) [Signature]		DATE 9/24/18 TIME 10:00		SAMPLE TEMPERATURE UPON RECEIPT CHILL PROCESS STARTED PRIOR TO RECEIPT SAMPLE(S) RECEIVED ON ICE PROPER BOTTLES RECEIVED IN GOOD CONDITION BOTTLES FILLED WITH ADEQUATE VOLUME SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS) DATE AND TIME TAKEN FROM SAMPLE BOTTLE		°C			





# PDC Laboratories, Inc.

PROFESSIONAL • DEPENDABLE • COMMITTED

September 25, 2018

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

Dear Jessica Goin:

Please find enclosed the analytical results for the sample(s) the laboratory received on **9/12/18 10:00 am** and logged in under work order **8092189**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President, John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com





**ANALYTICAL RESULTS**

**Sample:** 8092189-01  
**Name:** 2MT1\_201Cl\_10\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/25/18 13:45  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8400	ug/L		09/13/18 06:41	09/13/18 08:27	JMW	SW 6020
Cobalt	0.44	ug/L		09/13/18 06:41	09/13/18 08:27	JMW	SW 6020
Lithium	120	ug/L		09/18/18 08:00	09/18/18 09:26	TJJ	SW 6010*
Molybdenum	42	ug/L		09/13/18 06:41	09/13/18 08:27	JMW	SW 6020

**Sample:** 8092189-02  
**Name:** 2MT1\_301B\_10\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/25/18 17:00  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	220	ug/L		09/13/18 06:41	09/13/18 08:31	JMW	SW 6020
Cobalt	< 0.064	ug/L		09/13/18 06:41	09/13/18 08:31	JMW	SW 6020
Lithium	160	ug/L		09/18/18 08:00	09/18/18 09:29	TJJ	SW 6010*
Molybdenum	0.58	ug/L		09/13/18 06:41	09/13/18 08:31	JMW	SW 6020

**Sample:** 8092189-03  
**Name:** 2MT1\_401SL\_10\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/25/18 13:50  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8600	ug/L		09/13/18 06:41	09/13/18 08:35	JMW	SW 6020
Cobalt	2.5	ug/L		09/13/18 06:41	09/13/18 08:35	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 09:32	TJJ	SW 6010*
Molybdenum	1.4	ug/L		09/13/18 06:41	09/13/18 08:35	JMW	SW 6020

**Sample:** 8092189-04  
**Name:** 2MT1\_501Kc\_10\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/25/18 13:55  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	2600	ug/L		09/13/18 06:41	09/13/18 08:39	JMW	SW 6020
Cobalt	1.0	ug/L		09/13/18 06:41	09/13/18 08:39	JMW	SW 6020
Lithium	7.9	ug/L		09/18/18 08:00	09/18/18 09:34	TJJ	SW 6010*
Molybdenum	99	ug/L		09/13/18 06:41	09/13/18 08:39	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-05  
**Name:** 2MT1\_601MM\_10\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/25/18 14:00  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	4300	ug/L		09/13/18 06:41	09/13/18 08:42	JMW	SW 6020
Cobalt	1.2	ug/L		09/13/18 06:41	09/13/18 08:42	JMW	SW 6020
Lithium	1.9	ug/L		09/18/18 08:00	09/18/18 11:12	TJJ	SW 6010*
Molybdenum	2.1	ug/L		09/13/18 06:41	09/13/18 08:42	JMW	SW 6020

**Sample:** 8092189-06  
**Name:** 2MT1\_101Sa\_10\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/25/18 14:05  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9300	ug/L		09/13/18 06:41	09/13/18 08:46	JMW	SW 6020
Cobalt	1.5	ug/L		09/13/18 06:41	09/13/18 08:46	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 11:13	TJJ	SW 6010*
Molybdenum	70	ug/L		09/13/18 06:41	09/13/18 08:46	JMW	SW 6020

**Sample:** 8092189-07  
**Name:** 2MT1\_701ZV\_10\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/25/18 14:10  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	7300	ug/L		09/13/18 06:41	09/13/18 09:36	JMW	SW 6020
Cobalt	1.1	ug/L		09/13/18 06:41	09/13/18 09:36	JMW	SW 6020
Lithium	99	ug/L		09/18/18 08:00	09/18/18 11:16	TJJ	SW 6010*
Molybdenum	91	ug/L		09/13/18 06:41	09/13/18 09:36	JMW	SW 6020

**Sample:** 8092189-08  
**Name:** 2MT\_MB\_000\_t48  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/25/18 14:37  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	39	ug/L		09/13/18 06:41	09/13/18 09:40	JMW	SW 6020
Cobalt	< 0.064	ug/L		09/13/18 06:41	09/13/18 09:40	JMW	SW 6020
Lithium	0.23	ug/L	Q3	09/18/18 08:00	09/18/18 09:16	TJJ	SW 6010*
Molybdenum	< 0.069	ug/L		09/13/18 06:41	09/13/18 09:40	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-09  
**Name:** 4MT1\_201Cl\_10\_t96  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/27/18 12:30  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8600	ug/L		09/13/18 06:41	09/13/18 09:44	JMW	SW 6020
Cobalt	0.11	ug/L		09/13/18 06:41	09/13/18 09:44	JMW	SW 6020
Lithium	120	ug/L		09/18/18 08:00	09/18/18 11:19	TJJ	SW 6010*
Molybdenum	22	ug/L		09/13/18 06:41	09/13/18 09:44	JMW	SW 6020

**Sample:** 8092189-10  
**Name:** 4MT1\_301B\_10\_t96  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/27/18 16:00  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	160	ug/L		09/13/18 06:41	09/13/18 09:48	JMW	SW 6020
Cobalt	< 0.064	ug/L		09/13/18 06:41	09/13/18 09:48	JMW	SW 6020
Lithium	180	ug/L		09/18/18 08:00	09/18/18 11:22	TJJ	SW 6010*
Molybdenum	0.22	ug/L		09/13/18 06:41	09/13/18 09:48	JMW	SW 6020

**Sample:** 8092189-11  
**Name:** 4MT1\_401SL\_10\_t96  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/27/18 12:35  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8500	ug/L		09/13/18 06:41	09/13/18 09:51	JMW	SW 6020
Cobalt	1.6	ug/L		09/13/18 06:41	09/13/18 09:51	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 11:24	TJJ	SW 6010*
Molybdenum	1.4	ug/L		09/13/18 06:41	09/13/18 09:51	JMW	SW 6020

**Sample:** 8092189-12  
**Name:** 4MT1\_501Kc\_10\_t96  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/27/18 12:40  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	1900	ug/L		09/13/18 06:41	09/13/18 09:55	JMW	SW 6020
Cobalt	8.2	ug/L		09/13/18 06:41	09/13/18 09:55	JMW	SW 6020
Lithium	1.3	ug/L		09/18/18 08:00	09/18/18 11:25	TJJ	SW 6010*
Molybdenum	110	ug/L		09/13/18 06:41	09/13/18 09:55	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-13  
**Name:** 4MT1\_601MM\_10\_t96  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/27/18 12:45  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	3800	ug/L		09/13/18 06:41	09/13/18 09:59	JMW	SW 6020
Cobalt	1.2	ug/L		09/13/18 06:41	09/13/18 09:59	JMW	SW 6020
Lithium	0.35	ug/L		09/18/18 08:00	09/18/18 11:26	TJJ	SW 6010*
Molybdenum	0.62	ug/L		09/13/18 06:41	09/13/18 09:59	JMW	SW 6020

**Sample:** 8092189-14  
**Name:** 4MT1\_101Sa\_10\_t96  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/27/18 12:50  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8800	ug/L		09/13/18 06:41	09/13/18 10:03	JMW	SW 6020
Cobalt	1.5	ug/L		09/13/18 06:41	09/13/18 10:03	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 11:27	TJJ	SW 6010*
Molybdenum	71	ug/L		09/13/18 06:41	09/13/18 10:03	JMW	SW 6020

**Sample:** 8092189-15  
**Name:** 4MT1\_701ZV\_10\_t96  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/27/18 12:55  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	6500	ug/L		09/13/18 06:41	09/13/18 11:08	JMW	SW 6020
Cobalt	0.36	ug/L		09/13/18 06:41	09/13/18 11:08	JMW	SW 6020
Lithium	96	ug/L		09/18/18 08:00	09/18/18 11:29	TJJ	SW 6010*
Molybdenum	100	ug/L		09/13/18 06:41	09/13/18 11:08	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-16  
**Name:** 8MT1\_201CI\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:00  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Anions - PIA</b>							
Sulfate	820	mg/L	H	09/13/18 14:12	09/13/18 14:12	LAM	EPA 300.0
<b>Soluble Metals - PIA</b>							
Barium	30	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Boron	8400	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Calcium	190	mg/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Chromium	< 0.25	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Cobalt	< 0.064	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Iron	3500	ug/L		09/18/18 08:00	09/19/18 09:08	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Lithium	120	ug/L		09/18/18 08:00	09/18/18 11:44	TJJ	SW 6010*
Manganese	710	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Molybdenum	8.2	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Selenium	0.68	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 11:11	JMW	SW 6020

**Sample:** 8092189-17  
**Name:** 8MT1\_251CI\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:01  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Barium	29	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Boron	8600	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Calcium	200	mg/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Chromium	0.28	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Cobalt	< 0.064	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Iron	3400	ug/L		09/18/18 08:00	09/19/18 09:10	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Lithium	120	ug/L		09/18/18 08:00	09/18/18 11:46	TJJ	SW 6010*
Manganese	730	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Mercury	0.045	ug/L	H	09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Molybdenum	8.5	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Selenium	0.48	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 11:15	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-18  
**Name:** 8MT1\_202Cl\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:30  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Anions - PIA</b>							
Sulfate	750	mg/L	H	09/13/18 14:48	09/13/18 14:48	LAM	EPA 300.0
<b>Soluble Metals - PIA</b>							
Barium	56	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Boron	8100	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Calcium	200	mg/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Chromium	< 0.25	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Cobalt	0.085	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Iron	550	ug/L		09/18/18 08:00	09/19/18 09:13	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Lithium	130	ug/L		09/18/18 08:00	09/18/18 11:48	TJJ	SW 6010*
Manganese	84	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Molybdenum	18	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Selenium	0.32	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 11:19	JMW	SW 6020

**Sample:** 8092189-19  
**Name:** 8MT1\_252Cl\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:31  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Barium	52	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Boron	7900	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Calcium	230	mg/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Chromium	0.54	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Cobalt	0.16	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Iron	110	ug/L		09/18/18 08:00	09/19/18 09:16	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Lithium	130	ug/L		09/18/18 08:00	09/18/18 11:50	TJJ	SW 6010*
Manganese	100	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Molybdenum	19	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Selenium	0.54	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 11:23	JMW	SW 6020





**ANALYTICAL RESULTS**

**Sample:** 8092189-20  
**Name:** 8MT1\_301B\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 17:55  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	180	ug/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Boron	110	ug/L		09/13/18 06:41	09/17/18 07:35	JMW	SW 6020
Calcium	370	mg/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Chromium	0.37	ug/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Cobalt	< 0.064	ug/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Iron	25	ug/L		09/18/18 08:00	09/19/18 09:19	TJJ	SW 6010
Lead	0.58	ug/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Lithium	200	ug/L		09/18/18 08:00	09/18/18 11:51	TJJ	SW 6010*
Manganese	6.5	ug/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Molybdenum	0.26	ug/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Selenium	< 0.22	ug/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 11:26	JMW	SW 6020

**Sample:** 8092189-21  
**Name:** 8MT1\_302B\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 19:00  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	290	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Boron	2700	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Calcium	470	mg/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Chromium	7.5	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Cobalt	0.83	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Iron	290	ug/L		09/18/18 08:00	09/19/18 09:38	TJJ	SW 6010
Lead	0.96	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Lithium	220	ug/L		09/18/18 08:00	09/18/18 11:59	TJJ	SW 6010*
Manganese	190	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Mercury	0.055	ug/L	H	09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Molybdenum	6.9	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Selenium	0.96	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 11:30	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-22  
**Name:** 8MT1\_401SL\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:05  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	1600	mg/L	H	09/14/18 11:27	09/14/18 11:27	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	14	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Boron	8300	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Calcium	610	mg/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Chromium	1.1	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Cobalt	1.4	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Iron	300	ug/L		09/18/18 08:00	09/19/18 09:41	TJJ	SW 6010
Lead	12	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 12:01	TJJ	SW 6010*
Manganese	480	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Molybdenum	1.5	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Selenium	27	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020
Thallium	1.2	ug/L		09/13/18 06:41	09/13/18 11:34	JMW	SW 6020

**Sample:** 8092189-23  
**Name:** 8MT1\_451SL\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:06  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	14	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Boron	8100	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Calcium	610	mg/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Chromium	0.60	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Cobalt	1.1	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Iron	45	ug/L		09/18/18 08:00	09/19/18 09:44	TJJ	SW 6010
Lead	1.2	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 12:06	TJJ	SW 6010*
Manganese	470	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Molybdenum	1.7	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Selenium	27	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020
Thallium	1.1	ug/L		09/13/18 06:41	09/13/18 11:38	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-24  
**Name:** 8MT1\_402SL\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:35  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	1600	mg/L	H	09/14/18 11:46	09/14/18 11:46	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	13	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Boron	7800	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Calcium	610	mg/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Chromium	0.46	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Cobalt	1.4	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Iron	88	ug/L		09/18/18 08:00	09/19/18 09:47	TJJ	SW 6010
Lead	3.1	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Lithium	100	ug/L		09/18/18 08:00	09/18/18 12:08	TJJ	SW 6010*
Manganese	400	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Molybdenum	0.67	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Selenium	34	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020
Thallium	1.6	ug/L		09/13/18 06:41	09/13/18 11:42	JMW	SW 6020

**Sample:** 8092189-25  
**Name:** 8MT1\_452SL\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:36  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	11	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Boron	8100	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Calcium	620	mg/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Chromium	0.40	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Cobalt	1.8	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Iron	430	ug/L		09/18/18 08:00	09/19/18 09:49	TJJ	SW 6010
Lead	18	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Lithium	100	ug/L		09/18/18 08:00	09/18/18 12:10	TJJ	SW 6010*
Manganese	410	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Molybdenum	0.48	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Selenium	36	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020
Thallium	1.6	ug/L		09/13/18 06:41	09/13/18 12:55	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-26  
**Name:** 8MT1\_501Kc\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:10  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Anions - PIA</b>							
Sulfate	1800	mg/L	H	09/14/18 12:04	09/14/18 12:04	LAM	EPA 300.0
<b>Soluble Metals - PIA</b>							
Barium	97	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Boron	1400	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Calcium	550	mg/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Chromium	67	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Cobalt	5.1	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Iron	300	ug/L		09/18/18 08:00	09/19/18 09:52	TJJ	SW 6010
Lead	0.080	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Lithium	< 0.10	ug/L		09/18/18 08:00	09/18/18 12:12	TJJ	SW 6010*
Manganese	110	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Mercury	1.5	ug/L	H	09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Molybdenum	130	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Selenium	14	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 12:58	JMW	SW 6020

**Sample:** 8092189-27  
**Name:** 8MT1\_551Kc\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:11  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Barium	75	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Boron	1500	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Calcium	570	mg/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Chromium	67	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Cobalt	1.4	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Iron	73	ug/L		09/18/18 08:00	09/19/18 09:55	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Lithium	< 0.10	ug/L		09/18/18 08:00	09/18/18 12:14	TJJ	SW 6010*
Manganese	28	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Mercury	1.3	ug/L	H	09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Molybdenum	130	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Selenium	14	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 13:02	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-28  
**Name:** 8MT1\_502Kc\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:40  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	1900	mg/L	H	09/14/18 12:22	09/14/18 12:22	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	80	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Boron	700	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Calcium	530	mg/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Chromium	97	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Cobalt	1.2	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Iron	68	ug/L		09/18/18 08:00	09/19/18 10:04	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Lithium	< 0.10	ug/L		09/18/18 08:00	09/18/18 12:15	TJJ	SW 6010*
Manganese	21	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Mercury	1.9	ug/L	H	09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Molybdenum	180	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Selenium	17	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 13:06	JMW	SW 6020

**Sample:** 8092189-29  
**Name:** 8MT1\_552Kc\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:41  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	73	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Boron	820	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Calcium	530	mg/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Chromium	93	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Cobalt	0.84	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Iron	38	ug/L		09/18/18 08:00	09/19/18 09:30	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Lithium	< 0.10	ug/L		09/18/18 08:00	09/18/18 11:53	TJJ	SW 6010*
Manganese	20	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Mercury	1.6	ug/L	H	09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Molybdenum	170	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Selenium	17	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 13:10	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-30  
**Name:** 8MT1\_601MM\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:15  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	820	mg/L	H	09/13/18 16:56	09/13/18 16:56	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	1.1	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Boron	3600	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Calcium	0.59	mg/L		09/13/18 06:41	09/17/18 07:39	JMW	SW 6020
Chromium	230	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Cobalt	1.1	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Iron	11	ug/L		09/18/18 08:00	09/19/18 10:08	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Lithium	0.14	ug/L		09/18/18 08:00	09/18/18 12:17	TJJ	SW 6010*
Manganese	4600	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Molybdenum	0.26	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Selenium	10	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 13:14	JMW	SW 6020

**Sample:** 8092189-31  
**Name:** 8MT1\_651MM\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:16  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	0.62	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Boron	3600	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Calcium	0.11	mg/L		09/13/18 06:41	09/17/18 07:43	JMW	SW 6020
Chromium	220	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Cobalt	1.2	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Iron	21	ug/L		09/18/18 08:00	09/19/18 10:11	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Lithium	< 0.10	ug/L		09/18/18 08:00	09/18/18 12:18	TJJ	SW 6010*
Manganese	4600	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Mercury	0.035	ug/L	H	09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Molybdenum	0.16	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Selenium	10	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 13:17	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-32  
**Name:** 8MT1\_602MM\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:45  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	860	mg/L	H	09/13/18 17:14	09/13/18 17:14	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	3.0	ug/L		09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Boron	2000	ug/L		09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Calcium	11	mg/L	Q3	09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Chromium	350	ug/L		09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Cobalt	1.3	ug/L		09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Iron	20	ug/L		09/18/18 08:00	09/19/18 10:14	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Lithium	< 0.10	ug/L		09/18/18 08:00	09/18/18 12:19	TJJ	SW 6010*
Manganese	4500	ug/L	Q4	09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Mercury	0.050	ug/L	H	09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Molybdenum	3.1	ug/L		09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Selenium	9.9	ug/L		09/13/18 06:41	09/13/18 13:21	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/13/18 13:21	JMW	SW 6020

**Sample:** 8092189-33  
**Name:** 8MT1\_652MM\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:46  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	0.22	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Boron	1900	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Calcium	< 0.088	mg/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Chromium	380	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Cobalt	0.74	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Iron	20	ug/L		09/18/18 08:00	09/19/18 10:17	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Lithium	< 0.10	ug/L		09/18/18 08:00	09/18/18 12:20	TJJ	SW 6010*
Manganese	1300	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Molybdenum	1.1	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Selenium	11	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 06:42	JMW	SW 6020





**ANALYTICAL RESULTS**

**Sample:** 8092189-34  
**Name:** 8MT1\_101Sa\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:20  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	770	mg/L	H	09/13/18 17:33	09/13/18 17:33	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	51	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Boron	9000	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Calcium	300	mg/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Chromium	0.41	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Cobalt	1.5	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Iron	18	ug/L		09/18/18 08:00	09/19/18 10:20	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 12:24	TJJ	SW 6010*
Manganese	1000	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Molybdenum	72	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Selenium	10	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 06:46	JMW	SW 6020

**Sample:** 8092189-35  
**Name:** 8MT1\_151Sa\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:21  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	48	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Boron	9000	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Calcium	290	mg/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Chromium	< 0.25	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Cobalt	1.4	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Iron	23	ug/L		09/18/18 08:00	09/19/18 10:23	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 12:26	TJJ	SW 6010*
Manganese	980	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Molybdenum	71	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Selenium	10	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 06:49	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-36  
**Name:** 8MT1\_102Sa\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:50  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Anions - PIA</b>							
Sulfate	790	mg/L	H	09/13/18 17:51	09/13/18 17:51	LAM	EPA 300.0
<b>Soluble Metals - PIA</b>							
Barium	52	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Boron	8900	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Calcium	300	mg/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Chromium	0.50	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Cobalt	1.3	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Iron	17	ug/L		09/18/18 08:00	09/19/18 10:26	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 12:28	TJJ	SW 6010*
Manganese	940	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Molybdenum	71	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Selenium	9.9	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 06:53	JMW	SW 6020

**Sample:** 8092189-37  
**Name:** 8MT1\_152Sa\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:51  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Barium	49	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Boron	8800	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Calcium	290	mg/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Chromium	1.1	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Cobalt	1.3	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Iron	20	ug/L		09/18/18 08:00	09/19/18 10:30	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Lithium	110	ug/L		09/18/18 08:00	09/18/18 12:30	TJJ	SW 6010*
Manganese	960	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Molybdenum	72	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Selenium	10	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 06:57	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-38  
**Name:** 8MT1\_701ZV\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:25  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Anions - PIA</u></b>							
Sulfate	760	mg/L	H	09/13/18 18:09	09/13/18 18:09	LAM	EPA 300.0
<b><u>Soluble Metals - PIA</u></b>							
Barium	65	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Boron	5600	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Calcium	270	mg/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Chromium	0.88	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Cobalt	0.16	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Iron	1600	ug/L		09/18/18 08:00	09/19/18 10:32	TJJ	SW 6010
Lead	0.53	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Lithium	95	ug/L		09/18/18 08:00	09/18/18 12:32	TJJ	SW 6010*
Manganese	950	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Mercury	< 0.034	ug/L	H	09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Molybdenum	74	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Selenium	1.6	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 07:01	JMW	SW 6020

**Sample:** 8092189-39  
**Name:** 8MT1\_751ZV\_10\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 14:26  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	45	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Boron	4200	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Calcium	210	mg/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Chromium	5.6	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Cobalt	0.13	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Iron	1500	ug/L		09/18/18 08:00	09/19/18 10:41	TJJ	SW 6010
Lead	0.36	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Lithium	94	ug/L		09/18/18 08:00	09/18/18 12:34	TJJ	SW 6010*
Manganese	760	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Mercury	0.075	ug/L	H	09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Molybdenum	55	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Selenium	1.6	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 09:53	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-40  
**Name:** 8MT1\_702ZV\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:55  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Anions - PIA</b>							
Sulfate	750	mg/L	H	09/13/18 18:27	09/13/18 18:27	LAM	EPA 300.0
<b>Soluble Metals - PIA</b>							
Barium	64	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Boron	3900	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Calcium	270	mg/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Chromium	2.2	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Cobalt	0.20	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Iron	2000	ug/L		09/18/18 08:00	09/19/18 10:43	TJJ	SW 6010
Lead	1.5	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Lithium	84	ug/L		09/18/18 08:00	09/18/18 12:36	TJJ	SW 6010*
Manganese	810	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Mercury	0.070	ug/L	H	09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Molybdenum	64	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Selenium	0.79	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 09:56	JMW	SW 6020

**Sample:** 8092189-41  
**Name:** 8MT1\_752ZV\_5\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 13:56  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Barium	61	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Boron	3800	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Calcium	270	mg/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Chromium	0.87	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Cobalt	0.14	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Iron	1000	ug/L		09/18/18 08:00	09/19/18 10:55	TJJ	SW 6010
Lead	0.67	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Lithium	82	ug/L		09/18/18 08:00	09/18/18 12:46	TJJ	SW 6010*
Manganese	780	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Mercury	0.070	ug/L	H	09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Molybdenum	62	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Selenium	0.81	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 10:00	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092189-42  
**Name:** 8MT\_MB\_000\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 07/31/18 15:32  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Soluble Metals - PIA</u></b>							
Barium	0.93	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Boron	100	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Calcium	6.1	mg/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Chromium	0.62	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Cobalt	< 0.064	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Iron	8.6	ug/L		09/18/18 08:00	09/19/18 10:47	TJJ	SW 6010
Lead	< 0.070	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Lithium	< 0.10	ug/L		09/18/18 08:00	09/18/18 12:37	TJJ	SW 6010*
Manganese	19	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Mercury	0.050	ug/L	H	09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Molybdenum	0.84	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Selenium	< 0.22	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020
Thallium	< 0.068	ug/L		09/13/18 06:41	09/14/18 10:04	JMW	SW 6020



QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b>Batch B818620 - 6020 Sol no prep - SW 6020</b>									
<b>Blank (B818620-BLK1)</b>					Prepared & Analyzed: 09/13/18				
Barium	0.970	ug/L							
Boron	5.04	ug/L							
Calcium	< 0.088	mg/L							
Chromium	0.520	ug/L							
Cobalt	< 0.064	ug/L							
Lead	< 0.070	ug/L							
Manganese	< 0.064	ug/L							
Mercury	< 0.034	ug/L							
Molybdenum	< 0.069	ug/L							
Selenium	< 0.22	ug/L							
Thallium	< 0.068	ug/L							
<b>LCS (B818620-BS1)</b>					Prepared & Analyzed: 09/13/18				
Barium	248	ug/L		250.0		99	80-120		
Boron	2490	ug/L		2500		100	80-120		
Calcium	24.5	mg/L		25.00		98	80-120		
Chromium	241	ug/L		250.0		96	80-120		
Cobalt	241	ug/L		250.0		96	80-120		
Lead	236	ug/L		250.0		95	80-120		
Manganese	241	ug/L		250.0		96	80-120		
Mercury	24.0	ug/L		25.00		96	80-120		
Molybdenum	242	ug/L		250.0		97	80-120		
Selenium	249	ug/L		250.0		99	80-120		
Thallium	248	ug/L		250.0		99	80-120		
<b>Matrix Spike (B818620-MS2)</b>					Sample: 8092189-14 Prepared & Analyzed: 09/13/18				
Barium	296	ug/L		250.0	51.0	98	75-125		
Boron	11300	ug/L		2500	8840	98	75-125		
Calcium	313	mg/L	Q4	25.00	344	NR	75-125		
Chromium	237	ug/L		250.0	1.42	94	75-125		
Cobalt	234	ug/L		250.0	1.52	93	75-125		
Lead	232	ug/L		250.0	ND	93	75-125		
Manganese	1310	ug/L		250.0	1100	83	75-125		
Mercury	25.0	ug/L		25.00	0.0700	100	75-125		
Molybdenum	314	ug/L		250.0	70.6	97	75-125		
Selenium	259	ug/L		250.0	10.1	100	75-125		
Thallium	242	ug/L		250.0	ND	97	75-125		
<b>Matrix Spike (B818620-MS3)</b>					Sample: 8092189-32 Prepared & Analyzed: 09/13/18				
Barium	250	ug/L		250.0	2.96	99	75-125		
Boron	4500	ug/L		2500	1970	101	75-125		
Calcium	24.8	mg/L	Q1	25.00	10.8	56	75-125		
Chromium	591	ug/L		250.0	354	95	75-125		
Cobalt	238	ug/L		250.0	1.28	95	75-125		
Lead	226	ug/L		250.0	ND	90	75-125		
Manganese	4800	ug/L	Q4	250.0	4500	119	75-125		
Mercury	24.6	ug/L		25.00	0.0500	98	75-125		
Molybdenum	245	ug/L		250.0	3.10	97	75-125		



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B818620 - 6020 Sol no prep - SW 6020</u></b>									
<b>Matrix Spike (B818620-MS3)</b>		<b>Sample: 8092189-32</b>			Prepared & Analyzed: 09/13/18				
Selenium	254	ug/L		250.0	9.92	98	75-125		
Thallium	233	ug/L		250.0	ND	93	75-125		
<b>Matrix Spike Dup (B818620-MSD2)</b>		<b>Sample: 8092189-14</b>			Prepared & Analyzed: 09/13/18				
Barium	297	ug/L		250.0	51.0	98	75-125	0.5	20
Boron	11100	ug/L		2500	8840	90	75-125	2	20
Calcium	310	mg/L	Q4	25.00	344	NR	75-125	1	20
Chromium	240	ug/L		250.0	1.42	95	75-125	1	20
Cobalt	235	ug/L		250.0	1.52	93	75-125	0.6	20
Lead	234	ug/L		250.0	ND	94	75-125	1	20
Manganese	1320	ug/L		250.0	1100	86	75-125	0.5	20
Mercury	25.0	ug/L		25.00	0.0700	100	75-125	0.3	20
Molybdenum	313	ug/L		250.0	70.6	97	75-125	0.5	20
Selenium	258	ug/L		250.0	10.1	99	75-125	0.3	20
Thallium	246	ug/L		250.0	ND	98	75-125	1	20
<b>Matrix Spike Dup (B818620-MSD3)</b>		<b>Sample: 8092189-32</b>			Prepared & Analyzed: 09/13/18				
Barium	253	ug/L		250.0	2.96	100	75-125	1	20
Boron	4490	ug/L		2500	1970	101	75-125	0.4	20
Calcium	24.4	mg/L	Q2	25.00	10.8	55	75-125	2	20
Chromium	588	ug/L		250.0	354	93	75-125	0.6	20
Cobalt	238	ug/L		250.0	1.28	95	75-125	0.06	20
Lead	233	ug/L		250.0	ND	93	75-125	3	20
Manganese	4680	ug/L	Q4	250.0	4500	70	75-125	3	20
Mercury	24.8	ug/L		25.00	0.0500	99	75-125	0.7	20
Molybdenum	242	ug/L		250.0	3.10	96	75-125	1	20
Selenium	254	ug/L		250.0	9.92	98	75-125	0.2	20
Thallium	237	ug/L		250.0	ND	95	75-125	2	20
<b><u>Batch B818769 - No Prep - EPA 300.0</u></b>									
<b>Calibration Blank (B818769-CCB1)</b>					Prepared & Analyzed: 09/13/18				
Sulfate	0.00	mg/L							
<b>Calibration Check (B818769-CCV1)</b>					Prepared & Analyzed: 09/13/18				
Sulfate	5.10	mg/L		5.000		102	90-110		
<b><u>Batch B818871 - No Prep - EPA 300.0</u></b>									
<b>Calibration Blank (B818871-CCB1)</b>					Prepared & Analyzed: 09/14/18				
Sulfate	0.00	mg/L							
<b>Calibration Check (B818871-CCV1)</b>					Prepared & Analyzed: 09/14/18				
Sulfate	4.77	mg/L		5.000		95	90-110		
<b><u>Batch B818954 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B818954-BLK1)</b>					Prepared & Analyzed: 09/18/18				
Lithium	2.11	ug/L							
Iron	6.80	ug/L							
<b>LCS (B818954-BS1)</b>					Prepared & Analyzed: 09/18/18				
Lithium	518	ug/L		500.0		104	80-120		





**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B818954 - 6010 Sol no prep - SW 6010</u></b>									
<b>LCS (B818954-BS1)</b>					Prepared: 09/18/18 Analyzed: 09/19/18				
Iron	483	ug/L		500.0		97	80-120		
<b>Matrix Spike (B818954-MS1)</b>					Sample: 8092189-08 Prepared & Analyzed: 09/18/18				
Lithium	45.6	ug/L	Q1	500.0	0.232	9	75-125		
Iron	456	ug/L		500.0	8.75	89	75-125		
<b>Matrix Spike (B818954-MS2)</b>					Sample: 8092189-29 Prepared & Analyzed: 09/18/18				
Lithium	516	ug/L		500.0	ND	103	75-125		
Iron	499	ug/L		500.0	37.6	92	75-125		
<b>Matrix Spike (B818954-MS3)</b>					Sample: 8092189-42 Prepared & Analyzed: 09/18/18				
Lithium	535	ug/L		500.0	ND	107	75-125		
Iron	474	ug/L		500.0	8.62	93	75-125		
<b>Matrix Spike Dup (B818954-MSD1)</b>					Sample: 8092189-08 Prepared & Analyzed: 09/18/18				
Lithium	67.1	ug/L	Q2	500.0	0.232	13	75-125	38	200
Iron	451	ug/L		500.0	8.75	89	75-125	1	20
<b>Matrix Spike Dup (B818954-MSD2)</b>					Sample: 8092189-29 Prepared & Analyzed: 09/18/18				
Lithium	530	ug/L		500.0	ND	106	75-125	3	200
Iron	501	ug/L		500.0	37.6	93	75-125	0.5	20
<b>Matrix Spike Dup (B818954-MSD3)</b>					Sample: 8092189-42 Prepared & Analyzed: 09/18/18				
Lithium	547	ug/L		500.0	ND	109	75-125	2	200
Iron	471	ug/L		500.0	8.62	93	75-125	0.6	20



**NOTES**

Specific method revisions used for analysis are available upon request.

**Certifications**

CHI - McHenry, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Missouri Department of Natural Resources Certificate of Approval for Microbiological Laboratory Service No. 870  
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPIL - Springfield, IL

NELAP/NELAC accreditation through the Illinois EPA, Lab No. 100323

SPMO - Springfield, MO

USEPA DMR-QA Program

STL - St. Louis, MO

TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050  
Drinking Water Certifications: Missouri (1050)  
Missouri Department of Natural Resources

\* Not a TNI accredited analyte

**Qualifiers**

- H Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.
- Q1 Matrix Spike failed % Recovery
- Q2 Matrix Spike Duplicate failed % Recovery
- Q3 Matrix Spike/Matrix Spike Duplicate both failed % Recovery
- Q4 The matrix spike recovery result is unusable since the analyte concentration in the sample is greater than four times the spike level.  
The associated blank spike was acceptable.

*Gail Schindler*

Certified by: Gail Schindler, Project Manager





**PDC Laboratories, Inc.**  
 P.O. Box 9071 • Peoria, IL 61612-9071  
 (309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



## CASE NARRATIVE

**Client:** Anchor QEA, LLC Project AEP Mountaineer

**PDC Work Orders:** 8092189

PDC Laboratories, Inc. received 42 water samples on September 12, 2018. Sample analysis was performed at our Peoria, Illinois laboratory. Mercury and sulfate were received outside method recommended hold time. Approval was given by Ms. Jessica Goin to proceed with analysis. The chain of custody indicates 1 bottle was sent for 8MT1\_251CI\_10\_t192 but 2 bottles were received. The chain of custody also indicates 2 bottles were sent for 8MT1\_252CI\_5\_t192 and 8MT1\_552Kc\_5\_t192 but only 1 was received. The 1 bottle received was HNO3 preserved so we are unable to analyze for sulfate.

Sample ID's		Date	
Field	Lab ID	Collected	Received
2MT1_201CI_10_t48	8092189-01	7/25/18	09/12/18
2MT1_301B_10_t48	8092189-02	7/25/18	09/12/18
2MT1_401SL_10_t48	8092189-03	7/25/18	09/12/18
2MT1_501Kc_10_t48	8092189-04	7/25/18	09/12/18
2MT1_601MM_10_t48	8092189-05	7/25/18	09/12/18
2MT1_101Sa_10_t48	8092189-06	7/25/18	09/12/18
2MT1_701ZV_10_t48	8092189-07	7/25/18	09/12/18
2MT_MB_000_t48	8092189-08	7/25/18	09/12/18
4MT1_201CI_10_t96	8092189-09	7/27/18	09/12/18
4MT1_301B_10_t96	8092189-10	7/27/18	09/12/18
4MT1_401SL_10_t96	8092189-11	7/27/18	09/12/18
4MT1_501Kc_10_t96	8092189-12	7/27/18	09/12/18
4MT1_601MM_10_t96	8092189-13	7/27/18	09/12/18
4MT1_101Sa_10_t96	8092189-14	7/27/18	09/12/18
4MT1_701ZV_10_t96	8092189-15	7/27/18	09/12/18
8MT1_201CI_10_t192	8092189-16	7/31/18	09/12/18
8MT1_251CI_10_t192	8092189-17	7/31/18	09/12/18
8MT1_202CI_5_t192	8092189-18	7/31/18	09/12/18
8MT1_252CI_5_t192	8092189-19	7/31/18	09/12/18

Sample ID's		Date	
Field	Lab ID	Collected	Received
8MT1_301B_10_t192	8092189-20	7/31/18	09/12/18
8MT1_302B_5_t192	8092189-21	7/31/18	09/12/18
8MT1_401SL_10_t192	8092189-22	7/31/18	09/12/18
8MT1_451SL_10_t192	8092189-23	7/31/18	09/12/18
8MT1_402SL_5_t192	8092189-24	7/31/18	09/12/18
8MT1_452SL_5_t192	8092189-25	7/31/18	09/12/18
8MT1_501Kc_10_t192	8092189-26	7/31/18	09/12/18
8MT1_551Kc_10_t192	8092189-27	7/31/18	09/12/18
8MT1_502_Kc_5_t192	8092189-28	7/31/18	09/12/18
8MT1_552Kc_5_t192	8092189-29	7/31/18	09/12/18
8MT1_601MM_10_t192	8092189-30	7/31/18	09/12/18
8MT1_651MM_10_t192	8092189-31	7/31/18	09/12/18
8MT1_602MM_5_t192	8092189-32	7/31/18	09/12/18
8MT1_652MM_5_t192	8092189-33	7/31/18	09/12/18
8MT1_101Sa_10_t192	8092189-34	7/31/18	09/12/18
8MT1_151Sa_10_t192	8092189-35	7/31/18	09/12/18
8MT1_102Sa_5_t192	8092189-36	7/31/18	09/12/18
8MT1_152Sa_5_t192	8092189-37	7/31/18	09/12/18
8MT1_701ZV_10_t192	8092189-38	7/31/18	09/12/18
8MT1_751ZV_10_t192	8092189-39	7/31/18	09/12/18
8MT1_702ZV_5_t192	8092189-40	7/31/18	09/12/18
8MT1_752ZV_5_t192	8092189-41	7/31/18	09/12/18
8MT_MB_000_t192	8092189-42	7/31/18	09/12/18

## QC SUMMARY

All QC items in this QC summary report meet acceptance criteria with the following exceptions:

Lithium: Spiked sample 8092189-08 MS/MSD both recovered outside the acceptance criteria, flagged with Q3.

Calcium: Spiked sample 8092189-32 MS/MSD both recovered outside the acceptance criteria, flagged with Q3.

Manganese: Spiked sample 8092189-32, MS & MSD flagged with Q4, the level in the sample spiked is greater than 4 times the spiked amount.

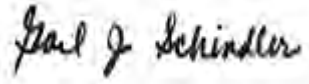
Mercury and Sulfate were received outside method recommended hold time and are flagged with an H.

**CERTIFICATION**

**Name:** Gail Schindler

**Title:** Project Manager

**Signature:**



**Date:** August 25, 2018

# CHAIN OF CUSTODY RECORD

PDC LABORATORIES, INC.  
 2231 WEST ALTORFER DRIVE  
 PEORIA, IL 61615

PHONE # 800-752-6651  
 FAX # 309-692-9689

State where samples collected

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

<b>1</b> CLIENT Anchor OEA ADDRESS 6720 SW Macadam Ave, Suite 125 CITY Portland, OR, 97219 STATE ZIP CONTACT PERSON J. Goin		PROJECT NUMBER AEP Mountaineer PHONE NUMBER 503-972-5019 P.O. NUMBER FEDEX FAX NUMBER DATE SHIPPED		MEANS SHIPPED DATE SHIPPED		ANALYSIS REQUESTED (FOR LAB USE ONLY) LOGIN # 8092189-42 LOGGED BY: [Signature] LAB PROJ. # TEMPLATE: PROJ. MGR.:	
<b>2</b> SAMPLE DESCRIPTION AS YOU WANT ON REPORT		DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE	MATRIX TYPE	BOTTLE COUNT	REMARKS  Dis. B., U., Mo. Co
2MT1-201CL-10-t48		7/25/18	13:45		Ground water	1	
2MT1-301B-10-t48		7/25/18	17:00				
2MT1-401SL-10-t48		7/25/18	13:50				
2MT1-501Kc-10-t48		7/25/18	13:55				
2MT1-601MM-10-t48		7/25/18	14:00				
2MT1-101Sa-10-t48		7/25/18	14:05				
2MT1-701ZV-10-t48		7/25/18	14:10				
2MT-MB-000-t48		7/25/18	14:37				
<b>5</b> TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH FEE IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) RUSH RESULTS VIA (PLEASE CIRCLE) FAX		NORMAL	RUSH	DATE RESULTS NEEDED	COMMENTS: (FOR LAB USE ONLY)		
<b>7</b> RELINQUISHED BY: (SIGNATURE) [Signature]		DATE	TIME	RECEIVED BY: (SIGNATURE)	SAMPLE TEMPERATURE UPON RECEIPT CHILL PROCESS STARTED PRIOR TO RECEIPT SAMPLE(S) RECEIVED ON ICE PROPER BOTTLES RECEIVED IN GOOD CONDITION BOTTLES FILLED WITH ADEQUATE VOLUME SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS) DATE AND TIME TAKEN FROM SAMPLE BOTTLE		

Copies: white should accompany samples to PDC Labs. Yellow copy to be retained by the client.



# CHAIN OF CUSTODY RECORD

PDC LABORATORIES, INC.  
 2231 WEST ALTORFER DRIVE  
 PEORIA, IL 61615

PHONE # 800-752-6651  
 FAX # 309-692-9689

State where samples collected \_\_\_\_\_

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

<b>1</b> CLIENT Anchor OEA ADDRESS 6720 SW Macadam Ave, Suite 125 CITY State Portland, OR, 97219 ZIP CONTACT PERSON J. Gain		PROJECT NUMBER AEP Mountaineer PHONE NUMBER 503-972-5019 SAMPLER (PLEASE PRINT) SAMPLER'S SIGNATURE		P.O. NUMBER MEANS SHIPPED Fedex DATE SHIPPED		ANALYSIS REQUESTED (FOR LAB USE ONLY) LOGIN # _____ LOGGED BY: _____ LAB PROJ. # _____ TEMPLATE: _____ PROJ. MGR.: _____	
<b>2</b> SAMPLE DESCRIPTION AS YOU WANT ON REPORT		DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	TYPE COMP	BOTTLE COUNT	REMARKS
4MT1-201CL-10-t96		7/27/18	12:30			1	Disc. B.L.Mo. Co ✓
4MT1-301B-10-t96		7/27/18	16:00				✓
4MT1-401SL-10-t96		7/27/18	12:35				✓
4MT1-501Kc-10-t96		7/27/18	12:40				✓
4MT1-601MM-10-t96		7/27/18	12:45				✓
4MT1-101Sa-10-t96		7/27/18	12:50				✓
4MT1-701ZV-10-t96		7/27/18	12:55				✓
<b>5</b> TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) RUSH RESULTS VIA (PLEASE CIRCLE) FAX		NORMAL	RUSH	DATE RESULTS NEEDED		(FOR LAB USE ONLY) The sample temperature will be measured upon receipt at the lab. By initiating this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0 °C. By not initiating this area you allow the lab to proceed with analytical testing regardless of the sample temperature.	
<b>7</b> RELINQUISHED BY: (SIGNATURE) RELINQUISHED BY: (SIGNATURE) RELINQUISHED BY: (SIGNATURE)		DATE TIME	DATE TIME	DATE TIME	DATE TIME	COMMENTS: (FOR LAB USE ONLY) SAMPLE TEMPERATURE UPON RECEIPT _____ °C CHILL PROCESS STARTED PRIOR TO RECEIPT _____ SAMPLE(S) RECEIVED ON ICE _____ PROPER BOTTLES RECEIVED IN GOOD CONDITION _____ BOTTLES FILLED WITH ADEQUATE VOLUME _____ SAMPLES RECEIVED WITHIN HOLD TIME(S) _____ (EXCLUDES TYPICAL FIELD PARAMETERS) DATE AND TIME TAKEN FROM SAMPLE BOTTLE _____	

Copies: white should accompany samples to PDC Labs. Yellow copy to be retained by the client.







# CHAIN OF CUSTODY RECORD

PDC LABORATORIES, INC.  
 2231 WEST ALTORFER DRIVE  
 PEORIA, IL 61615

PHONE # 800-752-6651  
 FAX # 309-692-9689

State where samples collected

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

1 CLIENT		PROJECT NUMBER		P.O. NUMBER		MEANS SHIPPED		3 ANALYSIS REQUESTED		4 (FOR LAB USE ONLY)	
Anchor Q&A		Aep Mountaineer		503-972-5019		Fedex				LOGIN # _____ LOGGED BY: _____ LAB PROJ. # _____ TEMPLATE: _____ PROJ. MGR.: _____	
ADDRESS		PHONE NUMBER		FAX NUMBER		DATE SHIPPED					
5720 SW Macadam Ave, Suite 125		503-972-5019									
CITY STATE ZIP		SAMPLER (PLEASE PRINT)				MATRIX TYPES:					
Portland, OR, 97219						WW-WASTEWATER DW-DRINKING WATER GW-GROUND WATER MS-SOLID WASTE LS-LEACHATE OTHER:					
CONTACT PERSON		SAMPLER'S SIGNATURE		DATE COLLECTED		TIME COLLECTED		SAMPLE TYPE		BOTTLE COUNT	
J. Goia				7/31/18		14:10		Ground water		2	
2 SAMPLE DESCRIPTION AS YOU WANT ON REPORT		DATE COLLECTED		TIME COLLECTED		DATE RESULTS NEEDED		DATE		REMARKS	
8MT1-501Kc-10-t192		7/31/18		14:10		NORMAL		7/31/18			
8MT1-551Kc-10-t192		7/31/18		14:11		RUSH		7/31/18			
8MT1-502Kc-5-t192		7/31/18		13:40		E-MAIL		7/31/18			
8MT1-552Kc-5-t192		7/31/18		13:41				7/31/18			
8MT1-601MM-10-t192		7/31/18		14:15				7/31/18			
8MT1-651MM-10-t192		7/31/18		14:16				7/31/18			
8MT1-602MM-5-t192		7/31/18		13:45				7/31/18			
8MT1-652MM-5-t192		7/31/18		13:46				7/31/18			
8MT1-101Sa-10-t192		7/31/18		14:20				7/31/18			
8MT1-151Sa-10-t192		7/31/18		14:21				7/31/18			
8MT1-102Sa-5-t192		7/31/18		13:50				7/31/18			
8MT1-152Sa-5-t192		7/31/18		13:51				7/31/18			

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE)  
 (RUSH FEE IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE)  
 RUSH RESULTS VIA (PLEASE CIRCLE) FAX

6 The sample temperature will be measured upon receipt at the lab. By initiating this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0°C. By not initiating this area you allow the lab to proceed with analytical testing regardless of the sample temperature.

7 RELINQUISHED BY: (SIGNATURE)  
 RECEIVED BY: (SIGNATURE)  
 DATE TIME

8 COMMENTS: (FOR LAB USE ONLY)  
 SAMPLE TEMPERATURE UPON RECEIPT \_\_\_\_\_ °C  
 CHILL PROCESS STARTED PRIOR TO RECEIPT \_\_\_\_\_  
 SAMPLE(S) RECEIVED ON ICE \_\_\_\_\_  
 BOTTLES FILLED WITH ADEQUATE VOLUME \_\_\_\_\_  
 SAMPLES RECEIVED WITHIN HOLD TIME(S) \_\_\_\_\_  
 (EXCLUDES TYPICAL FIELD PARAMETERS)  
 DATE AND TIME TAKEN FROM SAMPLE BOTTLE \_\_\_\_\_

Copies: white should accompany samples to PDC Labs. Yellow copy to be retained by the client.







# PDC Laboratories, Inc.

PROFESSIONAL • DEPENDABLE • COMMITTED

September 27, 2018

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

Dear Jessica Goin:

Please find enclosed the analytical results for the sample(s) the laboratory received on **9/12/18 10:00 am** and logged in under work order **8092190**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President, John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com





**ANALYTICAL RESULTS**

**Sample:** 8092190-01  
**Name:** 1MT2\_801BF\_10\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/11/18 12:50  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Total Metals - PIA</b>							
Antimony	< 3.2	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Arsenic	< 2.0	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Barium	92	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Beryllium	< 1.8	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Boron	6800	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Cadmium	< 2.0	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Calcium	360	mg/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Chromium	110	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Cobalt	< 1.5	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Iron	56	ug/L		09/20/18 14:40	09/24/18 13:45	TJJ	SW 6010
Lead	< 0.96	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Lithium	110	ug/L		09/20/18 14:40	09/21/18 08:05	TJJ	SW 6010*
Manganese	4.0	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Mercury	< 0.43	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Molybdenum	58	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Selenium	8.8	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020
Thallium	< 1.8	ug/L		09/20/18 14:40	09/24/18 09:33	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092190-02  
**Name:** 1MT2\_802BS\_5\_t24  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/11/18 12:45  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Total Metals - PIA</u></b>							
Antimony	< 3.2	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Arsenic	< 2.0	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Barium	160	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Beryllium	< 1.8	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Boron	5300	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Cadmium	< 2.0	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Calcium	430	mg/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Chromium	160	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Cobalt	< 1.5	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Iron	54	ug/L		09/20/18 14:40	09/24/18 11:56	TJJ	SW 6010
Lead	< 0.96	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Lithium	100	ug/L		09/20/18 14:40	09/21/18 08:07	TJJ	SW 6010*
Manganese	3.6	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Mercury	< 0.43	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Molybdenum	51	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Selenium	9.6	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020
Thallium	< 1.8	ug/L		09/20/18 14:40	09/24/18 09:37	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8092190-03  
**Name:** 1MT2\_MB\_000  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 09/11/18 11:50  
**Received:** 09/12/18 10:00

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b><u>Total Metals - PIA</u></b>							
Antimony	< 3.2	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Arsenic	< 2.0	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Barium	< 2.2	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Beryllium	< 1.8	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Boron	56	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Cadmium	< 2.0	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Calcium	0.50	mg/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Chromium	< 3.8	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Cobalt	< 1.5	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Iron	53	ug/L		09/20/18 14:40	09/24/18 12:01	TJJ	SW 6010
Lead	< 0.96	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Lithium	7.3	ug/L		09/20/18 14:40	09/21/18 08:09	TJJ	SW 6010*
Manganese	1.8	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Mercury	< 0.43	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Molybdenum	< 0.59	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Selenium	< 2.0	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020
Thallium	< 1.8	ug/L		09/20/18 14:40	09/24/18 09:41	JMW	SW 6020





**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B819232 - SW 3015 - SW 6020</u></b>									
<b>Blank (B819232-BLK1)</b>					Prepared: 09/20/18 Analyzed: 09/24/18				
Antimony	< 1.4	ug/L							
Lithium	2.39	ug/L							
Arsenic	< 0.90	ug/L							
Barium	< 0.96	ug/L							
Beryllium	< 0.78	ug/L							
Boron	4.43	ug/L							
Cadmium	< 0.89	ug/L							
Calcium	0.0304	mg/L							
Chromium	< 1.7	ug/L							
Cobalt	< 0.67	ug/L							
Iron	5.89	ug/L							
Lead	< 0.43	ug/L							
Manganese	< 0.57	ug/L							
Mercury	< 0.19	ug/L							
Molybdenum	< 0.26	ug/L							
Selenium	< 0.90	ug/L							
Thallium	< 0.79	ug/L							
<b>LCS (B819232-BS1)</b>					Prepared: 09/20/18 Analyzed: 09/21/18				
Lithium	575	ug/L		555.6		104	80-120		
Antimony	566	ug/L		555.6		102	80-120		
Arsenic	538	ug/L		555.6		97	80-120		
Barium	530	ug/L		555.6		95	80-120		
Beryllium	546	ug/L		555.6		98	80-120		
Boron	567	ug/L		555.6		102	80-120		
Cadmium	544	ug/L		555.6		98	80-120		
Calcium	5.46	mg/L		5.556		98	80-120		
Chromium	557	ug/L		555.6		100	80-120		
Cobalt	518	ug/L		555.6		93	80-120		
Iron	597	ug/L		555.6		108	80-120		
Lead	549	ug/L		555.6		99	80-120		
Manganese	553	ug/L		555.6		100	80-120		
Mercury	56.4	ug/L		55.56		102	80-120		
Molybdenum	540	ug/L		555.6		97	80-120		
Selenium	548	ug/L		555.6		99	80-120		
Thallium	553	ug/L		555.6		99	80-120		



## NOTES

Specific method revisions used for analysis are available upon request.

### Certifications

#### CHI - McHenry, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

#### PIA - Peoria, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Missouri Department of Natural Resources Certificate of Approval for Microbiological Laboratory Service No. 870  
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

#### SPIL - Springfield, IL

NELAP/NELAC accreditation through the Illinois EPA, Lab No. 100323

#### SPMO - Springfield, MO

USEPA DMR-QA Program

#### STL - St. Louis, MO

TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050  
Drinking Water Certifications: Missouri (1050)  
Missouri Department of Natural Resources

\* Not a TNI accredited analyte

Certified by: Gail Schindler, Project Manager





**PDC Laboratories, Inc.**  
 P.O. Box 9071 • Peoria, IL 61612-9071  
 (309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



## CASE NARRATIVE

**Client:** Anchor QEA, LLC Project AEP Mountaineer

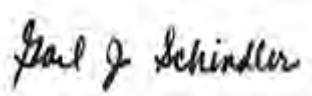
**PDC Work Orders:** 8092190

PDC Laboratories, Inc. received 3 water samples on September 12, 2018. Sample analysis was performed at our Peoria, Illinois laboratory. The date and time of sample collection was not listed on the chain of custody. This information was taken from the sample bottles.

Sample ID's		Date	
Field	Lab ID	Collected	Received
1MT2_801BF_10_t24	8092190-01	09/11/18	09/12/18
1MT2_802BS_5_t24	8092190-02	09/11/18	09/12/18
1MT2_MB_000	8092190-03	09/11/18	09/12/18

### QC SUMMARY

All QC items in this QC summary report meet acceptance criteria.

CERTIFICATION	
<b>Name:</b> Gail Schindler	<b>Title:</b> Project Manager
<b>Signature:</b> 	<b>Date:</b> September 25, 2018

# CHAIN OF CUSTODY RECORD

PDC LABORATORIES, INC.  
 2231 WEST ALTORFER DRIVE  
 PEORIA, IL 61615

PHONE # 800-752-6651  
 FAX # 309-692-9689

State where samples collected

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - (SAMPLE ACCEPTANCE POLICY ON REVERSE)

<b>1</b> CLIENT Anchor O&A ADDRESS 6720 SW Macadam Ave, Suite 125 CITY STATE ZIP Portland, OR, 97219 CONTACT PERSON J. Goin		PROJECT NUMBER Act Maintainers PHONE NUMBER 503-972-5019		P.O. NUMBER MEANS SHIPPED Fedex DATE SHIPPED		<b>3</b> ANALYSIS REQUESTED SO, AS, BA, BE, B, CA, CO CR, CO, FE, PB, LI, MN Hg, Mo, Se, TH		(FOR LAB USE ONLY) LOGIN # 8092190-3 LOGGED BY: [Signature] LAB PROJ. # TEMPLATE: PROJ. MGR.:	
<b>2</b> SAMPLE DESCRIPTION AS YOU WANT ON REPORT 1MT2-801BF-10-624 1MT2-802BS-5-624 1MT2-MB-000		DATE COLLECTED 9/11/18 9/11/18 9/11/18		TIME COLLECTED 12:50 12:45 11:50		MATRIX TYPE Ground Water ↓ ↓		BOTTLE COUNT 1 ↓ ↓	
<b>5</b> TURNAROUND TIME REQUESTED (PLEASE CIRCLE) (RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE) RUSH RESULTS VIA (PLEASE CIRCLE) FAX PHONE # EMAIL ADDRESS		NORMAL RUSH DATE RESULTS NEEDED E-MAIL		<b>6</b> The sample temperature will be measured upon receipt at the lab. By initiating this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0 C. By not initiating this area you allow the lab to proceed with analytical testing regardless of the sample temperature.		<b>4</b> REMARKS			
<b>7</b> RELINQUISHED BY: (SIGNATURE) DATE TIME 9/11/18 RECEIVED BY: (SIGNATURE) DATE TIME RECEIVED AT LAB BY: (SIGNATURE) DATE TIME		RECEIVED BY: (SIGNATURE) DATE TIME RECEIVED AT LAB BY: (SIGNATURE) DATE TIME		RECEIVED BY: (SIGNATURE) DATE TIME RECEIVED AT LAB BY: (SIGNATURE) DATE TIME		<b>8</b> COMMENTS: (FOR LAB USE ONLY) SAMPLE TEMPERATURE UPON RECEIPT CHILL PROCESS STARTED PRIOR TO RECEIPT SAMPLE(S) RECEIVED ON ICE PROPER BOTTLES RECEIVED IN GOOD CONDITION BOTTLES FILLED WITH ADEQUATE VOLUME SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS) DATE AND TIME TAKEN FROM SAMPLE BOTTLE			

Copies: white should accompany samples to PDC Labs. Yellow copy to be retained by the client.

Attachment B

Reactive Media Vendor Data Sheets

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# SAFETY DATA SHEET

## 1. Identification

**Product identifier** MetRem™ B sorbent

**Other means of identification**

**CAS number** 11137-98-7

**Recommended use** Catalyst. Adsorbent.

**Recommended restrictions** None known.

**Manufacturer/Importer/Supplier/Distributor information**

**Company name** CARUS CORPORATION

**Address** 315 Fifth Street,  
Peru, IL 61354, USA

**Telephone** +1 815 223-1500 - All other non-emergency inquiries about the product should be directed to the company

**E-mail** salesmkt@caruscorporation.com

**Website** www.caruscorporation.com

**Contact person** Shelley Corban

**Emergency Telephone** For Hazardous Materials [or Dangerous Goods] Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC at CHEMTREC®, USA: 001 (800) 424-9300  
CHEMTREC®, Mexico (Toll-Free - must be dialed from within country): 01-800-681-9531  
CHEMTREC®, Other countries: 001 (703) 527-3887

## 2. Hazard(s) identification

**Physical hazards** Not classified.

**Health hazards** Not classified.

**OSHA defined hazards** Not classified.

### Label elements

**Hazard symbol** None.

**Signal word** None.

**Hazard statement** The substance does not meet the criteria for classification.

**Precautionary statement**

**Prevention** Observe good industrial hygiene practices.

**Response** Wash hands after handling.

**Storage** Store away from incompatible materials.

**Disposal** Dispose of waste and residues in accordance with local authority requirements.

**Hazard(s) not otherwise classified (HNOC)** None known.

**Supplemental information** None.

## 3. Composition/information on ingredients

### Substances

Chemical name	Common name and synonyms	CAS number	%
Aluminum Magnesium Oxide		11137-98-7	100

**Composition comments** All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

## 4. First-aid measures

**Inhalation** Move to fresh air. Call a physician if symptoms develop or persist.

MetRem™ B sorbent

938550 Version #: 01 Revision date: - Issue date: 21-June-2017

SDS US

1 / 6

**Individual protection measures, such as personal protective equipment**

<b>Eye/face protection</b>	Wear safety glasses with side shields (or goggles).
<b>Skin protection</b>	
<b>Hand protection</b>	Wear appropriate chemical resistant gloves.
<b>Skin protection</b>	
<b>Other</b>	Wear suitable protective clothing.
<b>Respiratory protection</b>	Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits.
<b>Thermal hazards</b>	Wear appropriate thermal protective clothing, when necessary.
<b>General hygiene considerations</b>	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

**9. Physical and chemical properties****Appearance**

<b>Physical state</b>	Solid.
<b>Form</b>	Powder. Granular.
<b>Color</b>	White.

**Odor** Not available.

**Odor threshold** Not available.

**pH** 10.3 +/-0.5 (5% Solution)

**Melting point/freezing point** Not available.

**Initial boiling point and boiling range** Not available.

**Flash point** Not available.

**Evaporation rate** Not available.

**Flammability (solid, gas)** Not available.

**Upper/lower flammability or explosive limits**

**Flammability limit - lower (%)** Not available.

**Flammability limit - upper (%)** Not available.

**Explosive limit - lower (%)** Not available.

**Explosive limit - upper (%)** Not available.

**Vapor pressure** Not available.

**Vapor density** Not available.

**Relative density** Not available.

**Solubility(ies)**

**Solubility (water)** Insoluble.

**Partition coefficient (n-octanol/water)** Not available.

**Auto-ignition temperature** Not available.

**Decomposition temperature** Not available.

**Viscosity** Not available.

**Other information**

**Explosive properties** Not explosive.

**Molecular formula** Al.Mg.O

**Oxidizing properties** Not oxidizing.

**10. Stability and reactivity**

**Reactivity** The product is stable and non-reactive under normal conditions of use, storage and transport.

**Chemical stability** Material is stable under normal conditions.



**Waste from residues / unused products** Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

**Contaminated packaging** Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

## 14. Transport information

### DOT

Not regulated as dangerous goods.

### IATA

Not regulated as dangerous goods.

### IMDG

Not regulated as dangerous goods.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** Not applicable.

## 15. Regulatory information

**US federal regulations** This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200. All components are on the U.S. EPA TSCA Inventory List.

### TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

### OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

### CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

**Hazard categories** Immediate Hazard - No  
Delayed Hazard - No  
Fire Hazard - No  
Pressure Hazard - No  
Reactivity Hazard - No

### SARA 302 Extremely hazardous substance

Not listed.

**SARA 311/312 Hazardous chemical** No

### SARA 313 (TRI reporting)

Not regulated.

### Other federal regulations

#### Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

#### Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**US state regulations** California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

#### US. Massachusetts RTK - Substance List

Not regulated.

#### US. New Jersey Worker and Community Right-to-Know Act

Not listed.

#### US. Pennsylvania Worker and Community Right-to-Know Law

Not listed.

#### US. Rhode Island RTK

Not regulated.



MMO II is a proprietary blend of mixed metal oxides that effectively removes both Arsenate (As(V)) and Arsenite (As(III)) from municipal drinking water systems as well as institutional and domestic drinking water. MMO II treated water is safe for human consumption.

## BENEFITS OF MMO II

- Removes both Arsenic III and Arsenic V
- Processing of MMO II occurs in our United States location
- Durable material
- Shipped and stored as dry granules

## PROPERTIES

<b>Description:</b>	Dry granular solid
<b>Backwashed Density:</b>	57 lbs. per cubic foot
<b>Surface Area</b>	≥ 200 m <sup>2</sup> /g

## HANDLING AND STORAGE

MMO II should be handled with care. Protective equipment in handling should include safety glasses or goggles and rubber or plastic gloves. In cases where high dust exposure may exist, the use of NIOSH-MSHA dust respirator or an air-supplied respirator is advised.

The product should be stored in a cool, dry area in a closed container. Segregate from easily-oxidizable materials, peroxides, chlorates, and acids. Protect container against physical damage. Spillage should be collected and disposed of properly. Consult the SDS for additional safety information.

## SHIPPING

- DOT: Not regulated as dangerous goods.  
 IATA: Not regulated as dangerous goods.  
 IMDG: Not regulated as dangerous goods.

## SHIPPING CONTAINERS

**55 lbs. pail** net, with handle, made of high-density polyethylene (HDPE), weighs 2.1 lbs (.95 kg). It is tapered to allow nested storage of empty pails, stands approximately 15.6 inches (39.7 cm) high and has a maximum diameter of 12.3 inches (31.2 cm).

**FIBC (Flexible Intermediate Bulk Container) (2205-lb) net**, made of woven plastic, coated with inner poly liner. Dimensions are 37 inches high, 37 inches long, and 24 inches wide. The spout diameter is 14 inches and extends 15 inches in length.

## CARUS VALUE ADDED

### LABORATORY SUPPORT

Carus Corporation has technical assistance available to its potential and current customers to answer questions, evaluate applications alternatives or perform laboratory testing. Our laboratory capabilities include: catalyst analysis, performance testing, process evaluations, and analytical services.

### TECHNICAL SERVICES

As an integral part of our technical support, Carus provides in-house and on-site assistance. We offer full application services, including technical expertise, design recommendations, and follow-up support.

### CARUS CORPORATION

For over 100 years, our dedication to research and development, technical support, and customer service has enabled Carus to become the world leader in permanganate, manganese, and catalyst oxidation technologies. Call Carus for assistance with specific applications.




# SAFETY DATA SHEET

## DRAFT VERSION

### 1. Identification

<b>Product identifier</b>	<b>Mixed Media Oxide II</b>
<b>Other means of identification</b>	None.
<b>Recommended use</b>	Metal sorbent.
<b>Recommended restrictions</b>	None known.
<b>Manufacturer/Importer/Supplier/Distributor information</b>	
<b>Company name</b>	CARUS CORPORATION
<b>Address</b>	315 Fifth Street, Peru, IL 61354, USA
<b>Telephone</b>	+1 815 223-1500 - All other non-emergency inquiries about the product should be directed to the company
<b>E-mail</b>	salesmkt@caruscorporation.com
<b>Website</b>	www.caruscorporation.com
<b>Contact person</b>	Shelley Corban
<b>Emergency Telephone</b>	For Hazardous Materials [or Dangerous Goods] Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC at CHEMTREC®, USA: 001 (800) 424-9300 CHEMTREC®, Mexico (Toll-Free - must be dialed from within country): 01-800-681-9531 CHEMTREC®, Other countries: 001 (703) 527-3887

### 2. Hazard(s) identification

<b>Physical hazards</b>	Not classified.	
<b>Health hazards</b>	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
	Specific target organ toxicity, repeated exposure	Category 2 (brain)
<b>OSHA defined hazards</b>	Not classified.	
<b>Label elements</b>		

<b>Signal word</b>	Danger
<b>Hazard statement</b>	Causes skin irritation. Causes serious eye damage. May cause damage to organs (brain) through prolonged or repeated exposure.
<b>Precautionary statement</b>	
<b>Prevention</b>	Do not breathe dust. Wear protective gloves/eye protection/face protection. Wash thoroughly after handling.
<b>Response</b>	If on skin: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Get medical advice/attention if you feel unwell. Take off contaminated clothing and wash before reuse.
<b>Storage</b>	Store away from incompatible materials.
<b>Disposal</b>	Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Hazard(s) not otherwise classified (HNOC)</b>	None known.
<b>Supplemental information</b>	None.

### 3. Composition/information on ingredients

#### Mixtures

Chemical name	CAS number	%
Iron hydroxide oxide	20344-49-4	20 - 26
Limestone	1317-65-3	10 - 15
Calcium oxide	1305-78-8	8 - 10
Aluminum oxide	1344-28-1	4 - 8
Silica, vitreous	60676-86-0	4 - 8
Manganese dioxide	1313-13-9	4 - 7

**Composition comments** All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

The manufacturer has claimed the exact percentage as trade secret under the OSHA Hazard Communication Standard.

### 4. First-aid measures

**Inhalation** Move to fresh air. Oxygen or artificial respiration if needed. Call a physician if symptoms develop or persist.

**Skin contact** Remove contaminated clothing. Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Wash contaminated clothing before reuse.

**Eye contact** Do not rub eyes. Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

**Ingestion** Rinse mouth. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Get medical attention if symptoms occur. Never give anything by mouth to a victim who is unconscious or is having convulsions.

**Most important symptoms/effects, acute and delayed** Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain. Inhalation of dust may cause irritation of respiratory tract. Prolonged exposure may cause chronic effects.

**Indication of immediate medical attention and special treatment needed** Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

**General information** If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

### 5. Fire-fighting measures

**Suitable extinguishing media** Water fog. Foam. Dry chemical powder. Carbon dioxide (CO<sub>2</sub>).

**Unsuitable extinguishing media** Do not use water jet as an extinguisher, as this will spread the fire.

**Specific hazards arising from the chemical** During fire, gases hazardous to health may be formed such as: Carbon oxides. Metal oxides.

**Special protective equipment and precautions for firefighters** Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**Fire fighting equipment/instructions** In case of fire do not breath fumes. Use water spray to cool unopened containers.

**Specific methods** Use standard firefighting procedures and consider the hazards of other involved materials.

**General fire hazards** No unusual fire or explosion hazards noted.

### 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures** Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe dust. Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

**Methods and materials for containment and cleaning up**

Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Collect dust using a vacuum cleaner equipped with HEPA filter. The product is immiscible with water and will spread on the water surface. Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Absorb in vermiculite, dry sand or earth and place into containers. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal. Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS. Avoid discharge into drains, water courses or onto the ground.

**Environmental precautions****7. Handling and storage****Precautions for safe handling**

Minimize dust generation and accumulation. Provide appropriate exhaust ventilation at places where dust is formed. Do not breathe dust. Do not get this material in contact with eyes. Avoid contact with skin and clothing. Avoid prolonged exposure. Wear appropriate personal protective equipment. Wash thoroughly after handling. Observe good industrial hygiene practices.

**Conditions for safe storage, including any incompatibilities**

Store in tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

**8. Exposure controls/personal protection****Occupational exposure limits****US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)**

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	PEL	5 mg/m <sup>3</sup>	Respirable fraction.
		15 mg/m <sup>3</sup>	Total dust.
Calcium oxide (CAS 1305-78-8)	PEL	5 mg/m <sup>3</sup>	
Limestone (CAS 1317-65-3)	PEL	5 mg/m <sup>3</sup>	Respirable fraction.
		15 mg/m <sup>3</sup>	Total dust.
Manganese dioxide (CAS 1313-13-9)	Ceiling	5 mg/m <sup>3</sup>	

**US. OSHA Table Z-3 (29 CFR 1910.1000)**

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	5 mg/m <sup>3</sup>	Respirable fraction.
		15 mg/m <sup>3</sup>	Total dust.
		50 mppcf	Total dust.
		15 mppcf	Respirable fraction.
Silica, vitreous (CAS 60676-86-0)	TWA	0.8 mg/m <sup>3</sup>	
		20 mppcf	

**US. ACGIH Threshold Limit Values**

Components	Type	Value	Form
Aluminum oxide (CAS 1344-28-1)	TWA	1 mg/m <sup>3</sup>	Respirable fraction.
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m <sup>3</sup>	
Manganese dioxide (CAS 1313-13-9)	TWA	0.1 mg/m <sup>3</sup>	Inhalable fraction.
		0.02 mg/m <sup>3</sup>	Respirable fraction.

**US. NIOSH: Pocket Guide to Chemical Hazards**

Components	Type	Value	Form
Calcium oxide (CAS 1305-78-8)	TWA	2 mg/m3	
Limestone (CAS 1317-65-3)	TWA	5 mg/m3	Respirable.
		10 mg/m3	Total
Manganese dioxide (CAS 1313-13-9)	STEL	3 mg/m3	Fume.
	TWA	1 mg/m3	Fume.
Silica, vitreous (CAS 60676-86-0)	TWA	6 mg/m3	

**Biological limit values**

No biological exposure limits noted for the ingredient(s).

**Appropriate engineering controls**

Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. If engineering measures are not sufficient to maintain concentrations of dust particulates below the Occupational Exposure Limit (OEL), suitable respiratory protection must be worn. If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. Provide eyewash station and safety shower.

**Individual protection measures, such as personal protective equipment****Eye/face protection**

Wear safety glasses with side shields (or goggles) and a face shield.

**Skin protection****Hand protection**

Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

**Skin protection****Other**

Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

**Respiratory protection**

Use a NIOSH/MSHA approved respirator if there is a risk of exposure to dust/fume at levels exceeding the exposure limits. Chemical respirator with organic vapor cartridge, full facepiece, dust and mist filter.

**Thermal hazards**

Wear appropriate thermal protective clothing, when necessary.

**General hygiene considerations**

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

**9. Physical and chemical properties****Appearance****Physical state**

Solid.

**Form**

Granules.

**Color**

Dark tan to light brown.

**Odor**

Odorless.

**Odor threshold**

Not available.

**pH**

Not available.

**Melting point/freezing point**

Not available.

**Initial boiling point and boiling range**

Not available.

**Flash point**

Not available.

**Evaporation rate**

Not available.

**Flammability (solid, gas)**

Not available.

**Upper/lower flammability or explosive limits****Flammability limit - lower (%)**

Not available.

**Flammability limit - upper (%)**

Not available.

**Explosive limit - lower (%)**

Not available.

<b>Explosive limit - upper (%)</b>	Not available.
<b>Vapor pressure</b>	Not available.
<b>Vapor density</b>	Not available.
<b>Relative density</b>	Not available.
<b>Solubility(ies)</b>	
<b>Solubility (water)</b>	Insoluble.
<b>Partition coefficient (n-octanol/water)</b>	Not available.
<b>Auto-ignition temperature</b>	Not available.
<b>Decomposition temperature</b>	Not available.
<b>Viscosity</b>	Not available.
<b>Other information</b>	
<b>Explosive properties</b>	Not explosive.
<b>Oxidizing properties</b>	Not oxidizing.

## 10. Stability and reactivity

<b>Reactivity</b>	The product is stable and non-reactive under normal conditions of use, storage and transport.
<b>Chemical stability</b>	Material is stable under normal conditions.
<b>Possibility of hazardous reactions</b>	No dangerous reaction known under conditions of normal use.
<b>Conditions to avoid</b>	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Contact with incompatible materials.
<b>Incompatible materials</b>	Strong oxidizing agents. Acids. Chlorine. Fluorine.
<b>Hazardous decomposition products</b>	No hazardous decomposition products are known.

## 11. Toxicological information

### Information on likely routes of exposure

<b>Inhalation</b>	Dust may irritate respiratory system. Prolonged inhalation may be harmful.
<b>Skin contact</b>	Causes skin irritation.
<b>Eye contact</b>	Causes serious eye damage.
<b>Ingestion</b>	May cause discomfort if swallowed. However, ingestion is not likely to be a primary route of occupational exposure.

<b>Symptoms related to the physical, chemical and toxicological characteristics</b>	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain. Inhalation of dust may cause irritation of respiratory tract.
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### Information on toxicological effects

<b>Acute toxicity</b>	Not known.
<b>Skin corrosion/irritation</b>	Causes skin irritation.
<b>Serious eye damage/eye irritation</b>	Causes serious eye damage.
<b>Respiratory or skin sensitization</b>	
<b>Respiratory sensitization</b>	Not a respiratory sensitizer.
<b>Skin sensitization</b>	This product is not expected to cause skin sensitization.
<b>Germ cell mutagenicity</b>	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
<b>Carcinogenicity</b>	Not classifiable as to carcinogenicity to humans.
<b>IARC Monographs. Overall Evaluation of Carcinogenicity</b>	
Silica, vitreous (CAS 60676-86-0)	3 Not classifiable as to carcinogenicity to humans.
<b>NTP Report on Carcinogens</b>	
Not listed.	
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)</b>	
Not regulated.	
<b>Reproductive toxicity</b>	This product is not expected to cause reproductive or developmental effects.



<b>Specific target organ toxicity - single exposure</b>	Not classified.
<b>Specific target organ toxicity - repeated exposure</b>	May cause damage to organs (brain) through prolonged or repeated exposure.
<b>Aspiration hazard</b>	Not an aspiration hazard.
<b>Chronic effects</b>	Prolonged inhalation may be harmful. May cause damage to organs through prolonged or repeated exposure.

## 12. Ecological information

<b>Ecotoxicity</b>	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
<b>Persistence and degradability</b>	No data is available on the degradability of any ingredients in the mixture.
<b>Bioaccumulative potential</b>	No data available.
<b>Mobility in soil</b>	No data available.
<b>Other adverse effects</b>	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

## 13. Disposal considerations

<b>Disposal instructions</b>	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
<b>Local disposal regulations</b>	Dispose in accordance with all applicable regulations.
<b>Hazardous waste code</b>	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
<b>Waste from residues / unused products</b>	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
<b>Contaminated packaging</b>	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

## 14. Transport information

<b>DOT</b>	Not regulated as dangerous goods.
<b>IATA</b>	Not regulated as dangerous goods.
<b>IMDG</b>	Not regulated as dangerous goods.
<b>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code</b>	Not applicable.

## 15. Regulatory information

<b>US federal regulations</b>	This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.	
<b>TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)</b>	Not regulated.	
<b>CERCLA Hazardous Substance List (40 CFR 302.4)</b>	Manganese dioxide (CAS 1313-13-9)	Listed.
<b>SARA 304 Emergency release notification</b>	Not regulated.	
<b>OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)</b>	Not regulated.	
<b>Superfund Amendments and Reauthorization Act of 1986 (SARA)</b>		
<b>SARA 302 Extremely hazardous substance</b>	Not listed.	
<b>SARA 311/312 Hazardous chemical</b>	Yes	

**Classified hazard categories**

Skin corrosion or irritation  
Serious eye damage or eye irritation  
Specific target organ toxicity (single or repeated exposure)

**SARA 313 (TRI reporting)**

Chemical name	CAS number	% by wt.
Aluminum oxide	1344-28-1	4 - 8
Manganese dioxide	1313-13-9	4 - 7

**Other federal regulations****Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Manganese dioxide (CAS 1313-13-9)

**Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)**

Not regulated.

**Safe Drinking Water Act (SDWA)** Not regulated.

**US state regulations****US. Massachusetts RTK - Substance List**

Aluminum oxide (CAS 1344-28-1)  
Calcium oxide (CAS 1305-78-8)  
Limestone (CAS 1317-65-3)  
Silica, vitreous (CAS 60676-86-0)

**US. New Jersey Worker and Community Right-to-Know Act**

Aluminum oxide (CAS 1344-28-1)  
Calcium oxide (CAS 1305-78-8)  
Limestone (CAS 1317-65-3)  
Manganese dioxide (CAS 1313-13-9)  
Silica, vitreous (CAS 60676-86-0)

**US. Pennsylvania Worker and Community Right-to-Know Law**

Aluminum oxide (CAS 1344-28-1)  
Calcium oxide (CAS 1305-78-8)  
Limestone (CAS 1317-65-3)  
Manganese dioxide (CAS 1313-13-9)  
Silica, vitreous (CAS 60676-86-0)

**US. Rhode Island RTK**

Aluminum oxide (CAS 1344-28-1)  
Calcium oxide (CAS 1305-78-8)  
Limestone (CAS 1317-65-3)  
Silica, vitreous (CAS 60676-86-0)

**California Proposition 65**

California Safe Drinking Water and Toxic Enforcement Act of 2016 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

**International Inventories**

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

\*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

## 16. Other information, including date of preparation or last revision

<b>Issue date</b>	Draft version.
<b>Revision date</b>	Draft version.
<b>Version #</b>	Draft version.
<b>Further information</b>	CARUS is a trademark of Carus Corporation.
<b>HMIS® ratings</b>	Health: 3* Flammability: 0 Physical hazard: 0

### NFPA ratings



### Disclaimer

CARUS CORPORATION cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available. (Carus and design) is a registered service mark of Carus Corporation.

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/13/2015

Reviewed on 08/12/2015

### \* 1 Identification

- **Product identifier**
- **Trade name: Basic Oxygen Furnace Slag (BOF Slag / Steel Slag)**
- **CAS Number:** 91722-09-7
- **Relevant identified uses of the substance or mixture and uses advised against**  
No further relevant information available.
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**  
Edward C. Levy Company  
9300 Dix Avenue  
Dearborn, Michigan 48120  
Phone - (313) 429-2200  
Fax - (219) 465-7313  
www.edwclevy.com
- **Emergency telephone number:**  
John J. Yzenas Jr.  
Director of Technical Services  
Phone - (219) 741-6098  
jyzenas@levyco.net

### \* 2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS07

Acute Tox. 4 H332 Harmful if inhaled.  
Skin Irrit. 2 H315 Causes skin irritation.  
STOT SE 3 H335 May cause respiratory irritation.  
Eye Irrit. 2B H320 Causes eye irritation.

- **Label elements**
- **GHS label elements**  
The product is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**



GHS07

- **Signal word** Warning
- **Hazard-determining components of labeling:**  
Basic Oxygen Furnace (BOF) Slag
- **Hazard statements**  
Harmful if inhaled.  
Causes skin and eye irritation.  
May cause respiratory irritation.
- **Precautionary statements**  
Avoid breathing dust/fume/gas/mist/vapors/spray.  
Use only outdoors or in a well-ventilated area.

(Contd. on page 2)

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/13/2015

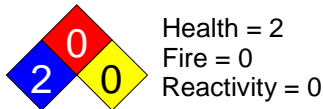
Reviewed on 08/12/2015

### Trade name: Basic Oxygen Furnace Slag

Wear protective gloves.  
Wash thoroughly after handling.  
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
Specific treatment (see supplementary first aid instructions on this Safety Data Sheet).  
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
Call a poison center/doctor if you feel unwell.  
If skin irritation occurs: Get medical advice/attention.  
If eye irritation persists: Get medical advice/attention.  
If on skin: Wash with plenty of water.  
Take off contaminated clothing and wash it before reuse.  
Store in a well-ventilated place. Keep container tightly closed.  
Dispose of contents/container in accordance with local/regional/national/international regulations.

• **Classification system:**

• **NFPA ratings (scale 0 - 4)**



• **HMS-ratings (scale 0 - 4)**



• **Hazard(s) not otherwise classified (HNOC):** None known

### \* 3 Composition/information on ingredients

Larnite, beta-dicalcium-silica [Beta - Ca <sub>2</sub> SiO <sub>4</sub> ]
Srebrodolskite, calcium-iron-oxide [Ca <sub>2</sub> Fe <sub>2</sub> O <sub>5</sub> ]
Hatrurite, tri-calcium-silicate [Ca <sub>3</sub> Si <sub>5</sub> ]
Spinel [Me <sub>2</sub> +Me <sub>3</sub> +2O <sub>5</sub> ]
Wuestite, Solid solution of iron(II)-oxide with MgO and MnO
Free Lime, calcium-oxide [CaO]

• **Chemical characterization: Mixtures**

• **Description:** Mixture of substances listed below with nonhazardous additions.

• **Dangerous Components:**

91722-09-7	Basic Oxygen Furnace (BOF) Slag	100%
	⚠ Acute Tox. 4, H332; Skin Irrit. 2, H315; STOT SE 3, H335; Eye Irrit. 2B, H320	

### \* 4 First-aid measures

• **Description of first aid measures**

• **General information:**

Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.

• **After inhalation:**

Remove to fresh air. Dust in throat and nasal passages should clear spontaneously. Seek medical attention for discomfort or if coughing or other symptoms do not subside.

(Contd. on page 3)

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/13/2015

Reviewed on 08/12/2015

**Trade name: Basic Oxygen Furnace Slag**

• **After skin contact:**

Wash with cool water and a pH neutral soap or a mild skin detergent. Seek medical attention for rash, burns, irritation and prolonged unprotected exposure.

• **After eye contact:**

Flush with water immediately for at least 15 minutes, including under the lids to remove all particles. Seek medical attention for abrasions and burns.

• **After swallowing:**

Do not induce vomiting. If conscious, have person drink plenty of water. Seek medical attention or contact poison control center immediately.

• **Information for doctor:**

• **Most important symptoms and effects, both acute and delayed:** No further relevant information available.

• **Indication of any immediate medical attention and special treatment needed**

No further relevant information available.

### \* 5 Fire-fighting measures

• **Extinguishing media**

• **Suitable extinguishing agents:**

CO<sub>2</sub>, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

• **Special hazards arising from the substance or mixture** No further relevant information available.

• **Advice for firefighters**

• **Protective equipment:**

As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

### \* 6 Accidental release measures

• **Personal precautions, protective equipment and emergency procedures**

Wear protective equipment. Keep unprotected persons away.

• **Environmental precautions:** None

• **Methods and material for containment and cleaning up:**

Pick up mechanically or by hand tools and reuse or dispose of as a common non-hazardous material in accordance with applicable federal, state and local regulations. Wetting the material prior to clean up may be necessary to suppress dust.

• **Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

### \* 7 Handling and storage

• **Handling:**

• **Precautions for safe handling**

Use personal protection equipment as outlined in section 8.

Respirable dust may be generated during processing, handling, and storage.

• **Information about protection against explosions and fires:** No special measures required.

• **Conditions for safe storage, including any incompatibilities**

• **Storage:**

• **Requirements to be met by storerooms and receptacles:** No special requirements.

• **Information about storage in one common storage facility:** Not required.

• **Further information about storage conditions:** None.

• **Specific end use(s)** No further relevant information available.

(Contd. on page 4)

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/13/2015

Reviewed on 08/12/2015

**Trade name: Basic Oxygen Furnace Slag**

### \* 8 Exposure controls/personal protection

- **Additional information about design of technical systems:** No further data; see section 7.
- **Control parameters**

**Exposure Limits:**

ACGIH TLV's for "Nuisance Dusts"	
Total Dust:	10mg/M3 < 1% quartz max.
Respirable dust:	5mg/M3 < 1% quartz max.

- **Components with occupational exposure limits:**  
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
- **Additional information:** The lists that were valid during the creation of this SDS were used as basis.
- **Exposure controls**  
Provide general ventilation in processing and storage. Provide local exhaust if necessary to reduce dust levels below acceptable limits.
- **Personal protective equipment:**
- **General protective and hygienic measures:**  
Immediately remove all soiled and contaminated clothing and wash before reuse.  
Wash hands before breaks and at the end of work.  
Avoid contact with the eyes and skin.
- **Breathing equipment:**



NIOSH/OSHA or EN approved respiratory protection is recommended for use in airborne concentrations exceeding exposure limits.

- **Protection of hands:**



Protective gloves

- **Material of gloves** Waterproof or water resistant material
- **Eye protection:**  
Wear ANSI approved glasses or goggles to prevent eye contact. Splash shields should be worn in wet conditions. Wearing contact lenses in dusty conditions is not recommended.
- **Body protection:**  
Wear hard hats, protective clothing and hard toed shoes to protect from impact and abrasion. In wet conditions, impervious PPE should be worn to protect the skin.

### \* 9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
- **Appearance:**
  - Form:** Granulate
  - Color:** Grey
- **Odor:** Not Distinctive
- **Odor threshold:** Not determined.
- **pH-value:** 9.5-12.5 (in water)
- **Change in condition**
  - Melting point/Melting range:** Not determined.
  - Boiling point/Boiling range:** Not determined.



## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/13/2015

Reviewed on 08/12/2015

### Trade name: Basic Oxygen Furnace Slag

- **Flash point:** Not applicable.
- **Flammability (solid, gaseous):** Not determined.
- **Ignition temperature:**
  - **Decomposition temperature:** Not determined.
- **Auto igniting:** Product is not self-igniting.
- **Danger of explosion:** Product does not present an explosion hazard.
- **Explosion limits:**
  - **Lower:** Not determined.
  - **Upper:** Not determined.
- **Vapor pressure:** Not applicable.
- **Density:** 3.1-3.6 (Bulk)
- **Relative density** Not determined.
- **Vapor density** Not applicable.
- **Evaporation rate** Not applicable.
- **Solubility in / Miscibility with Water:** Insoluble.
- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
  - **Dynamic:** Not applicable.
  - **Kinematic:** Not applicable.
- **Other information** No further relevant information available.

### \* 10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability** Un-weathered steel slag may contain potentially expansive compounds (Free Lime)
- **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.

### \* 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**
- **Corrosivity:** Non-Corrosive (OECD 431)
- **Primary irritant effect:** Elevated pH in moist conditions may cause irritation to the skin, and eyes or aggravate existing conditions. Can cause serious eye irritation.
- **Additional toxicological information:** The product shows the following dangers according to internally approved calculation methods for preparations:  
Harmful  
Irritant
- **Carcinogenic categories**
- **IARC (International Agency for Research on Cancer)**  
Iron and steel furnace slag is not listed as a carcinogen by IARC; however, slag contains trace amounts of crystalline silica which is classified by IARC as known human carcinogens.

None of the ingredients are listed.

(Contd. on page 6)

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/13/2015

Reviewed on 08/12/2015

**Trade name: Basic Oxygen Furnace Slag**

· **NTP (National Toxicology Program)**

None of the ingredients are listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**

None of the ingredients are listed.

### 12 Ecological information

- **Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **Persistence and degradability** No further relevant information available.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:** Not known to be hazardous to water.
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **Other adverse effects** No further relevant information available.

### \* 13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**  
Observe all federal, state and local environmental regulations when disposing of this material.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

### \* 14 Transport information

- |  |  |
|--|--|
| · <b>UN-Number</b>   |  |
| · <b>DOT, ADR, ADN, IMDG, IATA</b>   | Non-Regulated Material   |
| · <b>UN proper shipping name</b>   |  |
| · <b>DOT, ADR, ADN, IMDG, IATA</b>   | Non-Regulated Material   |
| · <b>Transport hazard class(es)</b>  |  |
| · <b>DOT, ADR, ADN, IMDG, IATA</b>   |  |
| · <b>Class</b>   | Non-Regulated Material   |
| · <b>Packing group</b>   |  |
| · <b>DOT, ADR, IMDG, IATA</b>  | Non-Regulated Material   |
| · <b>Environmental hazards:</b>  | Not applicable.  |
| · <b>Special precautions for user</b>  | Some areas require the use of tarps on trucks for containment of dust. |
| · <b>Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code</b> | Not applicable.  |
| · <b>UN "Model Regulation":</b>  | -  |

(Contd. on page 7)

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/13/2015

Reviewed on 08/12/2015

**Trade name: Basic Oxygen Furnace Slag**

### \*15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **Sara**

- **Section 355 (extremely hazardous substances):**

None of the ingredients are listed.

- **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

- **TSCA (Toxic Substances Control Act):**

None of the ingredients is listed.

- **California Proposition 65**

- **Chemicals known to cause cancer:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

- **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

- **Carcinogenic categories**

- **EPA (Environmental Protection Agency)**

None of the ingredients are listed.

- **TLV (Threshold Limit Value established by ACGIH)**

None of the ingredients are listed.

- **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients are listed.

- **GHS label elements**

The product is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms**



GHS07

- **Signal word** Warning

- **Hazard-determining components of labeling:**

Basic Oxygen Furnace (BOF) Slag

- **Hazard statements**

Harmful if inhaled.

Causes skin and eye irritation.

May cause respiratory irritation.

- **Precautionary statements**

Avoid breathing dust/fume/gas/mist/vapors/spray.

Use only outdoors or in a well-ventilated area.

## Safety Data Sheet (SDS)

OSHA HazCom Standard 29 CFR 1910.1200(g) and GHS Rev 03.

Issue date 07/13/2015

Reviewed on 08/12/2015

### Trade name: Basic Oxygen Furnace Slag

Wear protective gloves.  
 Wash thoroughly after handling.  
 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 Specific treatment (see supplementary first aid instructions on this Safety Data Sheet).  
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
 Call a poison center/doctor if you feel unwell.  
 If skin irritation occurs: Get medical advice/attention.  
 If eye irritation persists: Get medical advice/attention.  
 If on skin: Wash with plenty of water.  
 Take off contaminated clothing and wash it before reuse.  
 Store locked up.  
 Store in a well-ventilated place. Keep container tightly closed.  
 Dispose of contents/container in accordance with local/regional/national/international regulations.

• **National regulations:**

The product is subject to be classified according with the latest version of the regulations on hazardous substances.

• **State Right to Know**

91722-09-7	Basic Oxygen Furnace (BOF) Slag	100%
	⚠ Acute Tox. 4, H332; Skin Irrit. 2, H315; STOT SE 3, H335; Eye Irrit. 2B, H320	
All ingredients are listed.		

• **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

### 16 Other information

The information and recommendations in this safety data sheet are, to the best of our knowledge, accurate as of the date of issue. Nothing herein shall be deemed to create warranty, expressed or implied, and shall not establish a legally valid contractual relationship. It is the responsibility of the user to determine applicability of this information and the suitability of the material or product for any particular purpose.

• **Date of last revision** 08/12/2015 Rev - 1

• **Abbreviations and acronyms:**

ADR: The European Agreement concerning the International Carriage of Dangerous Goods by Road  
 ADN: The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways  
 IMDG: International Maritime Code for Dangerous Goods  
 DOT: US Department of Transportation  
 IATA: International Air Transport Association  
 ACGIH: American Conference of Governmental Industrial Hygienists  
 EINECS: European Inventory of Existing Commercial Chemical Substances  
 ELINCS: European List of Notified Chemical Substances  
 CAS: Chemical Abstracts Service (division of the American Chemical Society)  
 NFPA: National Fire Protection Association (USA)  
 HMIS: Hazardous Materials Identification System (USA)  
 PBT: Persistent, Bioaccumulative and Toxic  
 vPvB: very Persistent and very Bioaccumulative  
 Acute Tox. 4: Acute toxicity, Hazard Category 4  
 Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2  
 Eye Irrit. 2B: Serious eye damage/eye irritation, Hazard Category 2B  
 STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3

• **\* Data compared to the previous version altered. Previous version 07/13/2015**

**Product Data Sheet #112**

**Quantity +or- 100,000 ton lots**

**Price: Negotiable, per metric ton F.O.B. Copperhill**

**Physical Characteristics: Fine powdery material, purple-red in color, slightly magnetic**

**Intertrade Holdings, Inc.**

304 Ocoee St.  
Copperhill, TN 37317

Phone: (256) 282-6996  
(256) 499-6822

**Product Data Sheet  
Iron Calcine #212**

Specific Gravity = 5.0-5.2

<u>Typical Analysis %</u>		<u>Typical Size Distribution</u>	
Iron	63.5	Tyler Mesh	%
Copper	0.16	-100	5
Zinc	0.25	-100/-150	12
Lead	0.02	-150/-200	22
CaO	1.10	-200/-270	12
MgO	0.70	-270/-325	7
Al <sub>2</sub> O <sub>3</sub>	0.30	-325/-400	8
Sulfur	0.80	-400	34
SiO <sub>2</sub>	2.00		
Cobalt*	0.035		

Silver 0.35 tr. Oz/ton

**Note**

\*This cobalt is not radioactive (it is made from irradiated nickel)

+/-12% moisture

Binary Curve:

Opt. 4.5% Moisture

Max Dry Density 108.7

Low Point Moisture -101.6 lb.

Second High Point 21.5% Moisture 103.0 lb.













# CONNELLY – GPM, INC.

ESTABLISHED 1875

3154 SOUTH CALIFORNIA AVENUE CHICAGO, ILLINOIS 60608-5176

PHONE: (773) 247-7231 • [www.ConnellyGPM.com](http://www.ConnellyGPM.com) • FAX: (773) 247-7239

May 26, 2015

## SCREEN SPECIFICATION CC-1200

U.S. SCREEN

NUMBER (Opening Size)

20	(0.850 mm)	100% PASSING
40	(0.420 mm)	98 - 100% PASSING
60	(0.250 mm)	80 - 100
100	(0.150 mm)	40 - 75
200	(0.075 mm)	10 - 40

**MATERIAL WEIGHS APPROXIMATELY 195 - 215 POUNDS PER CUBIC FOOT**

## TYPICAL ANALYSIS OF IRON AGGREGATE

Metallic Iron/Iron Oxide	87-93%
Total Carbon	2.85-3.23
Manganese	0.14-0.60
Sulphur	0.067-0.107
Phosphorous	0.000-0.132
Silicon	1.0-1.85
Nickel	0.05-0.21
Chromium	0.03-0.23
Vanadium	ND
Molybdenum	0.08-0.15
Titanium	0.004-0.1
Copper	0.11-0.20
Aluminum	0-0.005
Cobalt	ND
Magnesium	0.01
Boron	0.01
Zinc	0.01
Zirconium	0.01

GALEN B. DIXON  
Technical Director

Attachment C

PDC Laboratory Column Test Results

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November 30, 2021

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

RE: ANCHOR QEA, LLC.

Dear Jessica Goin:

Please find enclosed the analytical results for the **2** sample(s) the laboratory received on **9/6/19 9:00 am** and logged in under work order **9091026**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Director of Client Services, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or lgrant@pdclab.com.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com





**SAMPLE RECEIPT CHECK LIST**

**Items not applicable will be marked as in compliance**

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Work Order 9091026

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NO	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
NO	Sampler name & signature present
YES	Unique sample IDs assigned
NO	Sample collection location recorded
NO	Date & time collected recorded on COC
NO	Relinquished by client signature on COC
NO	COC & labels match
NO	Sample labels are legible
NO	Appropriate bottle(s) received
NO	Sufficient sample volume received
NO	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
NO	All non-field analyses received within holding times
NO	Short hold time analysis
NO	Current PDC COC submitted
NO	Case narrative provided





**ANALYTICAL RESULTS**

**Sample:** 9091026-02  
**Name:** AEP-COL-CV-INF-20190819  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 08/19/19 09:10  
**Received:** 09/06/19 09:00

Parameter	Result	Unit	Qualifier	Prepared	Dilution	MRL	Analyzed	Analyst	Method
<b>Anions - PIA</b>									
Sulfate	680	mg/L		09/09/19 15:46	100	100	09/09/19 15:46	MGU	EPA 300.0 REV 2.1
<b>Soluble Metals - PIA</b>									
Antimony	< 0.25	ug/L		09/11/19 04:36	5	3.0	09/11/19 10:20	JMW	EPA 6020A
Arsenic	0.16	ug/L		09/11/19 04:36	5	1.0	09/11/19 10:20	JMW	EPA 6020A
Barium	49	ug/L		09/11/19 04:36	5	1.0	09/11/19 10:20	JMW	EPA 6020A
Beryllium	< 0.054	ug/L		09/11/19 04:36	5	1.0	09/11/19 10:20	JMW	EPA 6020A
Boron	7800	ug/L		09/11/19 04:36	5	15	09/11/19 10:20	JMW	EPA 6020A
Cadmium	0.12	ug/L		09/11/19 04:36	5	1.0	09/11/19 10:20	JMW	EPA 6020A
Calcium	280	mg/L		09/11/19 04:36	5	0.10	09/11/19 10:20	JMW	EPA 6020A
Chromium	< 0.25	ug/L		09/11/19 04:36	5	4.0	09/11/19 10:20	JMW	EPA 6020A
Cobalt	1.2	ug/L		09/11/19 04:36	5	2.0	09/11/19 10:20	JMW	EPA 6020A
Lead	< 0.070	ug/L		09/11/19 04:36	5	1.0	09/11/19 10:20	JMW	EPA 6020A
Mercury	0.065	ug/L		09/11/19 04:36	5	0.20	09/11/19 13:14	JMW	EPA 6020A
Molybdenum	67	ug/L		09/11/19 04:36	5	1.0	09/11/19 10:20	JMW	EPA 6020A
Selenium	8.8	ug/L		09/11/19 04:36	5	1.0	09/11/19 10:20	JMW	EPA 6020A
Thallium	< 0.068	ug/L		09/11/19 04:36	5	1.0	09/11/19 10:20	JMW	EPA 6020A
Lithium	100	ug/L		09/09/19 12:36	1	10	09/10/19 10:14	ZSA	EPA 6010B





QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B920488 - Metals filtration - EPA 6010B</u></b>									
<b>Blank (B920488-BLK1)</b>				Prepared: 09/09/19 Analyzed: 09/10/19					
Lithium	< 0.10	ug/L							
<b>LCS (B920488-BS1)</b>				Prepared: 09/09/19 Analyzed: 09/10/19					
Lithium	467	ug/L		500.0		93	80-120		
<b>Matrix Spike (B920488-MS1)</b>				Sample: 9091026-01 Prepared: 09/09/19 Analyzed: 09/10/19					
Lithium	726	ug/L		500.0	132	119	75-125		
<b>Matrix Spike Dup (B920488-MSD1)</b>				Sample: 9091026-01 Prepared: 09/09/19 Analyzed: 09/10/19					
Lithium	753	ug/L		500.0	132	124	75-125	4	200
<b><u>Batch B920563 - IC No Prep - EPA 300.0 REV 2.1</u></b>									
<b>Calibration Blank (B920563-CCB1)</b>				Prepared & Analyzed: 09/09/19					
Sulfate	0.00	mg/L							
<b>Calibration Check (B920563-CCV1)</b>				Prepared & Analyzed: 09/09/19					
Sulfate	4.88	mg/L		5.000		98	90-110		
<b>Matrix Spike (B920563-MS1)</b>				Sample: 9090699-01 Prepared & Analyzed: 09/09/19					
Sulfate	8.67	mg/L		1.500	7.05	108	80-120		
<b>Matrix Spike (B920563-MS2)</b>				Sample: 9090699-02 Prepared & Analyzed: 09/09/19					
Sulfate	9.14	mg/L		1.500	7.53	108	80-120		
<b>Matrix Spike Dup (B920563-MSD1)</b>				Sample: 9090699-01 Prepared & Analyzed: 09/09/19					
Sulfate	8.69	mg/L		1.500	7.05	110	80-120	0.3	20
<b>Matrix Spike Dup (B920563-MSD2)</b>				Sample: 9090699-02 Prepared & Analyzed: 09/09/19					
Sulfate	9.11	mg/L		1.500	7.53	106	80-120	0.3	20
<b><u>Batch B920663 - 6020 Sol no prep - EPA 6020A</u></b>									
<b>Blank (B920663-BLK1)</b>				Prepared & Analyzed: 09/11/19					
Antimony	< 1.4	ug/L							
Arsenic	< 0.59	ug/L							
Barium	< 0.18	ug/L							
Beryllium	< 0.33	ug/L							
Boron	< 4.5	ug/L							
Cadmium	< 0.12	ug/L							
Calcium	< 0.056	mg/L							
Chromium	< 0.25	ug/L							
Cobalt	< 0.054	ug/L							
Lead	< 0.092	ug/L							
Mercury	< 0.057	ug/L							
Molybdenum	< 0.17	ug/L							
Selenium	< 0.79	ug/L							
Thallium	< 0.31	ug/L							
<b>LCS (B920663-BS1)</b>				Prepared & Analyzed: 09/11/19					
Antimony	245	ug/L		250.0		98	80-120		
Arsenic	252	ug/L		250.0		101	80-120		
Barium	251	ug/L		250.0		101	80-120		
Beryllium	239	ug/L		250.0		96	80-120		



QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B920663 - 6020 Sol no prep - EPA 6020A</u></b>									
<b>LCS (B920663-BS1)</b>				Prepared & Analyzed: 09/11/19					
Boron	2440	ug/L		2500		98	80-120		
Cadmium	244	ug/L		250.0		97	80-120		
Calcium	24.8	mg/L		25.00		99	80-120		
Chromium	251	ug/L		250.0		100	80-120		
Cobalt	244	ug/L		250.0		98	80-120		
Lead	253	ug/L		250.0		101	80-120		
Mercury	22.9	ug/L		25.00		92	80-120		
Molybdenum	241	ug/L		250.0		96	80-120		
Selenium	248	ug/L		250.0		99	80-120		
Thallium	247	ug/L		250.0		99	80-120		
<b>Matrix Spike (B920663-MS1)</b>				Sample: 9086293-02		Prepared & Analyzed: 09/11/19			
Antimony	249	ug/L		250.0	ND	100	75-125		
Arsenic	256	ug/L		250.0	ND	102	75-125		
Barium	426	ug/L		250.0	175	101	75-125		
Beryllium	247	ug/L		250.0	ND	99	75-125		
Boron	2520	ug/L		2500	22.4	100	75-125		
Cadmium	253	ug/L		250.0	0.455	101	75-125		
Calcium	79.0	mg/L		25.00	56.2	91	75-125		
Chromium	259	ug/L		250.0	1.46	103	75-125		
Cobalt	249	ug/L		250.0	0.360	99	75-125		
Lead	256	ug/L		250.0	ND	102	75-125		
Mercury	23.8	ug/L		25.00	0.200	94	75-125		
Molybdenum	249	ug/L		250.0	ND	100	75-125		
Selenium	253	ug/L		250.0	2.40	100	75-125		
Thallium	258	ug/L		250.0	ND	103	75-125		
<b>Matrix Spike (B920663-MS2)</b>				Sample: 9091362-03		Prepared & Analyzed: 09/11/19			
Antimony	247	ug/L		250.0	ND	99	75-125		
Arsenic	277	ug/L		250.0	22.7	102	75-125		
Barium	536	ug/L		250.0	297	96	75-125		
Beryllium	252	ug/L		250.0	ND	101	75-125		
Cadmium	249	ug/L		250.0	ND	100	75-125		
Calcium	116	mg/L		25.00	92.9	93	75-125		
Chromium	258	ug/L		250.0	ND	103	75-125		
Cobalt	243	ug/L		250.0	ND	97	75-125		
Lead	254	ug/L		250.0	ND	102	75-125		
Mercury	23.2	ug/L		25.00	ND	93	75-125		
Molybdenum	250	ug/L		250.0	4.02	98	75-125		
Selenium	248	ug/L		250.0	ND	99	75-125		
Thallium	254	ug/L		250.0	ND	101	75-125		
<b>Matrix Spike Dup (B920663-MSD1)</b>				Sample: 9086293-02		Prepared & Analyzed: 09/11/19			
Antimony	247	ug/L		250.0	ND	99	75-125	0.8	20
Arsenic	254	ug/L		250.0	ND	102	75-125	0.5	20
Barium	424	ug/L		250.0	175	100	75-125	0.6	20
Beryllium	246	ug/L		250.0	ND	98	75-125	0.5	20



QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B920663 - 6020 Sol no prep - EPA 6020A</u></b>									
<b>Matrix Spike Dup (B920663-MSD1)</b>	<b>Sample: 9086293-02</b>			<b>Prepared &amp; Analyzed: 09/11/19</b>					
Boron	2540	ug/L		2500	22.4	101	75-125	0.7	20
Cadmium	251	ug/L		250.0	0.455	100	75-125	0.6	20
Calcium	80.8	mg/L		25.00	56.2	98	75-125	2	20
Chromium	260	ug/L		250.0	1.46	103	75-125	0.3	20
Cobalt	246	ug/L		250.0	0.360	98	75-125	0.9	20
Lead	256	ug/L		250.0	ND	103	75-125	0.2	20
Mercury	23.8	ug/L		25.00	0.200	94	75-125	0.2	20
Molybdenum	246	ug/L		250.0	ND	98	75-125	1	20
Selenium	253	ug/L		250.0	2.40	100	75-125	0.3	20
Thallium	254	ug/L		250.0	ND	101	75-125	2	20
<b>Matrix Spike Dup (B920663-MSD2)</b>	<b>Sample: 9091362-03</b>			<b>Prepared &amp; Analyzed: 09/11/19</b>					
Antimony	248	ug/L		250.0	ND	99	75-125	0.5	20
Arsenic	279	ug/L		250.0	22.7	103	75-125	0.7	20
Barium	539	ug/L		250.0	297	97	75-125	0.6	20
Beryllium	253	ug/L		250.0	ND	101	75-125	0.3	20
Cadmium	251	ug/L		250.0	ND	100	75-125	0.7	20
Calcium	115	mg/L		25.00	92.9	90	75-125	0.7	20
Chromium	259	ug/L		250.0	ND	104	75-125	0.7	20
Cobalt	243	ug/L		250.0	ND	97	75-125	0.09	20
Lead	254	ug/L		250.0	ND	102	75-125	0.006	20
Mercury	24.0	ug/L		25.00	ND	96	75-125	3	20
Molybdenum	254	ug/L		250.0	4.02	100	75-125	2	20
Selenium	244	ug/L		250.0	ND	98	75-125	2	20
Thallium	255	ug/L		250.0	ND	102	75-125	0.5	20



NOTES

Specifications regarding method revisions and method modifications used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050



Certified by: Erin Lane For Gail Schindler, Project Manager



November 30, 2021

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

RE: ANCHOR QEA, LLC.

Dear Jessica Goin:

Please find enclosed the analytical results for the **26** sample(s) the laboratory received on **9/25/19 10:00 am** and logged in under work order **9094847**. All testing is performed according to our current TNI accreditations unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Director of Client Services, Lisa Grant, with any feedback you have about your experience with our laboratory at 309-683-1764 or lgrant@pdclab.com.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com





**SAMPLE RECEIPT CHECK LIST**

**Items not applicable will be marked as in compliance**

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Work Order 9094847

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NO	Samples received within temperature compliance when applicable
YES	COC present upon sample receipt
YES	COC completed & legible
NO	Sampler name & signature present
YES	Unique sample IDs assigned
NO	Sample collection location recorded
NO	Date & time collected recorded on COC
NO	Relinquished by client signature on COC
NO	COC & labels match
NO	Sample labels are legible
NO	Appropriate bottle(s) received
NO	Sufficient sample volume received
NO	Sample containers received undamaged
NO	Zero headspace, <6 mm present in VOA vials
NO	Trip blank(s) received
NO	All non-field analyses received within holding times
NO	Short hold time analysis
NO	Current PDC COC submitted
NO	Case narrative provided



ANALYTICAL RESULTS

Sample: 9094847-02
Name: AEP\_COL\_MN\_INF\_082719
Matrix: Ground Water - Regular Sample

Sampled: 08/27/19 10:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Includes section header 'Soluble Metals - PIA' and lists various elements like Antimony, Arsenic, Barium, etc.





ANALYTICAL RESULTS

Sample: 9094847-04
Name: AEP\_COL\_MN\_INF\_090619
Matrix: Ground Water - Regular Sample

Sampled: 09/06/19 13:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Includes section header 'Soluble Metals - PIA' and lists various elements like Antimony, Arsenic, Barium, etc.



ANALYTICAL RESULTS

Sample: 9094847-06
Name: AEP\_COL\_MN\_SE\_081919
Matrix: Ground Water - Regular Sample

Sampled: 08/19/19 10:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Rows include Anions (Bromide, Chloride, Sulfate), General Chemistry (Alkalinity, Fluoride), and Soluble Metals (Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Potassium, Selenium, Sodium, Thallium, Lithium, Strontium).



ANALYTICAL RESULTS

Sample: 9094847-08
Name: AEP\_COL\_MN\_SE\_091019
Matrix: Ground Water - Regular Sample

Sampled: 09/10/19 10:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. It contains three sections: Anions - PIA (Bromide, Chloride, Sulfate), General Chemistry - PIA (Alkalinity, Fluoride), and Soluble Metals - PIA (Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Potassium, Selenium, Sodium, Thallium, Lithium, Strontium).



ANALYTICAL RESULTS

Sample: 9094847-10
Name: AEP\_COL\_MN\_INF\_092419
Matrix: Ground Water - Regular Sample

Sampled: 09/24/19 14:25
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Includes sub-section 'Anions - PIA' with rows for Bromide, Chloride, Sulfate and 'General Chemistry - PIA' with rows for Alkalinity - total as CaCO3, Fluoride.

Sample: 9094847-12
Name: AEP\_COL\_MN\_TE\_082019
Matrix: Ground Water - Regular Sample

Sampled: 08/20/19 11:35
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Includes sub-section 'Soluble Metals - PIA' with rows for Boron, Molybdenum, Lithium.

Sample: 9094847-14
Name: AEP\_COL\_MN\_TE\_082319
Matrix: Ground Water - Regular Sample

Sampled: 08/23/19 10:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Includes sub-section 'Soluble Metals - PIA' with rows for Boron, Molybdenum, Lithium.



ANALYTICAL RESULTS

Sample: 9094847-16
Name: AEP\_COL\_MN\_TE\_082719
Matrix: Ground Water - Regular Sample

Sampled: 08/27/19 08:45
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Contains data for Soluble Metals - PIA including Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Iron, Dissolved, Lead, Magnesium, Manganese, Mercury, Molybdenum, Potassium, Selenium, Sodium, Thallium, Lithium, and Strontium.

Sample: 9094847-18
Name: AEP\_COL\_MN\_TE\_083019
Matrix: Ground Water - Regular Sample

Sampled: 08/30/19 10:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Contains data for Soluble Metals - PIA including Boron, Molybdenum, and Lithium.



ANALYTICAL RESULTS

Sample: 9094847-20
Name: AEP\_COL\_MN\_TE\_090219
Matrix: Ground Water - Regular Sample

Sampled: 09/02/19 11:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Section: Soluble Metals - PIA. Rows: Boron, Molybdenum, Lithium.

Sample: 9094847-22
Name: AEP\_COL\_MN\_TE\_090619
Matrix: Ground Water - Regular Sample

Sampled: 09/06/19 10:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Section: Soluble Metals - PIA. Rows: Boron, Molybdenum, Lithium.



ANALYTICAL RESULTS

Sample: 9094847-24
Name: AEP\_COL\_MN\_TE\_091019
Matrix: Ground Water - Regular Sample

Sampled: 09/10/19 17:35
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Contains data for Soluble Metals - PIA including Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Iron, Dissolved, Lead, Magnesium, Manganese, Mercury, Molybdenum, Potassium, Selenium, Sodium, Thallium, Lithium, and Strontium.

Sample: 9094847-26
Name: AEP\_COL\_MN\_TE\_091319
Matrix: Ground Water - Regular Sample

Sampled: 09/13/19 15:05
Received: 09/25/19 10:00

Table with 10 columns: Parameter, Result, Unit, Qualifier, Prepared, Dilution, MRL, Analyzed, Analyst, Method. Contains data for Soluble Metals - PIA including Boron, Molybdenum, and Lithium.





QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B922197 - IC No Prep - EPA 300.0 REV 2.1</u></b>									
<b>Calibration Blank (B922197-CCB1)</b>				Prepared & Analyzed: 09/26/19					
Bromide	0.00	mg/L							
Sulfate	0.00	mg/L							
Chloride	0.00	mg/L							
<b>Calibration Check (B922197-CCV1)</b>				Prepared & Analyzed: 09/26/19					
Bromide	4.89	mg/L		5.000		98	90-110		
Chloride	4.80	mg/L		5.000		96	90-110		
Sulfate	4.92	mg/L		5.000		98	90-110		
<b><u>Batch B922345 - 6010 Sol no prep - EPA 6010B</u></b>									
<b>Blank (B922345-BLK1)</b>				Prepared & Analyzed: 09/30/19					
Lithium	< 0.10	ug/L							
<b>LCS (B922345-BS1)</b>				Prepared & Analyzed: 09/30/19					
Lithium	511	ug/L		500.0		102	80-120		
<b>Matrix Spike (B922345-MS1)</b>				Sample: 9094847-01 Prepared & Analyzed: 09/30/19					
Lithium	549	ug/L		500.0	113	87	75-125		
<b>Matrix Spike (B922345-MS2)</b>				Sample: 9094847-13 Prepared & Analyzed: 09/30/19					
Lithium	538	ug/L		500.0	3.58	107	75-125		
<b>Matrix Spike (B922345-MS3)</b>				Sample: 9094847-23 Prepared & Analyzed: 09/30/19					
Lithium	572	ug/L		500.0	4.01	114	75-125		
<b>Matrix Spike Dup (B922345-MSD1)</b>				Sample: 9094847-01 Prepared & Analyzed: 09/30/19					
Lithium	553	ug/L		500.0	113	88	75-125	0.8	200
<b>Matrix Spike Dup (B922345-MSD2)</b>				Sample: 9094847-13 Prepared & Analyzed: 09/30/19					
Lithium	543	ug/L		500.0	3.58	108	75-125	0.8	200
<b>Matrix Spike Dup (B922345-MSD3)</b>				Sample: 9094847-23 Prepared & Analyzed: 09/30/19					
Lithium	555	ug/L		500.0	4.01	110	75-125	3	200
<b><u>Batch B922473 - No Prep - SM 4500F C 1997</u></b>									
<b>Calibration Blank (B922473-CCB1)</b>				Prepared & Analyzed: 10/01/19					
Fluoride	0.0320	mg/L							
<b>Calibration Blank (B922473-CCB2)</b>				Prepared & Analyzed: 10/01/19					
Fluoride	0.0300	mg/L							
<b>Calibration Check (B922473-CCV1)</b>				Prepared & Analyzed: 10/01/19					
Fluoride	0.724	mg/L		0.7000		103	90-110		
<b>Calibration Check (B922473-CCV2)</b>				Prepared & Analyzed: 10/01/19					
Fluoride	0.678	mg/L		0.7000		97	90-110		
<b>Matrix Spike (B922473-MS1)</b>				Sample: 9094919-01 Prepared & Analyzed: 10/01/19					
Fluoride	1.11	mg/L		0.5000	0.656	92	80-120		
<b>Matrix Spike (B922473-MS2)</b>				Sample: 9094991-01 Prepared & Analyzed: 10/01/19					
Fluoride	1.38	mg/L		0.5000	0.794	117	80-120		
<b>Matrix Spike (B922473-MS3)</b>				Sample: 9095444-01 Prepared & Analyzed: 10/01/19					
Fluoride	1.17	mg/L		0.5000	0.578	119	80-120		
<b>Matrix Spike (B922473-MS4)</b>				Sample: 9095255-01 Prepared & Analyzed: 10/01/19					
Fluoride	1.72	mg/L		0.5000	1.14	114	80-120		



QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B922473 - No Prep - SM 4500F C 1997</u></b>									
<b>Matrix Spike (B922473-MS5)</b>	<b>Sample: 9095522-01</b>			Prepared & Analyzed: 10/01/19					
Fluoride	0.710	mg/L		0.5000	0.177	107	80-120		
<b>Matrix Spike (B922473-MS6)</b>	<b>Sample: 9100167-01</b>			Prepared & Analyzed: 10/01/19					
Fluoride	0.912	mg/L		0.5000	0.369	109	80-120		
<b>Matrix Spike Dup (B922473-MSD1)</b>	<b>Sample: 9094919-01</b>			Prepared & Analyzed: 10/01/19					
Fluoride	1.30	mg/L	Q2	0.5000	0.656	130	80-120	16	20
<b>Matrix Spike Dup (B922473-MSD2)</b>	<b>Sample: 9094991-01</b>			Prepared & Analyzed: 10/01/19					
Fluoride	1.43	mg/L	Q2	0.5000	0.794	126	80-120	3	20
<b>Matrix Spike Dup (B922473-MSD3)</b>	<b>Sample: 9095444-01</b>			Prepared & Analyzed: 10/01/19					
Fluoride	1.17	mg/L		0.5000	0.578	119	80-120	0.2	20
<b>Matrix Spike Dup (B922473-MSD4)</b>	<b>Sample: 9095255-01</b>			Prepared & Analyzed: 10/01/19					
Fluoride	1.73	mg/L		0.5000	1.14	118	80-120	0.9	20
<b>Matrix Spike Dup (B922473-MSD5)</b>	<b>Sample: 9095522-01</b>			Prepared & Analyzed: 10/01/19					
Fluoride	0.692	mg/L		0.5000	0.177	103	80-120	3	20
<b>Matrix Spike Dup (B922473-MSD6)</b>	<b>Sample: 9100167-01</b>			Prepared & Analyzed: 10/01/19					
Fluoride	0.928	mg/L		0.5000	0.369	112	80-120	2	20
<b><u>Batch B922526 - No Prep - SM 2320B 1997</u></b>									
<b>Blank (B922526-BLK1)</b>				Prepared & Analyzed: 10/01/19					
Alkalinity - total as CaCO3	1.00	mg/L							
<b>LCS (B922526-BS1)</b>				Prepared & Analyzed: 10/01/19					
Alkalinity - total as CaCO3	100	mg/L		98.80		101	85-115		
<b>Duplicate (B922526-DUP1)</b>	<b>Sample: 9094931-03</b>			Prepared & Analyzed: 10/01/19					
Alkalinity - total as CaCO3	185	mg/L			185			0	20
<b>Duplicate (B922526-DUP2)</b>	<b>Sample: 9095480-01</b>			Prepared & Analyzed: 10/01/19					
Alkalinity - total as CaCO3	290	mg/L			295			2	20
<b><u>Batch B922935 - 6020 Sol no prep - EPA 6020A</u></b>									
<b>Blank (B922935-BLK1)</b>				Prepared & Analyzed: 10/07/19					
Antimony	< 1.4	ug/L							
Arsenic	< 0.59	ug/L							
Barium	< 0.18	ug/L							
Beryllium	< 0.33	ug/L							
Boron	< 4.5	ug/L							
Cadmium	< 0.12	ug/L							
Calcium	< 0.056	mg/L							
Chromium	< 0.25	ug/L							
Cobalt	< 0.054	ug/L							
Iron	< 5.3	ug/L							
Lead	< 0.092	ug/L							
Magnesium	< 0.017	mg/L							
Manganese	< 0.11	ug/L							
Mercury	< 0.057	ug/L							
Molybdenum	< 0.17	ug/L							



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B922935 - 6020 Sol no prep - EPA 6020A</u></b>									
<b>Blank (B922935-BLK1)</b>					Prepared & Analyzed: 10/07/19				
Potassium	< 0.060	mg/L							
Selenium	< 0.79	ug/L							
Sodium	< 0.035	mg/L							
Thallium	< 0.31	ug/L							
<b>LCS (B922935-BS1)</b>					Prepared & Analyzed: 10/07/19				
Antimony	254	ug/L		250.0		102	80-120		
Arsenic	246	ug/L		250.0		98	80-120		
Barium	243	ug/L		250.0		97	80-120		
Beryllium	241	ug/L		250.0		97	80-120		
Boron	2430	ug/L		2500		97	80-120		
Cadmium	243	ug/L		250.0		97	80-120		
Calcium	25.2	mg/L		25.00		101	80-120		
Chromium	244	ug/L		250.0		98	80-120		
Cobalt	258	ug/L		250.0		103	80-120		
Iron	25000	ug/L		25000		100	80-120		
Lead	249	ug/L		250.0		100	80-120		
Magnesium	25.2	mg/L		25.00		101	80-120		
Manganese	241	ug/L		250.0		96	80-120		
Mercury	23.6	ug/L		25.00		94	80-120		
Molybdenum	239	ug/L		250.0		96	80-120		
Potassium	26.3	mg/L		25.00		105	80-120		
Selenium	252	ug/L		250.0		101	80-120		
Sodium	25.7	mg/L		25.00		103	80-120		
Thallium	244	ug/L		250.0		98	80-120		
<b>Matrix Spike (B922935-MS1)</b>			<b>Sample: 9092923-01</b>		Prepared & Analyzed: 10/07/19				
Antimony	258	ug/L		250.0	ND	103	75-125		
Arsenic	248	ug/L		250.0	ND	99	75-125		
Barium	272	ug/L		250.0	26.6	98	75-125		
Beryllium	254	ug/L		250.0	ND	102	75-125		
Boron	2560	ug/L		2500	18.6	101	75-125		
Cadmium	248	ug/L		250.0	ND	99	75-125		
Calcium	99.8	mg/L		25.00	76.2	94	75-125		
Chromium	246	ug/L		250.0	ND	99	75-125		
Cobalt	257	ug/L		250.0	0.370	103	75-125		
Iron	27100	ug/L		25000	2020	100	75-125		
Lead	253	ug/L		250.0	ND	101	75-125		
Magnesium	62.1	mg/L		25.00	38.0	97	75-125		
Manganese	339	ug/L		250.0	97.8	96	75-125		
Mercury	24.1	ug/L		25.00	ND	96	75-125		
Molybdenum	246	ug/L		250.0	0.175	98	75-125		
Potassium	27.3	mg/L		25.00	0.523	107	75-125		
Selenium	257	ug/L		250.0	ND	103	75-125		
Sodium	35.5	mg/L		25.00	9.57	104	75-125		
Thallium	250	ug/L		250.0	ND	100	75-125		



QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B922935 - 6020 Sol no prep - EPA 6020A</u></b>									
<b>Matrix Spike (B922935-MS2)</b>		<b>Sample: 9093828-02</b>			<b>Prepared &amp; Analyzed: 10/07/19</b>				
Antimony	253	ug/L		250.0	ND	101	75-125		
Arsenic	246	ug/L		250.0	ND	98	75-125		
Barium	404	ug/L		250.0	163	97	75-125		
Beryllium	239	ug/L		250.0	ND	95	75-125		
Boron	2460	ug/L		2500	52.4	96	75-125		
Cadmium	244	ug/L		250.0	ND	97	75-125		
Calcium	224	mg/L		25.00	205	76	75-125		
Chromium	242	ug/L		250.0	ND	97	75-125		
Cobalt	251	ug/L		250.0	1.10	100	75-125		
Iron	27100	ug/L		25000	2390	99	75-125		
Lead	242	ug/L		250.0	ND	97	75-125		
Magnesium	118	mg/L		25.00	96.4	85	75-125		
Manganese	422	ug/L		250.0	188	93	75-125		
Mercury	24.0	ug/L		25.00	ND	96	75-125		
Molybdenum	246	ug/L		250.0	1.08	98	75-125		
Potassium	28.9	mg/L		25.00	2.30	106	75-125		
Selenium	250	ug/L		250.0	ND	100	75-125		
Sodium	45.0	mg/L		25.00	19.9	101	75-125		
Thallium	241	ug/L		250.0	ND	96	75-125		
<b>Matrix Spike (B922935-MS3)</b>		<b>Sample: 9094847-16</b>			<b>Prepared &amp; Analyzed: 10/07/19</b>				
Antimony	257	ug/L		250.0	ND	103	75-125		
Arsenic	246	ug/L		250.0	ND	98	75-125		
Barium	290	ug/L		250.0	53.5	94	75-125		
Beryllium	239	ug/L		250.0	ND	96	75-125		
Boron	8190	ug/L		2500	5950	89	75-125		
Cadmium	240	ug/L		250.0	ND	96	75-125		
Calcium	619	mg/L	E, Q4	25.00	635	NR	75-125		
Chromium	241	ug/L		250.0	ND	96	75-125		
Cobalt	258	ug/L		250.0	0.670	103	75-125		
Iron	24900	ug/L		25000	ND	100	75-125		
Lead	247	ug/L		250.0	ND	99	75-125		
Magnesium	84.2	mg/L		25.00	62.3	88	75-125		
Manganese	391	ug/L		250.0	160	92	75-125		
Mercury	23.8	ug/L		25.00	ND	95	75-125		
Molybdenum	263	ug/L		250.0	20.2	97	75-125		
Potassium	64.7	mg/L		25.00	40.9	95	75-125		
Selenium	254	ug/L		250.0	ND	102	75-125		
Sodium	126	mg/L		25.00	105	82	75-125		
Thallium	246	ug/L		250.0	ND	98	75-125		
<b>Matrix Spike Dup (B922935-MSD1)</b>		<b>Sample: 9092923-01</b>			<b>Prepared &amp; Analyzed: 10/07/19</b>				
Antimony	255	ug/L		250.0	ND	102	75-125	1	20
Arsenic	245	ug/L		250.0	ND	98	75-125	1	20
Barium	266	ug/L		250.0	26.6	96	75-125	2	20
Beryllium	247	ug/L		250.0	ND	99	75-125	3	20



QC SAMPLE RESULTS

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B922935 - 6020 Sol no prep - EPA 6020A</u></b>									
<b>Matrix Spike Dup (B922935-MSD1)</b>	<b>Sample: 9092923-01</b>			<b>Prepared &amp; Analyzed: 10/07/19</b>					
Boron	2540	ug/L		2500	18.6	101	75-125	0.5	20
Cadmium	244	ug/L		250.0	ND	98	75-125	1	20
Calcium	99.2	mg/L		25.00	76.2	92	75-125	0.6	20
Chromium	244	ug/L		250.0	ND	97	75-125	1	20
Cobalt	255	ug/L		250.0	0.370	102	75-125	0.6	20
Iron	26800	ug/L		25000	2020	99	75-125	1	20
Lead	246	ug/L		250.0	ND	98	75-125	3	20
Magnesium	61.2	mg/L		25.00	38.0	93	75-125	1	20
Manganese	335	ug/L		250.0	97.8	95	75-125	1	20
Mercury	24.3	ug/L		25.00	ND	97	75-125	1	20
Molybdenum	242	ug/L		250.0	0.175	97	75-125	2	20
Potassium	27.0	mg/L		25.00	0.523	106	75-125	1	20
Selenium	252	ug/L		250.0	ND	101	75-125	2	20
Sodium	35.1	mg/L		25.00	9.57	102	75-125	1	20
Thallium	244	ug/L		250.0	ND	97	75-125	3	20
<b>Matrix Spike Dup (B922935-MSD2)</b>	<b>Sample: 9093828-02</b>			<b>Prepared &amp; Analyzed: 10/07/19</b>					
Antimony	256	ug/L		250.0	ND	103	75-125	1	20
Arsenic	248	ug/L		250.0	ND	99	75-125	0.9	20
Barium	419	ug/L		250.0	163	102	75-125	4	20
Beryllium	239	ug/L		250.0	ND	96	75-125	0.3	20
Boron	2520	ug/L		2500	52.4	99	75-125	2	20
Cadmium	245	ug/L		250.0	ND	98	75-125	0.5	20
Calcium	228	mg/L		25.00	205	89	75-125	1	20
Chromium	244	ug/L		250.0	ND	98	75-125	1	20
Cobalt	251	ug/L		250.0	1.10	100	75-125	0.2	20
Iron	27500	ug/L		25000	2390	100	75-125	1	20
Lead	244	ug/L		250.0	ND	98	75-125	0.6	20
Magnesium	119	mg/L		25.00	96.4	90	75-125	0.9	20
Manganese	427	ug/L		250.0	188	96	75-125	1	20
Mercury	23.9	ug/L		25.00	ND	96	75-125	0.6	20
Molybdenum	248	ug/L		250.0	1.08	99	75-125	0.5	20
Potassium	29.2	mg/L		25.00	2.30	108	75-125	1	20
Selenium	253	ug/L		250.0	ND	101	75-125	1	20
Sodium	45.6	mg/L		25.00	19.9	103	75-125	1	20
Thallium	242	ug/L		250.0	ND	97	75-125	0.6	20
<b>Matrix Spike Dup (B922935-MSD3)</b>	<b>Sample: 9094847-16</b>			<b>Prepared &amp; Analyzed: 10/07/19</b>					
Antimony	254	ug/L		250.0	ND	101	75-125	1	20
Arsenic	245	ug/L		250.0	ND	98	75-125	0.1	20
Barium	287	ug/L		250.0	53.5	94	75-125	0.7	20
Beryllium	240	ug/L		250.0	ND	96	75-125	0.6	20
Boron	8140	ug/L		2500	5950	87	75-125	0.6	20
Cadmium	239	ug/L		250.0	ND	95	75-125	0.3	20
Calcium	615	mg/L	E, Q4	25.00	635	NR	75-125	0.7	20
Chromium	241	ug/L		250.0	ND	96	75-125	0.1	20



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B922935 - 6020 Sol no prep - EPA 6020A</u></b>									
<b>Matrix Spike Dup (B922935-MSD3)</b>	<b>Sample: 9094847-16</b>			<b>Prepared &amp; Analyzed: 10/07/19</b>					
Cobalt	258	ug/L		250.0	0.670	103	75-125	0.09	20
Iron	25000	ug/L		25000	ND	100	75-125	0.4	20
Lead	241	ug/L		250.0	ND	96	75-125	2	20
Magnesium	84.0	mg/L		25.00	62.3	87	75-125	0.2	20
Manganese	389	ug/L		250.0	160	92	75-125	0.5	20
Mercury	24.0	ug/L		25.00	ND	96	75-125	1	20
Molybdenum	262	ug/L		250.0	20.2	97	75-125	0.3	20
Potassium	64.3	mg/L		25.00	40.9	94	75-125	0.5	20
Selenium	252	ug/L		250.0	ND	101	75-125	0.7	20
Sodium	124	mg/L		25.00	105	77	75-125	1	20
Thallium	243	ug/L		250.0	ND	97	75-125	1	20
<b><u>Batch B923822 - 6010 Sol no prep - EPA 6010B</u></b>									
<b>Blank (B923822-BLK1)</b>				<b>Prepared &amp; Analyzed: 10/15/19</b>					
Strontium	< 0.0050	mg/L							
<b>LCS (B923822-BS1)</b>				<b>Prepared &amp; Analyzed: 10/15/19</b>					
Strontium	0.535	mg/L		0.5000		107	80-120		
<b>Matrix Spike (B923822-MS1)</b>	<b>Sample: 9094847-01</b>			<b>Prepared &amp; Analyzed: 10/15/19</b>					
Strontium	6.75	mg/L	Q1	0.5000	1.36	NR	75-125		
<b>Matrix Spike Dup (B923822-MSD1)</b>	<b>Sample: 9094847-01</b>			<b>Prepared &amp; Analyzed: 10/15/19</b>					
Strontium	6.64	mg/L	Q2	0.5000	1.36	NR	75-125	2	20



NOTES

Specifications regarding method revisions and method modifications used for analysis are available upon request. Please contact your project manager.

\* Not a TNI accredited analyte

**Certifications**

CHI - McHenry, IL - 4314-A W. Crystal Lake Road, McHenry, IL 60050

TNI Accreditation for Drinking Water and Wastewater Fields of Testing through IL EPA Accreditation No. 100279  
Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL - 2231 W. Altorfer Drive, Peoria, IL 61615

TNI Accreditation for Drinking Water, Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. 100230

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory Registry No. 17553

Drinking Water Certifications/Accreditations: Iowa (240); Kansas (E-10338); Missouri (870)

Wastewater Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

Solid and Hazardous Material Certifications/Accreditations: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO - 1805 W Sunset Street, Springfield, MO 65807

USEPA DMR-QA Program

STL - Hazelwood, MO - 944 Anglum Rd, Hazelwood, MO 63042

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through KS KDHE Certification No. E-10389

TNI Accreditation for Wastewater, Solid and Hazardous Material Fields of Testing through IL EPA Accreditation No. - 200080

Illinois Department of Public Health Bacterial Analysis in Drinking Water Approved Laboratory, Registry No. 171050

Missouri Department of Natural Resources - Certificate of Approval for Microbiological Laboratory Service - No. 1050

**Qualifiers**

- E Estimated - concentration exceeds the instrument calibration range.
- H Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.
- Q1 Matrix Spike failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
- Q2 Matrix Spike Duplicate failed % recovery acceptance limits. The associated blank spike recovery was acceptable.
- Q4 The matrix spike recovery result is unusable since the analyte concentration in the sample is greater than four times the spike level. The associated blank spike was acceptable.



Certified by: Erin Lane For Gail Schindler, Project Manager



**Table C-1**  
**Column Test Results: Arsenic, Boron, Lithium, and Molybdenum**

Groundwater	Sampling Point	Sample ID	Sample Date and Time	Elapsed Time (days)	Flow Rate (mL/min)	Pore Volumes	pH	Specific Conductivity (µS/cm)	Boron (µg/L)	Lithium (µg/L)	Molybdenum (µg/L)
Mountaineer	Influent Reservoir	AEP-COL-MN-INF-081919 *	8/19/2019 17:00	3.7	NA	NA	--	--	7800	100	67
		AEP-COL-MN-INF-082019	8/20/2019 17:00	4.7	NA	NA	7.32	2,500	--	--	--
		AEP-COL-MN-INF-082319	8/23/2019 17:00	7.7	NA	NA	7.36	2,510	--	--	--
		AEP-COL-MN-INF-082719	8/27/2019 17:00	11.7	NA	NA	7.28	2,500	8000	110	60
		AEP-COL-MN-INF-083019	8/30/2019 17:00	14.7	NA	NA	7.34	2,520	--	--	--
		AEP-COL-MN-INF-090319	9/3/2019 17:00	18.7	NA	NA	7.49	2,540	--	--	--
		AEP-COL-MN-INF-090619	9/6/2019 17:00	21.7	NA	NA	7.9	2,420	7500	100	66
		AEP-COL-MN-INF-091019	9/10/2019 17:00	25.7	NA	NA	7.82	2,350	--	--	--
		AEP-COL-MN-INF-091319	9/13/2019 17:00	28.7	NA	NA	7.86	2,330	--	--	--
	Treatment Column Effluent	AEP_COL_MN_TE_082019	8/20/2019 17:00	4.7	0.30	16.1	7.86	3,470	370	2.5	49
		AEP_COL_MN_TE_082319	8/23/2019 17:00	7.7	0.30	26.3	7.90	3,500	4,600	5.5	25
		AEP_COL_MN_TE_082719	8/27/2019 17:00	11.7	0.30	39.9	8.36	3,710	6,000	4.3	20
		AEP_COL_MN_TE_083019	8/30/2019 17:00	14.7	0.29	50.1	8.24	3,540	6,300	3.8	16
		AEP_COL_MN_TE_090319	9/3/2019 17:00	18.7	0.27	63.8	8.15	3,590	6,800	3.3	15
		AEP_COL_MN_TE_090619	9/6/2019 17:00	21.7	0.29	74.0	7.96	3,470	6,900	4.4	14
		AEP_COL_MN_TE_091019	9/10/2019 17:00	25.7	0.26	87.6	8.48	3,270	6,700	8.0	11
		AEP_COL_MN_TE_091319	9/13/2019 17:00	28.7	0.28	97.9	8.16	3,450	6,900	3.6	11
	Soil Column Effluent	AEP_COL_MN_SE_081619	8/16/2019 17:00	0.7	0.30	2.4	7.86	3,480	91	9.2	160
AEP_COL_MN_SE_091019		9/11/2019 17:00	26.7	0.30	91.1	NA	3,290	6,200	3.8	17	

Notes:

-- not measured

µS/cm: microsiemens per centimeter

mg/L: milligrams per liter

mL/min: milliliters per minute

NA: not available

SC: specific conductance

U: Analyte was not detected. Reported value is the method detection limit.

\*: Sample bottles were swapped before analysis (corrected)

**Table C-2**  
**Column Test Results: Coal Combustion Residual Appendix III/IV Constituents (Metals)**

Groundwater	Sampling Point	Date and Time	Elapsed Time (d)	Pore Volume (-)	Sample ID	Antimony (µg/L)		Arsenic (µg/L)		Barium (µg/L)	Beryllium (µg/L)		Boron (µg/L)	Cadmium (µg/L)		Calcium (mg/L)		Chromium (µg/L)		Cobalt (µg/L)	Iron (µg/L)		Lead (µg/L)		Lithium (µg/L)	Magnesium (mg/L)	Manganese (µg/L)	Mercury (µg/L)		Molybdenum (µg/L)
							U		U			U			U		U		U		U		U		U		U			
Mountaineer	Influent reservoir	8/19/19 17:00	3.7	12.6	AEP-COL-MN-INF-081919 *	0.25	U	0.16		49	0.054	U	7,800	0.12		280	0.25	U	1.2	--		0.070	U	100	--	--	0.065		67	
	Influent reservoir	8/27/19 17:00	11.7	39.9	AEP_COL_MN_INF_082719	0.25	U	0.94		49	0.18		8,000	0.36		340	6.0		1.6	260		3.6		110	72	1,000	0.04	H	60	
	Influent reservoir	9/6/19 17:00	21.7	74.0	AEP_COL_MN_INF_090619	0.25	U	0.14		45	0.054	U	7,500	0.11		290	0.25	U	1.2	2.5	U	0.070	U	100	79	1,100	0.034	H	66	
	Treatment Column Effluent	8/27/19 17:00	11.7	39.9	AEP_COL_MN_TE_082719	0.25	U	0.18		54	0.054	U	6,000	0.049	U	640	0.25	U	0.67	4.0		0.070	U	4.3	62	160	0.034	H	20	
	Treatment Column Effluent	9/10/19 17:00	25.7	87.6	AEP_COL_MN_TE_091019	0.25	U	0.22		41	0.054	U	6,700	0.049	U	620	0.25	U	0.74	6.3		0.070	U	8.0	66	230	0.034	U	11	
	Soil Column Effluent	8/16/2019 17:00	0.7	2.4	AEP_COL_MN_SE_081919	0.25	U	0.088	U	56	0.054	U	91	0.32		610	0.25	U	2	2.5	U	0.070	U	9.2	17	2,000	0.034	H	160	
	Soil Column Effluent	9/10/2019 17:00	25.7	91.1	AEP_COL_MN_SE_091019	0.25	U	0.28		45	0.054	U	6,200	0.049	U	630	0.25	U	1.5	2.5	U	0.070	U	3.8	68	830	0.034	U	17	

Notes:

-- not measured

H: Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time

µg/L: micrograms per liter

mg/L: milligrams per liter

U: Analyte was not detected. Reported value is the method detection limit.

\*: Sample bottles were swapped before analysis (corrected)

**Table C-3****Column Test Results:Coal Combustion Residual Appendix III/IV Constituents (Alkalinity and Anions)**

Groundwater	Sampling Point	Date & Time	Elapsed time (d)	Pore Volume (-)	Sample ID	Alkalinity (mg/L as CaCO3)		Bromide (mg/L)		Chloride (mg/L)		Fluoride (mg/L)		Sulfate (mg/L)	
Mountaineer	Influent reservoir	8/19/19 17:00	3.7	12.6	AEP-COL-MN-INF-081919 *	--		--		--		--		680	U
	Influent reservoir	9/24/19 14:20	After termination		AEP_COL_MN_INF_092419	220		1.8		240		0.292		680	
	Soil Column Effluent	8/16/2019 17:00	0.7	2.4	AEP_COL_MN_SE_081919	12	H	1.8	H	240	H	0.613	H	1800	H
	Soil Column Effluent	9/10/2019 17:00	25.7	91.1	AEP_COL_MN_SE_091019	22	H	1.8		250		0.256		1700	

Notes:

-- not measured

H: Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time

µg/L: micrograms per liter

mg/L: milligrams per liter

U: Analyte was not detected. Reported value is the method detecton limit.

\*: Sample bottles were swapped before analysis (corrected)

## Attachment D

# 24-Hour Screening and Kinetic Batch Test Results

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**Table D**  
**24-Hour Screening and Kinetic Batch Test Results**

Groundwater	Media	L/S	Time (hr)	Sample ID	Type	pH	ORP (mV)	Total Dissolved Solids (ppm)	Arsenic (µg/L)	Barium (µg/L)	Boron (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Lead (µg/L)	Lithium (µg/L)						
Mountaineer	Control	NA	0	0MT_002_t0		6.99	232.0	1,500	0.54	B	47	8100	0.94	U	1.8	J	0.37	J	110		
Mountaineer	Control	NA	0	0MT_052_t0	D	6.99	232.0	1,700	0.47	J	59	9400	9.0		1.8	J	0.88	J	110		
Mountaineer	Basic Oxygen Furnace Slag	5	24	1MT2_802BF_5_t24		11.80	-55.3	2,440	0.81	U	160	5300	160		0.60	U	0.38	U	100		
Mountaineer	Basic Oxygen Furnace Slag	5	48	2MT2_802BF_5_t48		12.19	-73.3	3,720				5300			0.16	J			110		
Mountaineer	Basic Oxygen Furnace Slag	5	192	8MT2_802BF_5_t192		12.48	-65.3	6,130			480	3200	260		0.10	J	2.6		110		
Mountaineer	Basic Oxygen Furnace Slag	5	192	8MT2_852BF_5_t192	D	12.48	-65.3	6,130			480	3200	240		0.064	U	2.1		110		
Mountaineer	Basic Oxygen Furnace Slag	10	24	1MT1_801BF_10_t24		11.32	-37.3	1,570	0.81	U	92	6800	J	110	0.60	U	0.38	U	110		
Mountaineer	Basic Oxygen Furnace Slag	10	48	2MT2_801BF_10_t48		11.98	-54.9	2,430				6200			0.20	J			120		
Mountaineer	Basic Oxygen Furnace Slag	10	96	4MT2_801BF_10_t96		12.20	-34.5	3,800				5800			0.14	J			110		
Mountaineer	Basic Oxygen Furnace Slag	10	192	8MT2_801BF_10_t192		12.35	-58.4	4,390			230	5000	140		0.080	J	3.3		110		
Mountaineer	Basic Oxygen Furnace Slag	10	192	8MT2_851BF_10_t192	D	12.35	-58.4	4,390			240	5300	150		0.11	J	3.6		120		
Mountaineer	Carus B Removal Media	5	24	1MT1_302B_5_t24		11.87	-96.6	4,630	2.0		410	630	3.1	J	0.32	J	2.1		200		
Mountaineer	Carus B Removal Media	5	192	8MT1_302B_5_t192		12.19	-73.8	5,100			290	2700	7.5		0.83	J	0.96		220		
Mountaineer	Carus B Removal Media	10	24	1MT1_301B_10_t24		11.82	-95.9	3,360	0.088	U	160	42	0.66	J	0.064	U	1.3		140		
Mountaineer	Carus B Removal Media	10	48	2MT1_301B_10_t48		12.23	-78.8	3,620				220			0.064	U			160		
Mountaineer	Carus B Removal Media	10	96	4MT1_301B_10_t96		12.16	-61.8	3,900				160			0.064	U			180		
Mountaineer	Carus B Removal Media	10	192	8MT1_301B_10_t192		12.08	-64.3	3,960			180	110	0.37	J	0.064	U	0.58		200		
Mountaineer	Carus MMO II	5	24	1MT1_502Kc_5_t24		7.16	158.1	2,750	0.30	J	100	1800	64		1.8	J	0.12	J	4.0	J	
Mountaineer	Carus MMO II	5	192	8MT1_502Kc_5_t192		7.76	2.8	2,920			80	700	97		1.2	J	0.07	U	0.1	U	
Mountaineer	Carus MMO II	5	192	8MT1_552Kc_5_t192	D	7.76	2.8	2,920			73	820	93		0.84	J	0.07	U	0.1	U	
Mountaineer	Carus MMO II	10	24	1MT1_501Kc_10_t24		7.09	174.7	2,500	0.53	J	110	3800	39		4.1		0.31		9.4		
Mountaineer	Carus MMO II	10	48	2MT1_501Kc_10_t48		7.83	110.2	2,570				2600			1.0	J			7.9	J	
Mountaineer	Carus MMO II	10	96	4MT1_501Kc_10_t96		7.02	78.6	2,640				1900			8.2				1.3	J	
Mountaineer	Carus MMO II	10	192	8MT1_501Kc_10_t192		7.28	16.1	2,570			97	1400	67		5.1		0.08	J	0.1	U	
Mountaineer	Carus MMO II	10	192	8MT1_551Kc_10_t192	D	7.28	16.1	2,570			75	1500	67		1.4		0.07	U	0.1	U	
Mountaineer	Carus MMO	5	24	1MT1_602MM_5_t24		8.33	129.0	2,130	0.42	J	0.73	2700	270		0.76	J	0.07	U	5.6	J	
Mountaineer	Carus MMO	5	192	8MT1_602MM_5_t192		8.67	9.6	2,190			3.0	2000	350		1.3	J	0.07	U	0.1	U	
Mountaineer	Carus MMO	5	192	8MT1_652MM_5_t192	D	8.67	9.6	2,190			0.22	1900	380		0.74	J	0.07	U	0.1	U	
Mountaineer	Carus MMO	10	24	1MT1_601MM_10_t24		8.14	134.9	1,940	0.31	J	0.22	J	4900	150	0.55	J	0.07	U	5.4	J	
Mountaineer	Carus MMO	10	48	2MT1_601MM_10_t48		8.61	80.9	1,970				4300			1.2				1.9		
Mountaineer	Carus MMO	10	96	4MT1_601MM_10_t96		8.48	53.1	2,150				3800			1.2	J			0.35	J	
Mountaineer	Carus MMO	10	192	8MT1_601MM_10_t192		8.53	9.4	2,030			1.1	3600	230		1.1	J	0.07	U	0.14	J	
Mountaineer	Carus MMO	10	192	8MT1_651MM_10_t192	D	8.53	9.4	2,030			0.62	J	3600	220		1.2	J	0.07	U	0.1	U
Mountaineer	Cleanit	5	24	1MT1_202Cl_5_t24		6.41	34.5	1,390	0.088	U	41	8300	0.64	J	0.69	J	0.07	U	120		
Mountaineer	Cleanit	5	192	8MT1_202Cl_5_t192		6.92	-227.5	1,260			56	8100	0.25	U	0.085	J	0.07	U	130		
Mountaineer	Cleanit	5	192	8MT1_252Cl_5_t192	D	6.92	-227.5	1,260			52	7900	0.54	J	0.16	J	0.07	U	130		
Mountaineer	Cleanit	10	24	1MT1_201Cl_10_t24		6.44	-98.0	1,490	0.088	U	22	5100	0.42		0.98	J	0.12	J	150		
Mountaineer	Cleanit	10	48	2MT1_201Cl_10_t48		7.08	108.3	1,410				8400			0.44				120		
Mountaineer	Cleanit	10	96	4MT1_201Cl_10_t96		5.68	-234.9	1,430				8600			0.11	J			120		
Mountaineer	Cleanit	10	192	8MT1_201Cl_10_t192		5.69	-465.7	1,280			30	8400	0.25	U	0.064	U	0.07	U	120		
Mountaineer	Cleanit	10	192	8MT1_251Cl_10_t192	D	5.69	-465.7	1,280			29	8600	0.28	J	0.064	U	0.07	U	120		
Mountaineer	Copperhill Slag	5	24	1MT1_402SL_5_t24		6.34	187.7	2,050	0.42	J	13	8300	0.38	J	4.9		11		110		
Mountaineer	Copperhill Slag	5	192	8MT1_402SL_5_t192		6.64	84.3	2,150			13	7800	0.46	J	1.4	J	3.1		100		
Mountaineer	Copperhill Slag	5	192	8MT1_452SL_5_t192	D	6.64	84.3	2,150			11	8100	0.40	J	1.8	J	18		100		

**Table D**  
**24-Hour Screening and Kinetic Batch Test Results**

Groundwater	Media	L/S	Time (hr)	Sample ID	Type	pH	ORP (mV)	Total Dissolved Solids (ppm)	Arsenic (µg/L)	Barium (µg/L)	Boron (µg/L)	Chromium (µg/L)	Cobalt (µg/L)	Lead (µg/L)	Lithium (µg/L)				
Mountaineer	Copperhill Slag	10	24	1MT1_401SL_10_t24		6.41	232.0	2,070	0.23	J	17	8000	0.30	3.9	J	4.2	110		
Mountaineer	Copperhill Slag	10	48	2MT1_401SL_10_t48		7.03	118.7	1,760				8600		2.5			110		
Mountaineer	Copperhill Slag	10	96	4MT1_401SL_10_t96		6.33	91.7	2,270				8500		1.6	J		110		
Mountaineer	Copperhill Slag	10	192	8MT1_401SL_10_t192		6.61	79.8	2,120			14	8300	1.1	J	1.4	J	12	110	
Mountaineer	Copperhill Slag	10	192	8MT1_451SL_10_t192	D	6.61	79.8	2,120			14	8100	0.60	J	1.1	J	1.2	110	
Mountaineer	Sand	5	24	1MT1_102a_5_t24		6.69	183.0	1,490	0.38	J	50	8800	0.32	J	1.4	J	0.13	J	110
Mountaineer	Sand	5	192	8MT1_102Sa_5_t192		7.44	102.9	1,520			52	8900	0.50	J	1.3	J	0.07	U	110
Mountaineer	Sand	5	192	8MT1_152Sa_5_t192	D	7.44	102.9	1,520			49	8800	1.1	J	1.3	J	0.07	U	110
Mountaineer	Sand	10	24	1MT1_101Sa_10_t24		7.26	180.4	1,500	0.31	J	50	9300	0.30	J	1.4	J	0.08	J	110
Mountaineer	Sand	10	48	2MT1_101Sa_10_t48		7.44	145.3	1,370				9300		1.5				110	
Mountaineer	Sand	10	96	4MT1_101Sa_10_t96		7.21	118.0	1,550				8800		1.5				110	
Mountaineer	Sand	10	192	8MT1_101Sa_10_t192		7.31	108.0	1,500			51	9000	0.41	J	1.5		0.07	U	110
Mountaineer	Sand	10	192	8MT1_151Sa_10_t192	D	7.31	108.0	1,500			48	9000	0.25	U	1.4	J	0.07	U	110
Mountaineer	Zeravalent Iron	5	24	1MT1_702ZV_5_t24		6.68	-66.8	1,120	0.088	U	92	6800	0.64	J	3.1		0.36	J	100
Mountaineer	Zeravalent Iron	5	192	8MT1_702ZV_5_t192		7.75	-322.0	1,450			64	3900	2.2		0.20	J	1.5		84
Mountaineer	Zeravalent Iron	5	192	8MT1_752ZV_5_t192	D	7.75	-322.0	1,450			61	3800	0.87	J	0.14	J	0.67	J	82
Mountaineer	Zeravalent Iron	10	24	1MT1_701ZV_10_t24		7.14	-147.3	1,330	0.12	J	79	7700	1.1	J	3.8		0.36	J	110
Mountaineer	Zeravalent Iron	10	48	2MT1_701ZV_10_t48		7.40	-76.4	1,500				7300		1.1					99
Mountaineer	Zeravalent Iron	10	96	4MT1_701ZV_10_t96		7.55	-205.9	1,500				6500		0.36	J				96
Mountaineer	Zeravalent Iron	10	192	8MT1_701ZV_10_t192		7.64	-494.1	1,430			65	5600	0.88	J	0.16	J	0.53	J	95
Mountaineer	Zeravalent Iron	10	192	8MT1_751ZV_10_t192	D	7.64	-494.1	1,430			45	4200	5.6		0.13	J	0.36	J	94

**Table D**  
**24-Hour Screening and Kinetic Batch Test Results**

Groundwater	Media	L/S	Time (hr)	Sample ID	Mercury (µg/L)		Molybdenum (µg/L)		Selenium (µg/L)		Thallium (µg/L)		Iron (µg/L)		Manganese (µg/L)		Calcium (mg/L)		Sulfate (mg/L)		Data Quality Notes
Mountaineer	Control	NA	0	0MT_002_t0	0.060	J	72		11		0.21	J	15		1100		290		750		
Mountaineer	Control	NA	0	0MT_052_t0	0.044	U	82		12		0.24	J	2.4	U	1200		330		760		
Mountaineer	Basic Oxygen Furnace Slag	5	24	1MT2_802BF_5_t24	0.17	U	51		9.6		0.71	U	54		3.6		430				
Mountaineer	Basic Oxygen Furnace Slag	5	48	2MT2_802BF_5_t48			54														
Mountaineer	Basic Oxygen Furnace Slag	5	192	8MT2_802BF_5_t192	0.034	U	51		12		0.068	J	1900		450		1000		450		
Mountaineer	Basic Oxygen Furnace Slag	5	192	8MT2_852BF_5_t192	0.085	J	50		12		0.068	U	330		93		970		480		
Mountaineer	Basic Oxygen Furnace Slag	10	24	1MT1_801BF_10_t24	0.17	U	58		8.8		0.71	U	56		4.0	J	360				
Mountaineer	Basic Oxygen Furnace Slag	10	48	2MT2_801BF_10_t48			58														
Mountaineer	Basic Oxygen Furnace Slag	10	96	4MT2_801BF_10_t96			57														
Mountaineer	Basic Oxygen Furnace Slag	10	192	8MT2_801BF_10_t192	0.045	J	54		11		0.068	U	39		18		690		570		
Mountaineer	Basic Oxygen Furnace Slag	10	192	8MT2_851BF_10_t192	0.035	J	57		11		0.068	U	58		29		730		580		
Mountaineer	Carus B Removal Media	5	24	1MT1_302B_5_t24	0.055	J	1.8		0.47	J	0.068	U	330		95		350				
Mountaineer	Carus B Removal Media	5	192	8MT1_302B_5_t192	0.055	J	6.9		0.96	J	0.068	U	290		190		470				
Mountaineer	Carus B Removal Media	10	24	1MT1_301B_10_t24	0.050	J	0.20	J	0.22	U	0.068	U	52		9.2		280				
Mountaineer	Carus B Removal Media	10	48	2MT1_301B_10_t48			0.58	J													
Mountaineer	Carus B Removal Media	10	96	4MT1_301B_10_t96			0.22	J													
Mountaineer	Carus B Removal Media	10	192	8MT1_301B_10_t192	0.034	U	0.26		0.22	U	0.068	U	25		6.5		370				
Mountaineer	Carus MMO II	5	24	1MT1_502Kc_5_t24	4.4		110		15		0.068	U	120		30		520				
Mountaineer	Carus MMO II	5	192	8MT1_502Kc_5_t192	1.9		180		17		0.068	U	68		21		530		1,900		
Mountaineer	Carus MMO II	5	192	8MT1_552Kc_5_t192	1.6		170		17		0.068	U	38		20		530				
Mountaineer	Carus MMO II	10	24	1MT1_501Kc_10_t24	2.5		84		13		0.068		380		90		550				
Mountaineer	Carus MMO II	10	48	2MT1_501Kc_10_t48			99														
Mountaineer	Carus MMO II	10	96	4MT1_501Kc_10_t96			110														
Mountaineer	Carus MMO II	10	192	8MT1_501Kc_10_t192	1.5		130		14		0.068	U	300		110		550		1,800		
Mountaineer	Carus MMO II	10	192	8MT1_551Kc_10_t192	1.3		130		14		0.068	U	73		28		570				
Mountaineer	Carus MMO	5	24	1MT1_602MM_5_t24	0.040	J	1.6		10		0.068	U	2.9	J	1600		0.088	U			
Mountaineer	Carus MMO	5	192	8MT1_602MM_5_t192	0.050	J	3.1		9.9		0.068	U	20		4500		11		860		
Mountaineer	Carus MMO	5	192	8MT1_652MM_5_t192	0.034	U	1.1		11		0.068	U	20		1300		0.068	U			
Mountaineer	Carus MMO	10	24	1MT1_601MM_10_t24	0.060	J	7.7		9.7		0.068	U	3.1		660		0.088	U			
Mountaineer	Carus MMO	10	48	2MT1_601MM_10_t48			2.1														
Mountaineer	Carus MMO	10	96	4MT1_601MM_10_t96			0.62	J													
Mountaineer	Carus MMO	10	192	8MT1_601MM_10_t192	0.034	U	0.26		10		0.068	U	11		4600		0.59		820		
Mountaineer	Carus MMO	10	192	8MT1_651MM_10_t192	0.035	J	0.16		10		0.068	U	21		4600		0.11				
Mountaineer	Cleanit	5	24	1MT1_202CI_5_t24	0.065	J	49		6.5		0.068	U	1300		650		240				
Mountaineer	Cleanit	5	192	8MT1_202CI_5_t192	0.034	U	18		0.32	J	0.068	U	550		84		200		750		
Mountaineer	Cleanit	5	192	8MT1_252CI_5_t192	0.034	U	19		0.54	J	0.068	U	110		100		230				
Mountaineer	Cleanit	10	24	1MT1_201CI_10_t24	0.18	J	32		4.5		0.068	U	1000		540		150				
Mountaineer	Cleanit	10	48	2MT1_201CI_10_t48			42														
Mountaineer	Cleanit	10	96	4MT1_201CI_10_t96			22														
Mountaineer	Cleanit	10	192	8MT1_201CI_10_t192	0.034	U	8.2		0.68	J	0.068	U	3500		710		190		820		
Mountaineer	Cleanit	10	192	8MT1_251CI_10_t192	0.045	J	8.5		0.48	J	0.068	U	3400		730		200				
Mountaineer	Copperhill Slag	5	24	1MT1_402SL_5_t24	0.034	U	0.42	J	29		1.5		540		820		580				
Mountaineer	Copperhill Slag	5	192	8MT1_402SL_5_t192	0.034	U	0.67	J	34		1.6		88		400		610		1,600		
Mountaineer	Copperhill Slag	5	192	8MT1_452SL_5_t192	0.034	U	0.48	J	36		1.6		430		410		620				



**Table D**  
**24-Hour Screening and Kinetic Batch Test Results**

Groundwater	Media	L/S	Time (hr)	Sample ID	Mercury (µg/L)		Molybdenum (µg/L)	Selenium (µg/L)		Thallium (µg/L)		Iron (µg/L)	Manganese (µg/L)	Calcium (mg/L)	Sulfate (mg/L)	Data Quality Notes
Mountaineer	Copperhill Slag	10	24	1MT1_401SL_10_t24	0.034	U	1.3		22		1.1	240	870	550		
Mountaineer	Copperhill Slag	10	48	2MT1_401SL_10_t48			1.4									
Mountaineer	Copperhill Slag	10	96	4MT1_401SL_10_t96			1.4									
Mountaineer	Copperhill Slag	10	192	8MT1_401SL_10_t192	0.034	U	1.5		27		1.2	300	480	610	1,600	
Mountaineer	Copperhill Slag	10	192	8MT1_451SL_10_t192	0.034	U	1.7		27		1.1	45	470	610		
Mountaineer	Sand	5	24	1MT1_102a_5_t24	0.034	U	67		10		0.068	U	23	1100	290	
Mountaineer	Sand	5	192	8MT1_102Sa_5_t192	0.034	U	71		9.9		0.068	U	17	940	300	790
Mountaineer	Sand	5	192	8MT1_152Sa_5_t192	0.034	U	72		10		0.068	U	20	960	290	
Mountaineer	Sand	10	24	1MT1_101Sa_10_t24	0.034	U	68		11		0.068	U	16	1200	290	
Mountaineer	Sand	10	48	2MT1_101Sa_10_t48			70									
Mountaineer	Sand	10	96	4MT1_101Sa_10_t96			71									
Mountaineer	Sand	10	192	8MT1_101Sa_10_t192	0.034	U	72		10		0.068	U	18	1000	300	770
Mountaineer	Sand	10	192	8MT1_151Sa_10_t192	0.034	U	71		10		0.068	U	23	980	290	
Mountaineer	Zeravalent Iron	5	24	1MT1_702ZV_5_t24	0.034	U	66		6.6		0.068	U	11000	7100	270	
Mountaineer	Zeravalent Iron	5	192	8MT1_702ZV_5_t192	0.070	J	64		0.79	J	0.068	U	2000	810	270	750
Mountaineer	Zeravalent Iron	5	192	8MT1_752ZV_5_t192	0.070	J	62		0.81	J	0.068	U	1000	780	270	
Mountaineer	Zeravalent Iron	10	24	1MT1_701ZV_10_t24	0.034	U	51		7.3		0.068	U	11000	5900	280	
Mountaineer	Zeravalent Iron	10	48	2MT1_701ZV_10_t48			91									
Mountaineer	Zeravalent Iron	10	96	4MT1_701ZV_10_t96			100									
Mountaineer	Zeravalent Iron	10	192	8MT1_701ZV_10_t192	0.034	U	74		1.6		0.068	U	1600	950	270	760
Mountaineer	Zeravalent Iron	10	192	8MT1_751ZV_10_t192	0.075	J	55		1.6		0.068	U	1500	760	210	

# Attachment E

## Isotherm Batch Test Results

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**Table E**  
**Isotherm Batch Test Results**

Groundwater	Media	L/S	Sample ID	Type	pH	Total Dissolved Solids (ppm)	Boron (µg/L)	Boron Removal	Boron Uptake by Solids (mg/kg)	Lithium (µg/L)	Lithium Removal	Lithium Uptake by Solids (mg/kg)	Molybdenum (µg/L)	Molybdenum Removal	Molybdenum Uptake by Solids (mg/kg)	Cobalt (µg/L)	Cobalt Removal	Cobalt Uptake by Solids (mg/kg)		
Mountaineer	Control	NA	0MT_002_t0		6.99	1,500	8100	NA	NA	110	NA	NA	72	NA	NA	1.8	J	NA	NA	
Mountaineer	Control	NA	0MT_052_t0	D	6.99	1,700	9400	NA	NA	110	NA	NA	82	NA	NA	1.8	J	NA	NA	
Mountaineer	Control	NA	2MT_1002_ISO_GW		7.21	1,300	9100	NA	NA	110	NA	NA	69	NA	NA	0.5		NA	NA	
Mountaineer	Control	NA	2MT_2002_ISO_GW	D	7.21	1,300	9200	NA	NA	110	NA	NA	69	NA	NA	0.5		NA	NA	
Mountaineer	BOF Slag	5	8MT2_802BF_5_t192		12.48	6,130	3200	63%	27750	110	0%	0	51	34%	130	0.1	J	94%	9	
Mountaineer	BOF Slag	5	8MT2_852BF_5_t192	D	12.48	6,130	3200	63%	27750	110	0%	0	50	35%	135	0.064	U	96%	9	
Mountaineer	BOF Slag	10	8MT2_801BF_10_t192		12.35	4,390	5000	43%	37500	110	0%	0	54	30%	230	0.08	J	96%	17	
Mountaineer	BOF Slag	10	8MT2_851BF_10_t192	D	12.35	4,390	5300	39%	34500	120	-9%	0	57	26%	200	0.11	J	94%	17	
Mountaineer	BOF Slag	25	2MT_1801BOF_25_t192		11.90	3,180	5500	40%	91250	110	0%	0	55	20%	350	0.067		87%	11	
Mountaineer	BOF Slag	50	2MT_1802BOF_50_t192		11.72	2,020	6400	30%	137500	110	0%	0	51	26%	900	0.11		78%	20	
Mountaineer	BOF Slag	100	2MT_1803BOF_100_t192		11.80	1,550	6700	27%	245000	110	0%	0	49	29%	2000	0.25		50%	25	
Mountaineer	Carus B	5	8MT1_302B_5_t192		12.19	5,100	2700	69%	30250	220	-100%	NC	6.9	91%	351	0.83	J	54%	5	
Mountaineer	Carus B	10	8MT1_301B_10_t192		12.08	3,960	110	99%	86400	200	-82%	NC	0.26	100%	767	0.064	U	96%	17	
Mountaineer	Carus B	25	2MT_1302B_25_t192		11.84	2,870	1200	87%	198750	120	-9%	0	0.81	99%	1705	0.013	U	97%	12	
Mountaineer	Carus B	50	2MT_1303B_50_t192		11.76	2,610	4400	52%	237500	100	9%	500	4.6	93%	3220	0.035		93%	23	
Mountaineer	Carus B	100	2MT_1301B_100_t192		11.91	2,200	590	94%	856000	130	-18%	NC	0.40	99%	6860	0.013	U	97%	49	
Mountaineer	Carus K+ Cake	5	8MT1_502Kc_5_t192		7.76	2,920	700	92%	40250	0.1	U	100%	550	-134%	NC	1.2	J	33%	3	
Mountaineer	Carus K+ Cake	5	8MT1_552Kc_5_t192	D	7.76	2,920	820	91%	39650	0.1	U	100%	550	-121%	NC	0.84	J	53%	5	
Mountaineer	Carus K+ Cake	10	8MT1_501Kc_10_t192		7.28	2,570	1400	84%	73500	0.1	U	100%	1099	-69%	NC	5.1		-183%	NC	
Mountaineer	Carus K+ Cake	10	8MT1_551Kc_10_t192	D	7.28	2,570	1500	83%	72500	0.1	U	100%	1099	-69%	NC	1.4		22%	4	
Mountaineer	Carus K+ Cake	25	2MT_1501Kc_25_t192		8.31	2,390	3800	58%	133750	8.3	92%	2543	60	13%	225	3.7		-640%	NC	
Mountaineer	Carus K+ Cake	50	2MT_1502Kc_50_t192		8.15	2,300	5600	39%	177500	15	86%	4750	55	20%	700	4.7		-840%	NC	
Mountaineer	Carus K+ Cake	100	2MT_1503Kc_100_t192		7.97	2,050	7200	21%	195000	34	69%	7600	41	41%	2800	110		-21900%	NC	
Mountaineer	Carus MMO	5	8MT1_602MM_5_t192		8.67	2,190	2000	77%	33750	0.1	U	100%	550	96%	370	1.3	J	28%	3	
Mountaineer	Carus MMO	5	8MT1_652MM_5_t192	D	8.67	2,190	1900	78%	34250	0.1	U	100%	550	99%	380	0.74	J	59%	5	
Mountaineer	Carus MMO	10	8MT1_601MM_10_t192		8.53	2,030	3600	59%	51500	0.14	J	100%	1099	100%	767	1.1	J	39%	7	
Mountaineer	Carus MMO	10	8MT1_651MM_10_t192	D	8.53	2,030	3600	59%	51500	0.1	U	100%	1099	100%	768	1.2	J	33%	6	
Mountaineer	Carus MMO	25	2MT_1601MM_25_t192		7.01	1,870	6400	30%	68750	120	-9%	0	0.071	100%	1723	2.5		-400%	NC	
Mountaineer	Carus MMO	50	2MT_1602MM_50_t192		7.18	1,500	7400	19%	87500	120	-9%	0	0.02	100%	3449	0.58		-16%	NC	
Mountaineer	Carus MMO	100	2MT_1603MM_100_t192		6.88	1,630	8000	13%	115000	110	0%	0	0.10	100%	6890	0.64		-28%	NC	
Mountaineer	Cleanit	5	8MT1_202CI_5_t192		6.92	1,260	8100	7%	3250	130	-18%	NC	18	77%	295	0.085	J	95%	9	
Mountaineer	Cleanit	5	8MT1_252CI_5_t192	D	6.92	1,260	7900	10%	4250	130	-18%	NC	19	75%	290	0.16	J	91%	8	
Mountaineer	Cleanit	10	8MT1_201CI_10_t192		5.69	1,280	8400	4%	3500	120	-9%	NC	8.2	89%	688	0.064	U	96%	17	
Mountaineer	Cleanit	10	8MT1_251CI_10_t192	D	5.69	1,280	8600	2%	1500	120	-9%	NC	8.5	89%	685	0.064	U	96%	17	
Mountaineer	Cleanit	25	2MT_1201CI_25_t192		7.21	1,380	8800	4%	8750	120	-9%	NC	1.4	98%	1690	0.096		81%	10	
Mountaineer	Cleanit	50	2MT_1202CI_50_t192		7.06	1,410	9200	-1%	0	120	-9%	NC	0.99	99%	3401	0.16		68%	17	
Mountaineer	Cleanit	100	2MT_1203CI_100_t192		7.21	1,410	9200	-1%	0	120	-9%	NC	3.6	95%	6540	0.22		56%	28	
Mountaineer	Copperhill Slag	5	8MT1_402SL_5_t192		6.64	2,150	7800	11%	4750	100	9%	50	0.67	J	99%	382	1.4	J	22%	2
Mountaineer	Copperhill Slag	5	8MT1_452SL_5_t192	D	6.64	2,150	8100	7%	3250	100	9%	50	0.48	J	99%	383	1.8	J	0%	0
Mountaineer	Copperhill Slag	10	8MT1_401SL_10_t192		6.61	2,120	8300	5%	4500	110	0%	0	1.5	98%	755	1.4	J	22%	4	
Mountaineer	Copperhill Slag	10	8MT1_451SL_10_t192	D	6.61	2,120	8100	7%	6500	110	0%	0	1.7	98%	753	1.1	J	39%	7	
Mountaineer	Copperhill Slag	25	2MT_1401SL_25_t192		7.48	1,830	9100	1%	1250	110	0%	0	18	74%	1275	0.60		-20%	NC	
Mountaineer	Copperhill Slag	50	2MT_1402SL_50_t192		7.44	1,700	8800	4%	17500	110	0%	0	30	57%	1950	0.54		-8%	0	
Mountaineer	Copperhill Slag	100	2MT_1403SL_100_t192		7.59	1,610	9300	-2%	0	110	0%	0	43	38%	2600	0.48		4%	2	
Mountaineer	Sand	5	8MT1_102Sa_5_t192		7.44	1,520	8900	-2%	0	110	0%	0	71	8%	30	1.3	J	28%	3	
Mountaineer	Sand	5	8MT1_152Sa_5_t192	D	7.44	1,520	8800	-1%	0	110	0%	0	72	6%	25	1.3	J	28%	3	

**Table E**  
**Isotherm Batch Test Results**

Groundwater	Media	L/S	Sample ID	Type	pH	Total Dissolved Solids (ppm)	Boron (µg/L)	Boron Removal	Boron Uptake by Solids (mg/kg)	Lithium (µg/L)	Lithium Removal	Lithium Uptake by Solids (mg/kg)	Molybdenum (µg/L)	Molybdenum Removal	Molybdenum Uptake by Solids (mg/kg)	Cobalt (µg/L)	Cobalt Removal	Cobalt Uptake by Solids (mg/kg)
Mountaineer	Sand	10	8MT1_101Sa_10_t192		7.31	1,500	9000	-3%	0	110	0%	0	72	6%	50	1.5	17%	3
Mountaineer	Sand	10	8MT1_151Sa_10_t192	D	7.31	1,500	9000	-3%	0	110	0%	0	71	8%	60	1.4	J 22%	4
Mountaineer	Sand	25	2MT_1101Sa_25_t192		7.70	1,500	9100	1%	1250	120	-9%	0	67	3%	50	0.48	4%	1
Mountaineer	Sand	50	2MT_1102Sa_50_t192		7.66	1,510	8800	4%	17500	110	0%	0	67	3%	100	0.47	6%	2
Mountaineer	Sand	100	2MT_1103Sa_100_t192		7.62	1,480	9100	1%	5000	110	0%	0	67	3%	200	0.48	4%	2
Mountaineer	ZVI	5	8MT1_702ZV_5_t192		7.75	1,450	3900	55%	24250	84	24%	130	64	17%	65	0.20	J 89%	8
Mountaineer	ZVI	5	8MT1_752ZV_5_t192	D	7.75	1,450	3800	57%	24750	82	25%	140	62	19%	75	0.14	J 92%	8
Mountaineer	ZVI	10	8MT1_701ZV_10_t192		7.64	1,430	5600	36%	31500	95	14%	150	74	4%	30	0.16	J 91%	16
Mountaineer	ZVI	10	8MT1_751ZV_10_t192	D	7.64	1,430	4200	52%	45500	94	15%	160	55	29%	220	0.13	J 93%	17
Mountaineer	ZVI	25	2MT_1701ZV_25_t192		7.73	1,440	7100	22%	51250	110	0%	0	40	42%	725	0.63	-26%	NC
Mountaineer	ZVI	50	2MT_1702ZV_50_t192		7.14	1,450	8000	13%	57500	110	0%	0	23	67%	2300	0.74	-48%	NC
Mountaineer	ZVI	100	2MT_1703ZV_100_t192		7.49	1,450	8300	9%	85000	110	0%	0	25	64%	4400	0.95	-90%	NC

Notes:

Cells highlighted in red represent samples with negative removal (final concentration more than 10% greater than the initial concentration), indicating the analyte was leached from the media.

µg/L: micrograms per liter

B: Result is less than 5 times greater than the result for the associated method blank sample. True concentration may be less than the reported value.

D: duplicate sample

J: Estimated value. Analyte was detected above the method detection limit, but concentration is less than the method reporting limit.

L/S: liquid-to-solid ratio

mg/kg: micrograms per kilogram

NA: not applicable

NC: not calculated

ND: Analyte was not detected. Reported value is less than the minimum detectable concentration.

NM: Not measured

ORP: oxidation reduction potential

ppm: parts per million

U: Analyte was not detected. Reported value is the method detection limit.

Attachment F

PDC Laboratories Isotherm Test Analytical  
Reports

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# PDC Laboratories, Inc.

PROFESSIONAL • DEPENDABLE • COMMITTED

December 12, 2018

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

Dear Jessica Goin:

Please find enclosed the **revised** analytical results for the sample(s) the laboratory received on **11/27/18 10:20 am** and logged in under work order **8114200**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President, John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com





**REVISED ANALYTICAL RESULTS**

**Sample:** 8114200-01  
**Name:** 2MT\_1301B\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/21/18 09:10  
**Received:** 11/27/18 10:20  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	590	ug/L		12/01/18 05:58	12/03/18 10:56	JMW	SW 6020
Cobalt	< 0.013	ug/L		12/01/18 05:58	12/01/18 09:55	JMW	SW 6020
Lithium	130	ug/L		12/03/18 13:07	12/03/18 16:21	TJJ	SW 6010*
Molybdenum	0.40	ug/L		12/01/18 05:58	12/01/18 09:55	JMW	SW 6020

**Sample:** 8114200-02  
**Name:** 2MT\_1302B\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/21/18 09:15  
**Received:** 11/27/18 10:20  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	1200	ug/L		12/01/18 05:58	12/03/18 11:00	JMW	SW 6020
Cobalt	< 0.013	ug/L		12/01/18 05:58	12/01/18 10:08	JMW	SW 6020
Lithium	120	ug/L		12/03/18 13:07	12/03/18 16:22	TJJ	SW 6010*
Molybdenum	0.81	ug/L		12/01/18 05:58	12/01/18 10:08	JMW	SW 6020

**Sample:** 8114200-03  
**Name:** 2MT\_1303B\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 16:30  
**Received:** 11/27/18 10:20  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	4400	ug/L		12/01/18 05:58	12/03/18 10:49	JMW	SW 6020
Cobalt	0.035	ug/L		12/01/18 05:58	12/01/18 10:11	JMW	SW 6020
Lithium	100	ug/L		12/03/18 13:07	12/03/18 16:24	TJJ	SW 6010*
Molybdenum	4.6	ug/L		12/01/18 05:58	12/01/18 10:11	JMW	SW 6020





**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B824782 - 6020 Sol no prep - SW 6020</u></b>									
<b>Blank (B824782-BLK1)</b>				Prepared: 12/01/18 Analyzed: 12/03/18					
Boron	< 0.25	ug/L							
Cobalt	< 0.013	ug/L							
Molybdenum	< 0.014	ug/L							
<b>LCS (B824782-BS1)</b>				Prepared: 12/01/18 Analyzed: 12/03/18					
Boron	504	ug/L		500.0		101	80-120		
Cobalt	47.5	ug/L		50.00		95	80-120		
Molybdenum	48.5	ug/L		50.00		97	80-120		
<b><u>Batch B824845 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B824845-BLK1)</b>				Prepared & Analyzed: 12/03/18					
Lithium	< 0.10	ug/L							
<b>LCS (B824845-BS1)</b>				Prepared & Analyzed: 12/03/18					
Lithium	495	ug/L		500.0		99	80-120		



**NOTES**

Specific method revisions used for analysis are available upon request.

**Memos**

Revised Report - edited sample description and coc form

**Certifications**

CHI - McHenry, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Missouri Department of Natural Resources Certificate of Approval for Microbiological Laboratory Service No. 870  
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPIL - Springfield, IL

NELAP/NELAC accreditation through the Illinois EPA, PAS IL 100323

SPMO - Springfield, MO

USEPA DMR-QA Program

STL - St. Louis, MO

TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389  
Accreditation of Laboratories for Wastewater, Hazardous, and Solid Waste Analysis through IL EPA No. 200080  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050  
Drinking Water Certifications: Missouri (1050)  
Missouri Department of Natural Resources

\* Not a TNI accredited analyte

Certified by: Gail Schindler, Project Manager





**PDC Laboratories, Inc.**  
 P.O. Box 9071 • Peoria, IL 61612-9071  
 (309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



## CASE NARRATIVE

**Client:** Anchor QEA, LLC Project AEP\_MOUNTAINEER

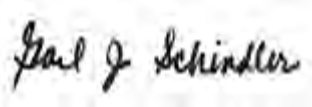
**PDC Work Orders:** 8114200

PDC Laboratories, Inc. received 3 water samples on November 27, 2018. Sample analysis was performed at our Peoria, Illinois laboratory. Samples were analyzed for dissolved boron, cobalt, lithium and molybdenum. The sample temperature upon receipt was measured at 4°C. Boron required dilutions on all samples.

Sample ID's		Date	
Field	Lab ID	Collected	Received
2MT_1301B_25_t192	8114200-01	11/21/18	11/27/18
2MT_1302B_50_t192	8114200-02	11/21/18	11/27/18
2MT_1303B_100_t192	8114200-03	11/16/18	11/27/18

### QC SUMMARY

All QC items in this QC summary report meet acceptance criteria.

CERTIFICATION	
<b>Name:</b> Gail Schindler	<b>Title:</b> Project Manager
<b>Signature:</b> 	<b>Date:</b> December 12, 2018

PDC Laboratories, Inc.  
 2231 W. Altorfer Dr  
 Peoria, IL 61615

**CHAIN OF CUSTODY RECORD**

State where samples were collected \_\_\_\_\_

Phone: (800) 752-6651  
 Fax: (309) 692-9689  
 www.pdcilab.com

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT)

<b>1</b> CLIENT <b>Anchor QEA</b>		P.O. NUMBER <b>AEP - Mountaineer</b>		PROJECT NAME <b>AEP - Mountaineer</b>		DATE SHIPPED <b>11/26/18</b>		<b>3</b> ANALYSIS REQUESTED Dissolved B, Co, Li, Mg		<b>4</b> WORK ORDER (FOR LAB USE ONLY) LOGIN #: <u>8114200-3</u> LOGGED BY: <u>[Signature]</u> PROJECT: _____ PROJ MGR: _____	
ADDRESS <b>6720 SW Macadam Ave</b>		PHONE <b>(503) 972-5019</b>		EMAIL <b>jgoi@anchoragea.com</b>		MEANS SHIPPED <b>FedEx</b>					
CITY <b>Portland</b>		STATE <b>OR</b>		ZIP <b>97219</b>		SAMPLER (PLEASE PRINT) <b>Sasha Norwood</b>					
CONTACT PERSON <b>Jessica Goin</b>		SAMPLER'S SIGNATURE <u>[Signature]</u>		MATRIX TYPES: WW - WASTE WATER DW - DRINKING WATER GW - GROUND WATER WWSL - SLUDGE NAS - SOLID LCHT - LEACHATE OTHER: _____		MATRIX TYPE <b>GW</b>					
<b>2</b> SAMPLE DESCRIPTION AS YOU WANT TO REPORT		DATE COLLECTED		TIME COLLECTED		SAMPLE TYPE <b>GW</b>		BOTTLE COUNT <b>1</b>		REMARKS <b>All samples 0.45 um filtered.</b>	
<b>5</b> TURNAROUND TIME REQUESTED (RUSH TAT IS SUBJECT TO APPROVAL AND SURCHARGE)		<input type="checkbox"/> NORMAL		<input type="checkbox"/> RUSH		DATE RESULTS NEEDED					
<b>7</b> RELINQUISHED BY (SIGNATURE) <u>[Signature]</u>		DATE <b>11/26/18</b>		TIME <b>1100</b>		RECEIVED BY (SIGNATURE) <u>[Signature]</u>		<b>6</b> The sample temperature will be measured upon receipt at the lab. By initialing this area, you request that we notify you before proceeding with analysis if the sample temperature is outside of the range of 0-6 °C. By not initialing this area, you allow the lab to proceed with analytical testing regardless of the sample temperature.			
RELINQUISHED BY (SIGNATURE)		DATE		TIME		RECEIVED BY (SIGNATURE)		<b>8</b> COMMENTS (FOR LAB USE ONLY) <b>changed description per J. Goin email 11/27/18</b> SAMPLE TEMPERATURE UPON RECEIPT _____ °C CHILL PROCESS STARTED PRIOR TO RECEIPT _____ SAMPLE(S) RECEIVED ON ICE _____ PROPER BOTTLES RECEIVED IN GOOD CONDITION _____ BOTTLES FILLED WITH ADEQUATE VOLUME _____ SAMPLES RECEIVED WITHIN HOLD TIME(S) _____ (EXCLUDES TYPICAL FIELD PARAMETERS) DATE AND TIME TAKEN FROM SAMPLE BOTTLE _____			
RELINQUISHED BY (SIGNATURE)		DATE		TIME		RECEIVED BY (SIGNATURE)					



# PDC Laboratories, Inc.

PROFESSIONAL • DEPENDABLE • COMMITTED

December 05, 2018

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

Dear Jessica Goin:

Please find enclosed the analytical results for the sample(s) the laboratory received on **11/21/18 9:50 am** and logged in under work order **8113905**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President, John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com





**ANALYTICAL RESULTS**

**Sample:** 8113905-01  
**Name:** 2MT\_1101Sa\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 14:45  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9100	ug/L		12/01/18 05:58	12/03/18 08:20	JMW	SW 6020
Cobalt	0.48	ug/L		12/01/18 05:58	12/01/18 07:34	JMW	SW 6020
Lithium	120	ug/L		12/03/18 13:07	12/03/18 14:40	TJJ	SW 6010*
Molybdenum	67	ug/L		12/01/18 05:58	12/01/18 07:34	JMW	SW 6020

**Sample:** 8113905-02  
**Name:** 2MT\_1102Sa\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 14:50  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8800	ug/L		12/01/18 05:58	12/03/18 11:33	JMW	SW 6020
Cobalt	0.47	ug/L		12/01/18 05:58	12/01/18 07:37	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 14:42	TJJ	SW 6010*
Molybdenum	67	ug/L		12/01/18 05:58	12/01/18 07:37	JMW	SW 6020

**Sample:** 8113905-03  
**Name:** 2MT\_1103Sa\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 14:55  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9100	ug/L		12/01/18 05:58	12/03/18 08:23	JMW	SW 6020
Cobalt	0.48	ug/L		12/01/18 05:58	12/01/18 07:40	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 14:44	TJJ	SW 6010*
Molybdenum	67	ug/L		12/01/18 05:58	12/01/18 07:40	JMW	SW 6020

**Sample:** 8113905-04  
**Name:** 2MT\_1201Cl\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:00  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8800	ug/L		12/01/18 05:58	12/03/18 08:27	JMW	SW 6020
Cobalt	0.096	ug/L		12/01/18 05:58	12/01/18 07:43	JMW	SW 6020
Lithium	120	ug/L		12/03/18 13:07	12/03/18 14:45	TJJ	SW 6010*
Molybdenum	1.4	ug/L		12/01/18 05:58	12/01/18 07:43	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8113905-05  
**Name:** 2MT\_1202Cl\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:05  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9200	ug/L		12/01/18 05:58	12/03/18 08:31	JMW	SW 6020
Cobalt	0.16	ug/L		12/01/18 05:58	12/01/18 08:04	JMW	SW 6020
Lithium	120	ug/L		12/03/18 13:07	12/03/18 14:47	TJJ	SW 6010*
Molybdenum	0.99	ug/L		12/01/18 05:58	12/01/18 08:04	JMW	SW 6020

**Sample:** 8113905-06  
**Name:** 2MT\_1203Cl\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:10  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9200	ug/L	Q4	12/01/18 05:58	12/03/18 08:35	JMW	SW 6020
Cobalt	0.22	ug/L		12/01/18 05:58	12/01/18 08:07	JMW	SW 6020
Lithium	120	ug/L		12/03/18 13:07	12/03/18 14:48	TJJ	SW 6010*
Molybdenum	3.6	ug/L		12/01/18 05:58	12/01/18 08:07	JMW	SW 6020

**Sample:** 8113905-07  
**Name:** 2MT\_1401SL\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:15  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9100	ug/L		12/01/18 05:58	12/03/18 08:46	JMW	SW 6020
Cobalt	0.60	ug/L		12/01/18 05:58	12/01/18 08:56	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 14:50	TJJ	SW 6010*
Molybdenum	18	ug/L		12/01/18 05:58	12/01/18 08:56	JMW	SW 6020

**Sample:** 8113905-08  
**Name:** 2MT\_1402SL\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:20  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8800	ug/L		12/01/18 05:58	12/03/18 09:20	JMW	SW 6020
Cobalt	0.54	ug/L		12/01/18 05:58	12/01/18 08:13	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 14:51	TJJ	SW 6010*
Molybdenum	30	ug/L		12/01/18 05:58	12/01/18 08:13	JMW	SW 6020





**ANALYTICAL RESULTS**

**Sample:** 8113905-09  
**Name:** 2MT\_1403SL\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:25  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9300	ug/L		12/01/18 05:58	12/03/18 09:24	JMW	SW 6020
Cobalt	0.48	ug/L		12/01/18 05:58	12/01/18 08:16	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 14:53	TJJ	SW 6010*
Molybdenum	43	ug/L		12/01/18 05:58	12/01/18 08:16	JMW	SW 6020

**Sample:** 8113905-10  
**Name:** 2MT\_1501Kc\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:30  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	3800	ug/L		12/01/18 05:58	12/03/18 09:28	JMW	SW 6020
Cobalt	3.7	ug/L		12/01/18 05:58	12/01/18 09:07	JMW	SW 6020
Lithium	8.3	ug/L		12/03/18 13:07	12/03/18 14:55	TJJ	SW 6010*
Molybdenum	60	ug/L		12/01/18 05:58	12/01/18 09:07	JMW	SW 6020

**Sample:** 8113905-11  
**Name:** 2MT\_1502Kc\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:35  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	5600	ug/L		12/01/18 05:58	12/03/18 09:31	JMW	SW 6020
Cobalt	4.7	ug/L		12/01/18 05:58	12/01/18 08:22	JMW	SW 6020
Lithium	15	ug/L		12/03/18 13:07	12/03/18 15:01	TJJ	SW 6010*
Molybdenum	55	ug/L		12/01/18 05:58	12/01/18 08:22	JMW	SW 6020

**Sample:** 8113905-12  
**Name:** 2MT\_1503Kc\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:40  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	7200	ug/L		12/01/18 05:58	12/03/18 09:35	JMW	SW 6020
Cobalt	110	ug/L		12/01/18 05:58	12/01/18 08:25	JMW	SW 6020
Lithium	34	ug/L		12/03/18 13:07	12/03/18 15:03	TJJ	SW 6010*
Molybdenum	41	ug/L		12/01/18 05:58	12/01/18 08:25	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8113905-13  
**Name:** 2MT\_1601MM\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:45  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	6400	ug/L		12/01/18 05:58	12/03/18 09:39	JMW	SW 6020
Cobalt	2.5	ug/L		12/01/18 05:58	12/01/18 08:51	JMW	SW 6020
Lithium	120	ug/L		12/03/18 13:07	12/03/18 15:05	TJJ	SW 6010*
Molybdenum	0.071	ug/L		12/01/18 05:58	12/01/18 08:51	JMW	SW 6020

**Sample:** 8113905-14  
**Name:** 2MT\_1602MM\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:50  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	7400	ug/L		12/01/18 05:58	12/03/18 09:43	JMW	SW 6020
Cobalt	0.58	ug/L		12/01/18 05:58	12/01/18 08:59	JMW	SW 6020
Lithium	120	ug/L		12/03/18 13:07	12/03/18 15:06	TJJ	SW 6010*
Molybdenum	0.020	ug/L		12/01/18 05:58	12/01/18 08:59	JMW	SW 6020

**Sample:** 8113905-15  
**Name:** 2MT\_1603MM\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 15:55  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8000	ug/L		12/01/18 05:58	12/03/18 09:46	JMW	SW 6020
Cobalt	0.64	ug/L		12/01/18 05:58	12/01/18 09:10	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:08	TJJ	SW 6010*
Molybdenum	0.10	ug/L		12/01/18 05:58	12/01/18 09:10	JMW	SW 6020

**Sample:** 8113905-16  
**Name:** 2MT\_1701ZV\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 16:00  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	7100	ug/L		12/01/18 05:58	12/03/18 09:50	JMW	SW 6020
Cobalt	0.63	ug/L		12/01/18 05:58	12/01/18 09:13	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:10	TJJ	SW 6010*
Molybdenum	40	ug/L		12/01/18 05:58	12/01/18 09:13	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8113905-17  
**Name:** 2MT\_1702ZV\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 16:05  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8000	ug/L		12/01/18 05:58	12/03/18 09:54	JMW	SW 6020
Cobalt	0.74	ug/L		12/01/18 05:58	12/01/18 09:16	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:12	TJJ	SW 6010*
Molybdenum	23	ug/L		12/01/18 05:58	12/01/18 09:16	JMW	SW 6020

**Sample:** 8113905-18  
**Name:** 2MT\_1703ZV\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 16:10  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	8300	ug/L		12/01/18 05:58	12/03/18 10:26	JMW	SW 6020
Cobalt	0.95	ug/L		12/01/18 05:58	12/01/18 09:28	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:18	TJJ	SW 6010*
Molybdenum	25	ug/L		12/01/18 05:58	12/01/18 09:28	JMW	SW 6020

**Sample:** 8113905-19  
**Name:** 2MT\_1801BOF\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 16:15  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	5500	ug/L		12/01/18 05:58	12/03/18 10:30	JMW	SW 6020
Cobalt	0.067	ug/L		12/01/18 05:58	12/01/18 09:31	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:23	TJJ	SW 6010*
Molybdenum	55	ug/L		12/01/18 05:58	12/01/18 09:31	JMW	SW 6020

**Sample:** 8113905-20  
**Name:** 2MT\_1802BOF\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 16:20  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	6400	ug/L		12/01/18 05:58	12/03/18 10:34	JMW	SW 6020
Cobalt	0.11	ug/L		12/01/18 05:58	12/01/18 09:34	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:25	TJJ	SW 6010*
Molybdenum	51	ug/L		12/01/18 05:58	12/01/18 09:34	JMW	SW 6020



**ANALYTICAL RESULTS**

**Sample:** 8113905-21  
**Name:** 2MT\_1803BOF\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 16:25  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	6700	ug/L		12/01/18 05:58	12/03/18 10:38	JMW	SW 6020
Cobalt	0.25	ug/L		12/01/18 05:58	12/01/18 10:32	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:27	TJJ	SW 6010*
Molybdenum	49	ug/L		12/01/18 05:58	12/01/18 10:32	JMW	SW 6020

**Sample:** 8113905-22  
**Name:** 2MT\_0000\_MB  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 12:45  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	2.1	ug/L		12/01/18 05:58	12/03/18 07:11	JMW	SW 6020
Cobalt	< 0.013	ug/L		12/01/18 05:58	12/01/18 09:40	JMW	SW 6020
Lithium	< 0.10	ug/L		12/03/18 13:07	12/03/18 15:29	TJJ	SW 6010*
Molybdenum	< 0.014	ug/L		12/01/18 05:58	12/01/18 09:40	JMW	SW 6020

**Sample:** 8113905-23  
**Name:** 2MT\_1002\_ISO\_GW  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/19/18 10:30  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9100	ug/L		12/01/18 05:58	12/03/18 10:41	JMW	SW 6020
Cobalt	0.50	ug/L		12/01/18 05:58	12/01/18 09:43	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:30	TJJ	SW 6010*
Molybdenum	69	ug/L		12/01/18 05:58	12/01/18 09:43	JMW	SW 6020

**Sample:** 8113905-24  
**Name:** 2MT\_2002\_ISO\_GW  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/19/18 10:35  
**Received:** 11/21/18 09:50  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	9200	ug/L		12/01/18 05:58	12/03/18 10:45	JMW	SW 6020
Cobalt	0.50	ug/L		12/01/18 05:58	12/01/18 09:46	JMW	SW 6020
Lithium	110	ug/L		12/03/18 13:07	12/03/18 15:31	TJJ	SW 6010*
Molybdenum	69	ug/L		12/01/18 05:58	12/01/18 09:46	JMW	SW 6020



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B824782 - 6020 Sol no prep - SW 6020</u></b>									
<b>Blank (B824782-BLK1)</b>					Prepared: 12/01/18 Analyzed: 12/03/18				
Boron	< 0.25	ug/L							
Cobalt	< 0.013	ug/L							
Molybdenum	< 0.014	ug/L							
<b>LCS (B824782-BS1)</b>					Prepared: 12/01/18 Analyzed: 12/03/18				
Boron	504	ug/L		500.0		101	80-120		
Cobalt	47.5	ug/L		50.00		95	80-120		
Molybdenum	48.5	ug/L		50.00		97	80-120		
<b>Matrix Spike (B824782-MS1)</b>					Sample: 8113905-06 Prepared: 12/01/18 Analyzed: 12/03/18				
Boron	9480	ug/L	Q4	500.0	9210	52	75-125		
Cobalt	46.4	ug/L		50.00	0.220	92	75-125		
Molybdenum	53.1	ug/L		50.00	3.60	99	75-125		
<b>Matrix Spike (B824782-MS2)</b>					Sample: 8113905-24 Prepared & Analyzed: 12/01/18				
Cobalt	45.7	ug/L		50.00	0.503	90	75-125		
Molybdenum	117	ug/L		50.00	68.7	96	75-125		
<b>Matrix Spike Dup (B824782-MSD1)</b>					Sample: 8113905-06 Prepared: 12/01/18 Analyzed: 12/03/18				
Boron	9510	ug/L	Q4	500.0	9210	59	75-125	0.3	20
Cobalt	46.4	ug/L		50.00	0.220	92	75-125	0.02	20
Molybdenum	53.9	ug/L		50.00	3.60	101	75-125	1	20
<b>Matrix Spike Dup (B824782-MSD2)</b>					Sample: 8113905-24 Prepared & Analyzed: 12/01/18				
Cobalt	46.6	ug/L		50.00	0.503	92	75-125	2	20
Molybdenum	120	ug/L		50.00	68.7	102	75-125	3	20
<b><u>Batch B824845 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B824845-BLK1)</b>					Prepared & Analyzed: 12/03/18				
Lithium	< 0.10	ug/L							
<b>LCS (B824845-BS1)</b>					Prepared & Analyzed: 12/03/18				
Lithium	495	ug/L		500.0		99	80-120		
<b>Matrix Spike (B824845-MS3)</b>					Sample: 8113905-17 Prepared & Analyzed: 12/03/18				
Lithium	620	ug/L		500.0	111	102	75-125		
<b>Matrix Spike Dup (B824845-MSD3)</b>					Sample: 8113905-17 Prepared & Analyzed: 12/03/18				
Lithium	623	ug/L		500.0	111	103	75-125	0.5	200



**NOTES**

Specific method revisions used for analysis are available upon request.

**Memos**

Sample temperature upon receipt was 7oC. Approval was given to proceed with analysis by Jessica Goin via email on 11/21/18.

**Certifications**

CHI - McHenry, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Missouri Department of Natural Resources Certificate of Approval for Microbiological Laboratory Service No. 870  
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPIL - Springfield, IL

NELAP/NELAC accreditation through the Illinois EPA, PAS IL 100323

SPMO - Springfield, MO

USEPA DMR-QA Program

STL - St. Louis, MO

TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389  
Accreditation of Laboratories for Wastewater, Hazardous, and Solid Waste Analysis through IL EPA No. 200080  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050  
Drinking Water Certifications: Missouri (1050)  
Missouri Department of Natural Resources

\* Not a TNI accredited analyte

**Qualifiers**

- Q4 The matrix spike recovery result is unusable since the analyte concentration in the sample is greater than four times the spike level. The associated blank spike was acceptable.

*Gail G Schindler*

Certified by: Gail Schindler, Project Manager





**PDC Laboratories, Inc.**  
P.O. Box 9071 • Peoria, IL 61612-9071  
(309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



## CASE NARRATIVE

**Client:** Anchor QEA, LLC Project AEP\_MOUNTAINEER

**PDC Work Orders:** 8113905

PDC Laboratories, Inc. received 24 water samples on November 21, 2018. Sample analysis was performed at our Peoria, Illinois laboratory. Samples were analyzed for dissolved boron, cobalt, lithium and molybdenum. The sample temperature upon receipt was measured at 7°C. Approval was given by Ms. Jessica Gojn to proceed with analysis. Boron required dilutions on all samples except 2MT\_0000\_MB.

Sample ID's		Date	
Field	Lab ID	Collected	Received
2MT_1101Sa_25_t192	8113905-01	11/16/18	11/21/18
2MT_1102Sa_50_t192	8113905-02	11/16/18	11/21/18
2MT_1103Sa_100_t192	8113905-03	11/16/18	11/21/18
2MT_1201CI_25_t192	8113905-04	11/16/18	11/21/18
2MT_1202CI_50_t192	8113905-05	11/16/18	11/21/18
2MT_1203CI_100_t192	8113905-06	11/16/18	11/21/18
2MT_1401SL_25_t192	8113905-07	11/16/18	11/21/18
2MT_1402SL_50_t192	8113905-08	11/16/18	11/21/18
2MT_1403SL_100_t192	8113905-09	11/16/18	11/21/18
2MT_1501Kc_25_t192	8113905-10	11/16/18	11/21/18
2MT_1502Kc_50_t192	8113905-11	11/16/18	11/21/18
2MT_1503Kc_100_t192	8113905-12	11/16/18	11/21/18
2MT_1601MM_25_t192	8113905-13	11/16/18	11/21/18
2MT_1602MM_50_t192	8113905-14	11/16/18	11/21/18
2MT_1603MM_100_t192	8113905-15	11/16/18	11/21/18
2MT_1701ZV_25_t192	8113905-16	11/16/18	11/21/18
2MT_1702ZV_50_t192	8113905-17	11/16/18	11/21/18
2MT_1703ZV_100_t192	8113905-18	11/16/18	11/21/18
2MT_1801BOF_25_t192	8113905-19	11/16/18	11/21/18

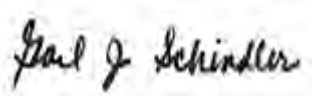


Sample ID's		Date	
Field	Lab ID	Collected	Received
2MT_1802BOF_50_t192	8113905-20	11/16/18	11/21/18
2MT_1803BOF_100_t192	8113905-21	11/16/18	11/21/18
2MT_0000_MB	8113905-22	11/16/18	11/21/18
2MT_1002_ISO_GW	8113905-23	11/19/18	11/21/18
2MT_2002_ISO_GW	8113905-24	11/19/18	11/21/18

## QC SUMMARY

All QC items in this QC summary report meet acceptance criteria with the following exceptions:

Boron: Spiked sample 8113905-06, MS & MSD flagged with Q4, the level in the sample spiked is greater than 4 times the spiked amount.

CERTIFICATION	
<b>Name:</b> Gail Schindler	<b>Title:</b> Project Manager
<b>Signature:</b> 	<b>Date:</b> December 5, 2018

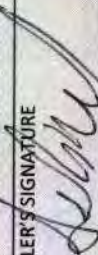
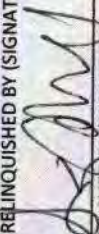

PDC Laboratories, Inc.  
 2231 W. Altorfer Dr  
 Peoria, IL 61615

### CHAIN OF CUSTODY RECORD

Phone: (800) 752-6651  
 Fax: (309) 692-9689  
 www.pdcclab.com

State where samples were collected \_\_\_\_\_

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT)

<b>1</b> CLIENT <b>Anchor QEA</b>		P.O. NUMBER <b>AEP-Mountaineer</b>		PROJECT NAME <b>AEP-Mountaineer</b>		DATE SHIPPED <b>11/19/18</b>		<b>3</b> ANALYSIS REQUESTED <input checked="" type="checkbox"/> Dissolved B, Co, Li, Mo		<b>4</b> WORK ORDER (FOR LAB USE ONLY) LOGIN #: <u>8113965-24</u> LOGGED BY: <u>[Signature]</u> PROJECT: _____ PROJ MGR: _____					
ADDRESS <b>6720 SW Macadam Ave</b>		PHONE <b>(503) 972-5019</b>		EMAIL <b>jgoin@anchorage.com</b>		MEANS SHIPPED <b>FedEx</b>		<b>6</b> The sample temperature will be measured upon receipt at the lab. By initialing this area, you request that we notify you before proceeding with analysis if the sample temperature is outside of the range of 0-16.0°C. By not initialing this area, you allow the lab to proceed with analytical testing regardless of the sample temperature.							
CITY <b>Portland</b>		STATE <b>OR</b>		ZIP <b>97219</b>		MATRIX TYPES: WW - WASTE WATER DW - DRINKING WATER GW - GROUND WATER WWSL - SLUDGE NAS - SOLID LCHT - LEACHATE OTHER: _____									
CONTACT PERSON <b>Jessica Goin</b>		SAMPLER (PLEASE PRINT) <b>Sasha Norwood</b>		SAMPLER'S SIGNATURE 		MATRIX TYPE <b>GW</b>						BOTTLE COUNT <b>1</b>			
<b>2</b> SAMPLE DESCRIPTION AS YOU WANT TO REPORT		DATE COLLECTED		TIME COLLECTED		SAMPLE TYPE GRAB						COMP		REMARKS	
2MT_1101Sa_25_t192		11/16/18		1445		GW						X		All samples 0.45 um filtered.	
2MT_1102Sa_50_t192		11/16/18		1450		GW						X		Please do not dilute	
2MT_1103Sa_100_t192		11/16/18		1455		GW						X		samples without confirmation.	
2MT_1201CI_25_t192		11/16/18		1500		GW						X			
2MT_1202CI_50_t192		11/16/18		1505		GW						X			
2MT_1203CI_100_t192		11/16/18		1510		GW						X			
2MT_1401SL_25_t192		11/16/18		1515		GW		X							
2MT_1402SL_50_t192		11/16/18		1520		GW		X							
2MT_1403SL_100_t192		11/16/18		1525		GW		X							
2MT_1501Kc_25_t192		11/16/18		1530		GW		X							
<b>5</b> TURNAROUND TIME REQUESTED (RUSH TAT IS SUBJECT TO APPROVAL AND SURCHARGE)		<input type="checkbox"/> NORMAL		<input type="checkbox"/> RUSH		DATE RESULTS NEEDED		<b>6</b> The sample temperature will be measured upon receipt at the lab. By initialing this area, you request that we notify you before proceeding with analysis if the sample temperature is outside of the range of 0-16.0°C. By not initialing this area, you allow the lab to proceed with analytical testing regardless of the sample temperature.							
<b>7</b> RELINQUISHED BY (SIGNATURE) 		DATE <b>11/19/18</b>		TIME <b>1245</b>		RECEIVED BY (SIGNATURE) 		DATE <b>11/21/18</b>		TIME <b>950</b>					
RELINQUISHED BY (SIGNATURE)		DATE		TIME		RECEIVED BY (SIGNATURE)		DATE		TIME					
RELINQUISHED BY (SIGNATURE)		DATE		TIME		RECEIVED BY (SIGNATURE)		DATE		TIME					
<b>8</b> COMMENTS (FOR LAB USE ONLY) <u>collected per chain of custody</u>		SAMPLE TEMPERATURE UPON RECEIPT <u>7</u> °C		CHILL PROCESS STARTED PRIOR TO RECEIPT		SAMPLE(S) RECEIVED ON ICE		PROPER BOTTLES RECEIVED IN GOOD CONDITION		BOTTLES FILLED WITH ADEQUATE VOLUME					
RELINQUISHED BY (SIGNATURE)		DATE		TIME		RECEIVED BY (SIGNATURE)		DATE		TIME					
RELINQUISHED BY (SIGNATURE)		DATE		TIME		RECEIVED BY (SIGNATURE)		DATE		TIME					











# PDC Laboratories, Inc.

PROFESSIONAL • DEPENDABLE • COMMITTED

December 05, 2018

Jessica Goin  
ANCHOR QEA, LLC.  
6720 SW Macadam Ave, Suite 125  
Portland, OR 97219

Dear Jessica Goin:

Please find enclosed the analytical results for the sample(s) the laboratory received on **11/27/18 10:20 am** and logged in under work order **8114200**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President, John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Gail Schindler  
Project Manager  
(309) 692-9688 x1716  
gschindler@pdclab.com





**ANALYTICAL RESULTS**

**Sample:** 8114200-01  
**Name:** 2MT\_1301B\_100\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/16/18 16:30  
**Received:** 11/27/18 10:20  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	590	ug/L		12/01/18 05:58	12/03/18 10:56	JMW	SW 6020
Cobalt	< 0.013	ug/L		12/01/18 05:58	12/01/18 09:55	JMW	SW 6020
Lithium	130	ug/L		12/03/18 13:07	12/03/18 16:21	TJJ	SW 6010*
Molybdenum	0.40	ug/L		12/01/18 05:58	12/01/18 09:55	JMW	SW 6020

**Sample:** 8114200-02  
**Name:** 2MT\_1302B\_25\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/21/18 09:10  
**Received:** 11/27/18 10:20  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	1200	ug/L		12/01/18 05:58	12/03/18 11:00	JMW	SW 6020
Cobalt	< 0.013	ug/L		12/01/18 05:58	12/01/18 10:08	JMW	SW 6020
Lithium	120	ug/L		12/03/18 13:07	12/03/18 16:22	TJJ	SW 6010*
Molybdenum	0.81	ug/L		12/01/18 05:58	12/01/18 10:08	JMW	SW 6020

**Sample:** 8114200-03  
**Name:** 2MT\_1303B\_50\_t192  
**Matrix:** Ground Water - Regular Sample

**Sampled:** 11/21/18 09:15  
**Received:** 11/27/18 10:20  
**PO #:** 181668-03.01

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
<b>Soluble Metals - PIA</b>							
Boron	4400	ug/L		12/01/18 05:58	12/03/18 10:49	JMW	SW 6020
Cobalt	0.035	ug/L		12/01/18 05:58	12/01/18 10:11	JMW	SW 6020
Lithium	100	ug/L		12/03/18 13:07	12/03/18 16:24	TJJ	SW 6010*
Molybdenum	4.6	ug/L		12/01/18 05:58	12/01/18 10:11	JMW	SW 6020



**QC SAMPLE RESULTS**

Parameter	Result	Unit	Qual	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
<b><u>Batch B824782 - 6020 Sol no prep - SW 6020</u></b>									
<b>Blank (B824782-BLK1)</b>				Prepared: 12/01/18 Analyzed: 12/03/18					
Boron	< 0.25	ug/L							
Cobalt	< 0.013	ug/L							
Molybdenum	< 0.014	ug/L							
<b>LCS (B824782-BS1)</b>				Prepared: 12/01/18 Analyzed: 12/03/18					
Boron	504	ug/L		500.0		101	80-120		
Cobalt	47.5	ug/L		50.00		95	80-120		
Molybdenum	48.5	ug/L		50.00		97	80-120		
<b><u>Batch B824845 - 6010 Sol no prep - SW 6010</u></b>									
<b>Blank (B824845-BLK1)</b>				Prepared & Analyzed: 12/03/18					
Lithium	< 0.10	ug/L							
<b>LCS (B824845-BS1)</b>				Prepared & Analyzed: 12/03/18					
Lithium	495	ug/L		500.0		99	80-120		





## NOTES

Specific method revisions used for analysis are available upon request.

### Certifications

#### CHI - McHenry, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

#### PIA - Peoria, IL

TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553  
Missouri Department of Natural Resources Certificate of Approval for Microbiological Laboratory Service No. 870  
Drinking Water Certifications: Iowa (240); Kansas (E-10338); Missouri (870)  
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)  
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

#### SPIL - Springfield, IL

NELAP/NELAC accreditation through the Illinois EPA, PAS IL 100323

#### SPMO - Springfield, MO

USEPA DMR-QA Program

#### STL - St. Louis, MO

TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389  
Accreditation of Laboratories for Wastewater, Hazardous, and Solid Waste Analysis through IL EPA No. 200080  
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050  
Drinking Water Certifications: Missouri (1050)  
Missouri Department of Natural Resources

\* Not a TNI accredited analyte

Certified by: Gail Schindler, Project Manager





**PDC Laboratories, Inc.**  
 P.O. Box 9071 • Peoria, IL 61612-9071  
 (309) 692-9688 • (800) 752-6651 • FAX (309) 692-9689



## CASE NARRATIVE

**Client:** Anchor QEA, LLC Project AEP\_MOUNTAINEER

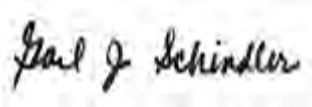
**PDC Work Orders:** 8114200

PDC Laboratories, Inc. received 3 water samples on November 27, 2018. Sample analysis was performed at our Peoria, Illinois laboratory. Samples were analyzed for dissolved boron, cobalt, lithium and molybdenum. The sample temperature upon receipt was measured at 4°C. Boron required dilutions on all samples.

Sample ID's		Date	
Field	Lab ID	Collected	Received
2MT_1301B_100_t192	8114200-01	11/16/18	11/27/18
2MT_1302B_25_t192	8114200-02	11/21/18	11/27/18
2MT_1303B_50_t192	8114200-03	11/21/18	11/27/18

### QC SUMMARY

All QC items in this QC summary report meet acceptance criteria.

CERTIFICATION	
<b>Name:</b> Gail Schindler	<b>Title:</b> Project Manager
<b>Signature:</b> 	<b>Date:</b> December 5, 2018

PDC Laboratories, Inc.  
 2231 W. Altorfer Dr  
 Peoria, IL 61615

### CHAIN OF CUSTODY RECORD

State where samples were collected \_\_\_\_\_

Phone: (800) 752-6651  
 Fax: (309) 692-9689  
 www.pdcclab.com

ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT)

<b>1</b> CLIENT <b>Anchor QEA</b>		P.O. NUMBER <b>AEP - Mountaineer</b>		PROJECT NAME <b>AEP - Mountaineer</b>		DATE SHIPPED <b>11/26/18</b>		<b>3</b> ANALYSIS REQUESTED Dissolved B, Co, Li, Mg		<b>4</b> WORK ORDER (FOR LAB USE ONLY) LOGIN #: <u>8114200-3</u> LOGGED BY: <u>[Signature]</u> PROJECT: _____ PROJ MGR: _____	
ADDRESS <b>6720 SW Macadam Ave</b>		PHONE <b>(503) 972-5019</b>		EMAIL <b>jgoin@anchorage.com</b>		MEANS SHIPPED <b>FedEx</b>		REMARKS All samples 0.45 um filtered. Please do not dilute samples without confirmation.			
CITY <b>Portland</b>		STATE <b>OR</b>		ZIP <b>97219</b>		MATRIX TYPES: WW - WASTE WATER DW - DRINKING WATER GW - GROUND WATER WWSL - SLUDGE NAS - SOLID LCHT - LEACHATE OTHER: _____					
CONTACT PERSON <b>Jessica Goin</b>		SAMPLER (PLEASE PRINT) <b>Sasha Norwood</b>		SAMPLER'S SIGNATURE <u>[Signature]</u>		MATRIX TYPE <b>GW</b>					
SAMPLE DESCRIPTION AS YOU WANT TO REPORT		DATE COLLECTED		TIME COLLECTED		MATRIX TYPE					
<b>2MT_1301B_100_t192</b>		<b>11/16/18</b>		<b>1630</b>		<b>GW</b>		<b>1</b>			
<b>2MT_1302B_25_t192</b>		<b>11/21/18</b>		<b>0910</b>		<b>GW</b>		<b>1</b>			
<b>2MT_1303B_50_t192</b>		<b>11/21/18</b>		<b>0915</b>		<b>GW</b>		<b>1</b>			
<b>5</b> TURNAROUND TIME REQUESTED (RUSH TAT IS SUBJECT TO APPROVAL AND SURCHARGE)		<input type="checkbox"/> NORMAL		<input type="checkbox"/> RUSH		DATE RESULTS NEEDED		<b>6</b> The sample temperature will be measured upon receipt at the lab. By initiating this area, you request that we notify you before proceeding with analysis if the sample temperature is outside of the range of 0-16°C. By not initiating this area, you allow the lab to proceed with analytical testing regardless of the sample temperature.			
<b>7</b> RELINQUISHED BY (SIGNATURE) <u>[Signature]</u>		DATE <b>11/26/18</b>		RECEIVED BY (SIGNATURE) <u>[Signature]</u>		DATE <b>11/27/18</b>		<b>8</b> COMMENTS (FOR LAB USE ONLY) SAMPLE TEMPERATURE UPON RECEIPT <u>4</u> °C CHILL PROCESS STARTED PRIOR TO RECEIPT SAMPLE(S) RECEIVED ON ICE PROPER BOTTLES RECEIVED IN GOOD CONDITION BOTTLES FILLED WITH ADEQUATE VOLUME SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS) DATE AND TIME TAKEN FROM SAMPLE BOTTLE			
RELINQUISHED BY (SIGNATURE)		DATE		RECEIVED BY (SIGNATURE)		DATE		SAMPLE TEMPERATURE UPON RECEIPT			
RELINQUISHED BY (SIGNATURE)		DATE		RECEIVED BY (SIGNATURE)		DATE		CHILL PROCESS STARTED PRIOR TO RECEIPT			
RELINQUISHED BY (SIGNATURE)		DATE		RECEIVED BY (SIGNATURE)		DATE		PROPER BOTTLES RECEIVED IN GOOD CONDITION			
RELINQUISHED BY (SIGNATURE)		DATE		RECEIVED BY (SIGNATURE)		DATE		BOTTLES FILLED WITH ADEQUATE VOLUME			
RELINQUISHED BY (SIGNATURE)		DATE		RECEIVED BY (SIGNATURE)		DATE		SAMPLES RECEIVED WITHIN HOLD TIME(S)			
RELINQUISHED BY (SIGNATURE)		DATE		RECEIVED BY (SIGNATURE)		DATE		(EXCLUDES TYPICAL FIELD PARAMETERS)			
RELINQUISHED BY (SIGNATURE)		DATE		RECEIVED BY (SIGNATURE)		DATE		DATE AND TIME TAKEN FROM SAMPLE BOTTLE			

## Attachment G

# Analytical Data Quality Control for Batch Tests

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## Analytical Data Quality Control for Batch Tests

The analytical data associated with this report includes re-reporting to correct for excessive dilution (elevated method detection limits), sample misidentification, and reanalysis of constituents due to inconsistent duplicate results. Each of these quality control issues with PDC Laboratories occurred for a small subset of the data.

A set of isotherm batch test samples were re-reported by PDC Laboratories due to a mismatch between the bottle label and the PDC Laboratories report sample identification. This included the Carus B media isotherm samples for the following samples: 2MT\_1301B\_25\_t192, 2MT\_1302B\_50\_t192, and 2MT\_1303B\_100\_t192.

A set of kinetic batch test samples was reanalyzed by PDC Laboratories to correct for an elevated dilution and associated elevated method detection limit for arsenic (1MT2\_802BF\_5\_t24 and 1MT1\_801BF\_10\_t24). These samples were all non-detect for arsenic at both the elevated and corrected method detection limit.

Method blanks, duplicates, and matrix spike samples were submitted in association with the batch test samples. Except as described above, no outstanding data quality assurance concerns were noted.